IMPLEMENTATION OF SUSTAINABLE AQUACULTURE AS A MODEL OF SATO UMI TO IMPROVE PRODUCTIVITY WITHIN COASTAL AREA OF INDONESIA

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OUTLINE

1. Background
2. Global and National Issue
3. Sato Umi Concept and National Program of Fisheries Techno Park Development
4. Implementation Strategies
   4.1. Experimental Practice and collaboration research
   4.2. Workshop and Training
   4.3. Dissemination to the various stackholders
5. Conclusion Remarks
6. Acknowledgement
BACKGROUND
### Indonesian Marine Resources Statistics

<table>
<thead>
<tr>
<th>Area Statistics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marine area</td>
<td>2,915,000 km²</td>
</tr>
<tr>
<td>Shelf area</td>
<td>1,847,700 km²</td>
</tr>
<tr>
<td>Coastline</td>
<td>95,181 km</td>
</tr>
<tr>
<td>Land area</td>
<td>1,826,440 km²</td>
</tr>
<tr>
<td>Reef area</td>
<td>51,020 km²</td>
</tr>
<tr>
<td>Mangrove area</td>
<td>42,550 km²</td>
</tr>
<tr>
<td>Reefs At Risk</td>
<td>82 %</td>
</tr>
</tbody>
</table>

### Socioeconomic Statistics

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>250,000,000 (BKKBN, 2013)</td>
</tr>
<tr>
<td>Coastal Population</td>
<td>96 %</td>
</tr>
<tr>
<td>Fish consumption</td>
<td>31.64 Kg/capita (Ditjen P2HP, 2011)</td>
</tr>
</tbody>
</table>

- Indonesia, the world’s largest archipelago: 18,000 islands, 17,000 islands with 6000 inhabited
- Covering both the Indian and Pacific Oceans, Andaman, Java, South China, Sulawesi, Banda and Arafura Seas
- Ornamental Fish: 253 species
- Coral: 400 species (57% of the world)

Space Utilization of Fisheries, Coastal and Marine Resources

Marine Resources

Sport and Commercial Fishing
- Marine Fisheries Resources
  - Pelagic Fish (Tuna, Skipjact, Etc)
  - Demersal Fish: Shrimp, Sea bream, etc.
  - Coral Fish: Grouper, etc

Commercial and Tourism Aquaculture

Coastal Fisheries Resources
- Breackishwater: Shrimp, Tilapia, Milk Fish, Seaweed
- Swamp area: Snakhead, Sand gobi

Breakishwater Aquaculture and Swamp

Coastal Resources

Breakishwater Aquaculture and Fishing
- Carp, Tilapia, Gourame, Cat fish

Freshwater Resources
- Pond, Lake, Reservoir
GLOBAL AND NATIONAL ISSUES
GLOBAL AND NATIONAL ISSUES

Global Warming
- Climate Change
  - Rapid Industrial Growth
  - Environmental Degradation
    - Excessive of Natural Resources Exploitation
    - Declining Carrying Capacity and Production
  - Food demand increment
  - Food Shortage
    - Adaptive Technology for Climate Change and the Environment
    - Improvement of Production and Food Sufficiency
  - Population Growth

Badan Pengkajian dan Penerapan Teknologi
Creating new strain of fish adaptive to the environment change: Saline Tilapia

Application Technology of the “INTEGRATED MULTI-TROPHIC AQUACULTURE (IMTA)”

Enrichment biodiversity (product diversification)

Mangrove reforestation

Coastal Restoration

Dissemination and publication

Productivity of the brackishwater ➔ LOW (Decrease)

Monokulture of Shrimp

SATO UMI CONCEPT AND NATIONAL PROGRAM OF FISHERIES TECHNO PARK DEVELOPMENT
The concept of management and utilization of fishery resources in the coastal area by involving the community actively to:

- Increase the productivity of fishery resources and sustainable fisheries production in coastal areas;

- Maintain the productivity of fisheries resources in a balanced and harmonious with the potential resources.

- Improve the welfare of coastal communities through the development and optimum utilization of fishery resources by increasing the diversity of aquaculture commodities and various processed fishery products.
PROFILE OF FISHERIES RESOURCES AND COASTAL MANAGEMENT ON THE BASE SATO UMI CONCEPT
SATO UMI CONCEPT AND NATIONAL PROGRAM OF FISHERIES TECHNO PARK DEVELOPMENT

SATO UMI

- Harmonization Nature and Human with mutualism symbiosis spirit
- Stabilization of the environment and the availability of the natural resources
- Encouraging high productivities and biodiversities ecosystem
- Sustainable utilization of the natural resources in the coastal area.
- Stabilization and sustainability of the human welfare

TECHNO PARK

- To create a permanent link between universities (academia), industry / business / financial, and government resulting in clustering and critical mass of researchers and companies.
- Strengthening the company performance.
- To combine ideas, innovation, and know-how from the academic world and the financial ability (and marketing) of the business world.
- To improve and speed up product development and reduce the time required to move innovations into marketable products, to obtain a high economic return.

