SATO UMI CONCEPT AND SUSTAINABLE AQUACULTURE IMPLEMENTATION IN THE COASTAL AREA OF INDONESIA

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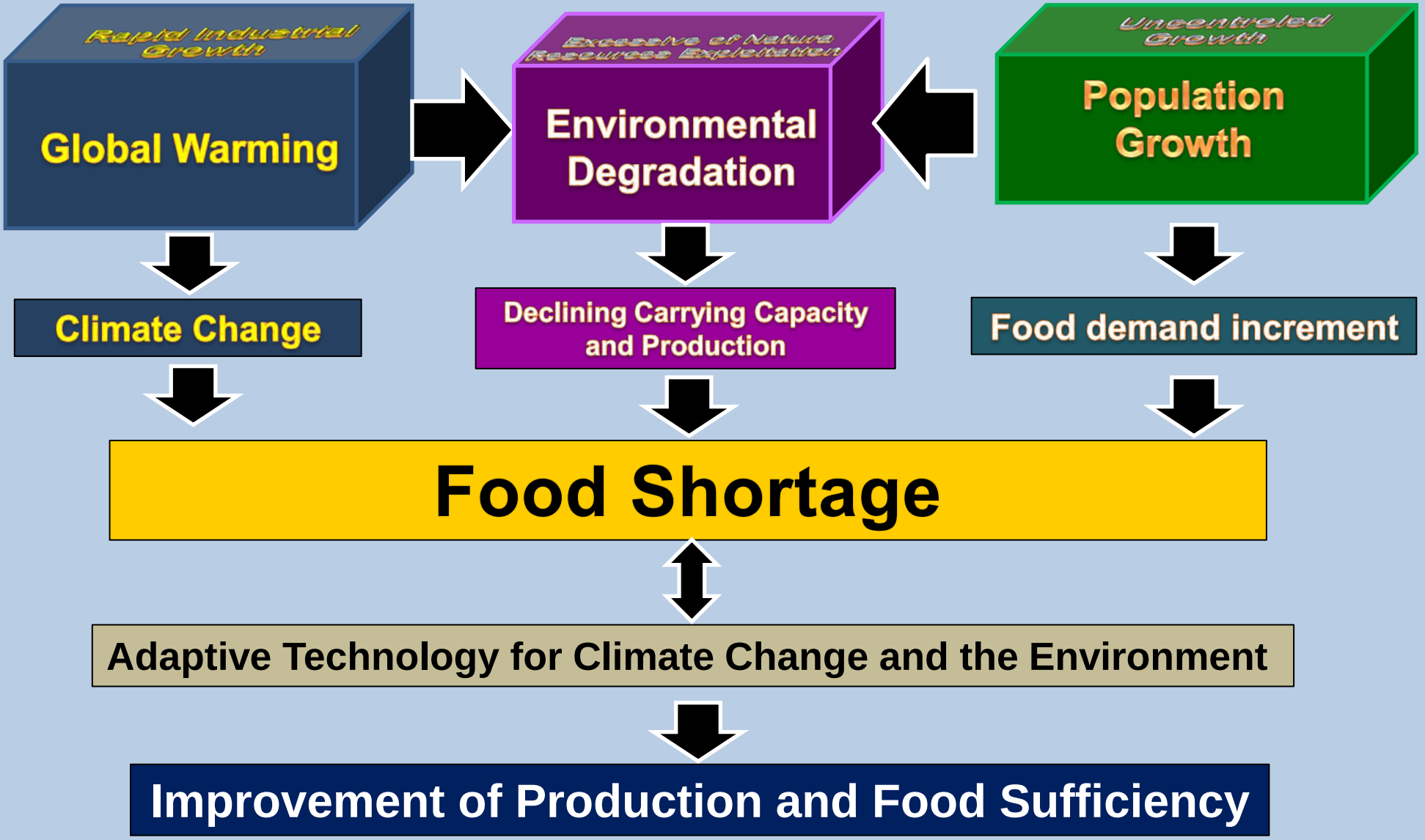
GLOBAL AND NATIONAL ISSUES BACKGROUND

