Polyculture of Tilapia and Seaweeds in Soft-Shell Mud Crab Ponds in Indonesia and Thailand

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Overview

- Soft shell mud crab farming
- Polyculture with tilapia
- Need to improve water quality
- Stocking of *Gracilaria*

Results

Marketing

Future efforts
Soft Shell Mud Crab Farming has been identified as an effective aqua farming industry.

It has been practiced for some time now in a number of Asian countries.

Because of its profitability there is an increasing interest to engage in this aquaculture business venture.
Soft Shell Crab Production Profile of Thailand

- Start 1987

- In 1997 Bangkok provinces Samutphakan and Samut Sakhon
  - Water depth 30-50cm
  - Stock 10-15 pieces per square meter
  - Dismember limbs and the claws
  - Mortality 50%
In 2000-2001
- Ranong province started using crab boxes
- This resulted in a decrease in mortality to 20 to 30%

In 2005
- Commercial farming increased considerably
- 756 soft shell mud crab farms
- Culture areas of 1458 hectares
- 21,000 people are involved

- The majority of soft shell mud crab farms belong to small-scale independent operators. (Info: Banchongt, 2007)
Present soft shell mud crab farming system in Thailand

- Stock crab individual crab box
- Inspect every four hours
- Feed every other day
- Exchange water every spring tide
5200 mt in 2005
### 2005 (Thai Bath)

<table>
<thead>
<tr>
<th>Market Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local market Soft Shell mud crab</td>
<td>260 mt</td>
</tr>
<tr>
<td>Export market Soft shell mud crab</td>
<td>4940 mt</td>
</tr>
<tr>
<td>Total Soft shell Crab</td>
<td>5200 mt</td>
</tr>
</tbody>
</table>

150 to 200 ton/Month in 2009 in Ranong Province alone (Info from Processing Plants in Ranong)
Exported to Countries

Sources: www.tradekey.com
www.alba.com
Recent price history of soft shell crabs in Thailand

![Prices in US $ per Kg]

- Year 2005: $8
- Year 2006: $8
- Year 2007: $7
- Year 2008: $4
- Year 2009: $8
- Year 2010: $9

Prices in US $
Soft shell crab farming in Indonesia

Started by some farmers in Aceh Besar, Aceh Timur and Kota Langsa
- Remove limbs or claw of crab to induce molting.
- This technique induces stress and increases the mortality of the crab.
- Not widely accepted among the community in ACEH, because it’s not socially acceptable (religious and welfare reasons).
Work Shop in Banda Ache


Training was undertaken at two sites: BBAP ujung Batee and Kota Langsa. The total of five (5) BBAP Ujung Batee staff, 40 farmers, 11 Dinas Kelautan, Perikanan dan Pertanian Kota Langsa, two (2) SUPM Ladong staff and one (1) JFPR staff participated in this training.
Aceh Besar 21 July 2009
Aceh-Kota Langsa 23 July 2009
Soft shell crab farming used by Thai farmers which is culture in natural system was introduced.

Detail explanation biology of the crab, design and lay out of soft shell farming in Thailand, stocking technique, inspection, feed and feedings, water management, pond preparation, processing and packing and also business planning and management.
Follow-up training was undertaken in Aceh Timur (Langsa), Aceh Utara (Samudera), Bireuen (Samalanga) and Aceh Besar (Ujung Batee) districts 8-15 May 2010.
Demonstration farm in Samudera

OISCA / JFPR have established demonstration soft-shell crab farms at Samudera (Aceh Utara), Samalanga (Bireuen) and Lamnga (Aceh Besar).
Issues for soft shell crab farming in Ache

- Production problems
- Market
- Processing
Future efforts

➢ Try to help markets for soft shell product for Achenes

➢ Provide additional post-harvest processing training for better quality and products

➢ Return visit to Indonesia in June or July this year
Polyculture with Tilapia

- Maximize the space of the pond
  - Crab occupy the surface area
  - Fish can serve as aerators

- Extra income

- Improve water quality
Why Tilapia?

- Tilapia are a popular farmed fish
- High market demand
- Able to utilize natural foods.
- Tilapia can be produced in various location, water system, temperatures and salinities.
- Fast growth rate
- Tilapia clean cages by grazing periphyton and other fouling from the boxes
General data of poly culture with tilapia in soft shell crab ponds

Farming system  - Extensive farming
Culture species  - Red and black tilapia
Water depth in the pond  - 80 - 1.2 m
Stocking size  - 30 - 100g
Sex  - Both male and female
Feed  - No feeding
Grading  - Nil
Duration of rearing  - 6-10 months
Size at harvest  - 250g – 500g
Total no of production  - No record
Technical support needed to improve commercial polyculture of soft shell mud crabs and tilapia

- Optimal salinities,
- Stocking densities,
- Feeding rates,
- Parasite infestations,
- Cost-benefits, and
- Environmental impacts of tilapia-soft shell mud crab polyculture.
Seaweed culture in Aceh Shrimp ponds

Use of Gracilaria in shrimp ponds
Decide to replicate in soft shell crab ponds in Thailand
Heavily stocked ponds containing thousands of crabs can deplete the available oxygen during neap tides with reduced tidal flow.

The seaweed culture benefits the pond environment by absorbing CO2 and ammonia produced by the crabs and gives off oxygen. The ammonia is used as nitrogen fertilizer to produce more seaweed biomass.
Economical Advantages of sea weed

- Extra income
- No Feeding
- The farming requires relatively low investment
- Not labor-intensive
Gracilaria grows naturally at the soft shell crab pond bottom
No proper method of culturing
Cages built from PVC and fish netting

- Cages were constructed in Sept 2010
- Seaweed collected and cleaned
- Cages stocked
Addition of seaweed

- Gracilaria added to ponds in cages.
- Cages facilitate management and harvest.
### Preliminary data

<table>
<thead>
<tr>
<th>Distance from cage (m)</th>
<th>Dissolved oxygen level (ppm)</th>
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<tbody>
<tr>
<td>0.1</td>
<td>5.4</td>
</tr>
<tr>
<td>0.2</td>
<td>5.3</td>
</tr>
<tr>
<td>0.5</td>
<td>4.5</td>
</tr>
<tr>
<td>1.0</td>
<td>4.4</td>
</tr>
<tr>
<td>2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>3.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>
Seaweed growing quickly

- Start with four cages
- After 5 months, additional 25 cages are stocked
Survival rate and growth

- No hard data yet, slow time during Oct – Feb months
- But appears that water quality is improved
- Hope that crab survival will be higher during upcoming growth cycle
Issues for polyculture of sea weed in soft shell mud crab pond

➢ Production problems
  ▪ Stocking density
  ▪ Lack of knowledge in culture species
  ▪ Cause and effect of poly culture with soft shell crabs
  Possible Solution: Need more applied research

➢ Market
  ▪ Low market prices
  ▪ Consumer lack of knowledge in species
  - Need more market support and media attention health benefit of seaweed

➢ Processing
  ▪ Drying method is still not well know
  ▪ Method of maintaining fresh sea weed
  - Support applied research
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