- Improving
  - Environment
  - Natural Resources
  - Product Variance
  - New Economic Growth Center
  - Improving the welfare of coastal community,

Harmonization, Sustainability, innovation, Productivity, Effectivity, Optimization, Education
IMPLEMENTATION STRATEGIES

- Experimental practice and collaboration research
- Workshop and training
- Dissemination to the various stack holders
IMPLEMENTATION STRATEGY

Problem Identification and Experimental Research

Research and Development Agenda
International, National, Regional, Local

Dissemination Strategies

Workshop/Seminar/Symposium/Conference
Training and Education
Government Officer and Farm Societies, R & D Institute and Universities
Demonstration Plot Development at Some Regions
EXPERIMENTAL RESEARCH

Biorecycle System on Integrated Multi Tropic Aquaculture

Sea Weed
Oyster
Fish
Shrimp
Karawang West Java

Control
Control-1
Control-2
Control-3

P-1
P-2
P-3
P-4

Tilapia Shrimp Seaweed P.1
Tilapia Shrimp Seaweed P.2
Tilapia Shrimp Seaweed P.3
Tilapia Shrimp Seaweed P.4

Other Aquatic Organisms
Aquatic Vegetation
Phytoplankton
Zooplankton
Aquatic Insects

DIN (ppm)  DIP (ppm)

<table>
<thead>
<tr>
<th>Concentration (ppm)</th>
<th>P-1</th>
<th>P-2</th>
<th>P-3</th>
<th>P-4</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.51</td>
<td>3.19</td>
<td>2.93</td>
<td>2.18</td>
<td>2.31</td>
<td></td>
</tr>
<tr>
<td>0.13</td>
<td>0.11</td>
<td>0.10</td>
<td>0.07</td>
<td>0.08</td>
<td></td>
</tr>
</tbody>
</table>

Brackishwater pond model

Shrimp
Fish
Seaweed
Green muscle

Biomass (kg)

<table>
<thead>
<tr>
<th>Biomass (kg)</th>
<th>P-1</th>
<th>P-2</th>
<th>P-3</th>
<th>P-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.3</td>
<td>1529</td>
<td>8.7</td>
<td>1521</td>
<td>6.1</td>
</tr>
<tr>
<td>337.2</td>
<td></td>
<td></td>
<td>467.4</td>
<td></td>
</tr>
<tr>
<td>1250</td>
<td>24.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Brackishwater pond model
Diversity Product of GAPURA

Bio recycle System and Zero Emmission

Production Technology of Saline Tilapia (Breeding and Genetic Improvement)

Tilapia

Eel

Black Tiger Shrimp

Sea Weed/Gracilaria

Softcell Crab

Green Muscle

Kolam udang, ikan nila, dan rumput laut

Kolam udang, ikan nila, dan rumput laut

Penimbangan rumput laut
Expansion Program

1. Karawang
2. Riau
3. Anambas
4. Bantaeng
5. Tual
IMPLEMENTATION AT PEKALONGAN
Sylvo Fishery, Shrimp, Tilapia Farm and IMTA-Pekalongan
2014
IMPLEMENTATION AT BANTAENG FISH AND SEED FARMING
Biorecycle System on Integrated Multi Tropic Aquaculture
WORKSHOP IN JAKARTA 2013
DISSEMINATION AT KARAWANG 2013
WORKSHOP AT PEKALONGAN 2014
TRAINING WATER QUALITY MANAGEMENT FOR SATO UMI KARAWANG 2014
DISSEMINATION AND TRAINING PROGRAM 2015
BANTAENG-SOUTH SULAWESI
CONCLUSION REMARK

- The sustainable model of aquaculture by applying Sato Umi concept has been applied and expanded within coastal area of Indonesia from the center of first experiment in the northern coastal area of west Java to central Java (western Indonesia) and Bantaeng in the South Sulawesi of central Indonesia. The similar program has also been proposed for Maluku Province in the eastern part of Indonesia.

- In the near future, the sustainable model of aquaculture hopefully can be applied in the Techno Parks which is developed by government and can be expanded to whole coastal area of Indonesia to stimulate and accelerate the economical growth and human well being within the Indonesian region.

- International symposium or conference of Sato Umi hopefully can be held in Indonesia to promote Sato Umi Concept to various stake holders and exchange scientific and technology of the sustainable coastal and fisheries management.
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- Aquaculture Business Center-Karawang, Ministry of Fisheries and Marine Affair
- Dept. of Agriculture, Animal Husbandry and Marine Affair of Central Java
- Dept. of Fisheries and Marine Affair of Bantaeng-South Sulawesi

PICES : North Pacific Marine Science Organization

International EMECS Center

JSPS A Core Program
THANK YOU

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