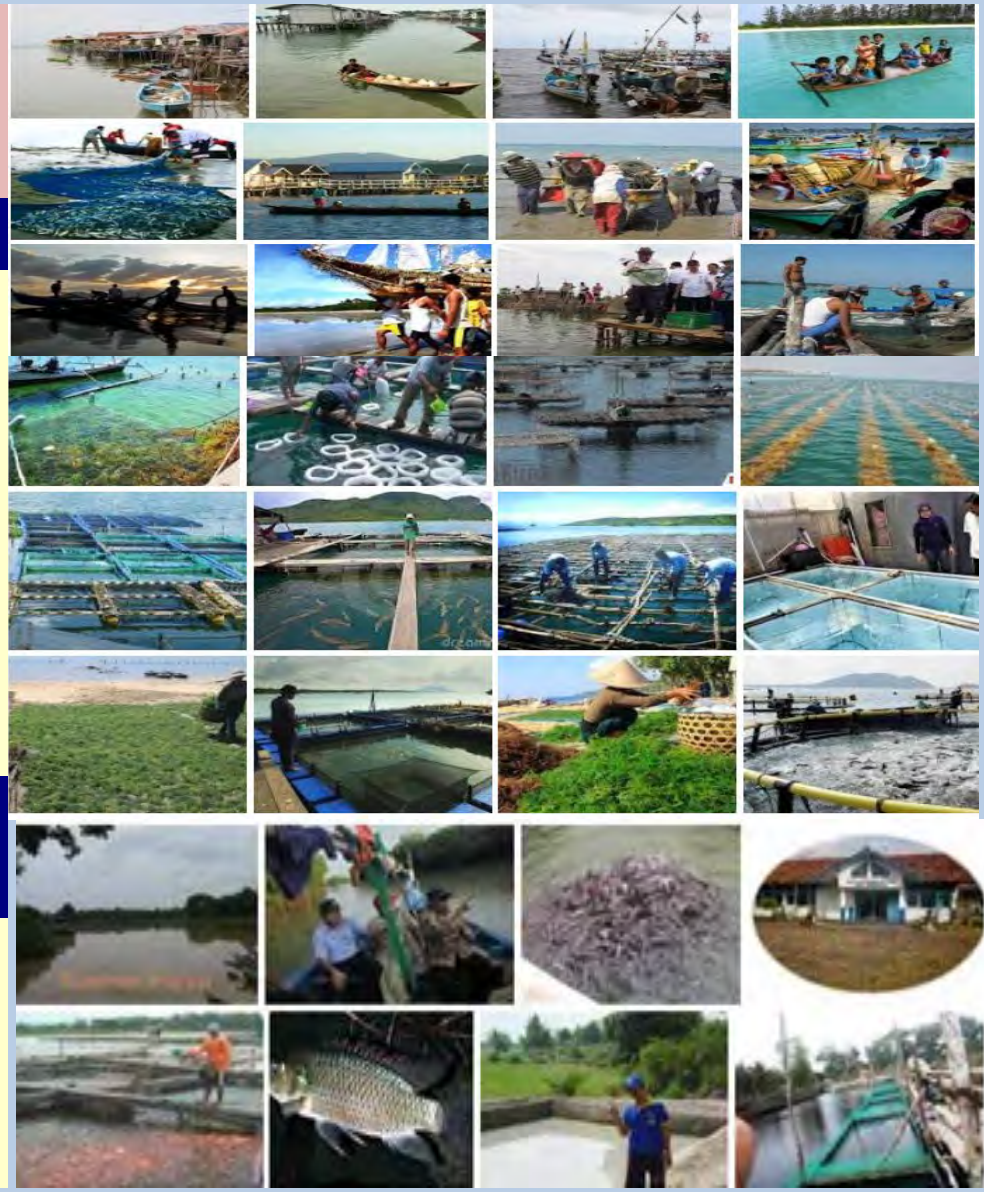


INDONESIAN MARINE RESOURCES AND POPULATIOM STATISTICS

Indonesia, the world's largest archipelago :
- **18,000 islands,**
- **17,000 islands with 6000 inhabited**

Area Statistics	Value	
Marine area	3.257.483	km²
Coastline	95,181	km
Marine aquaculture area	12 million	hectares
Brackishwater Area	2,963,717	hectares
Mangrove area	42,550	km²

Socioeconomic Statistics	Value	
Population	250,000,000 (BKKBN, 2013)	
Coastal Population	96	%



BRACKISHWATER AND MARINE AQUACULTURE STATUS

Indonesian Brackish Water Pond Area : 2.9 M Ha (the utilization : 22.2 %)

- **Productivity of brackishwater pond : LOW (Decrease) from 4 ton to 1 ton/ha (Monokulture of Shrimp) after 1980**
- **Marine aquaculture area 12 million hectares (Utilize : 2.69%)**

High Natural Resources Exploitation → **Environment Degradation** ← **Shrimp Culture Intensification**

↓

Decreasing Carrying Capacity and Productivity

↓

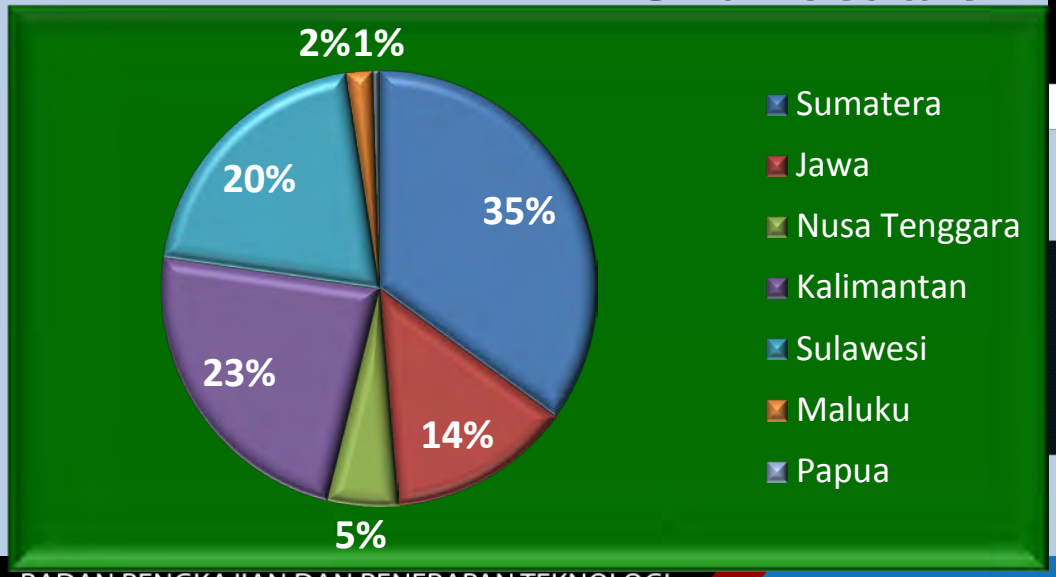
Development of technology adaptive to the environment change for improving productivity and sustainable utilization of the brackish water pond in the coastal area

↓

- ✓ **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**

MAP OF INDONESIAN AQUACULTURE AREA

● Freshwater ● Brackishwater ● Marine Culture



Space Utilization of Fisheries, Coastal and Marine Resources

Sport and Commercial Fishing

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

Commecial and Tourism Aquaculture

Freshwater Resources
Pond, Lake, Reservoir

Breackishwater Aquaculture and Fishing

Carp, Tilapia, Gourame , Cat fish

Coastal Fisheries Resources

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

Breackishwater Aquaculture and Swamp

The Degradation of Mangrove Forest in Indonesia

Impact of :
Land conversion into **brackiswater pond**, housing, industrial estate, firewood, sand mining, etc.

- Indonesia
  Year 1982 : 5.209.543 ha ⇨ Year 1992 : 2.496.185 ha (52.08% loss)

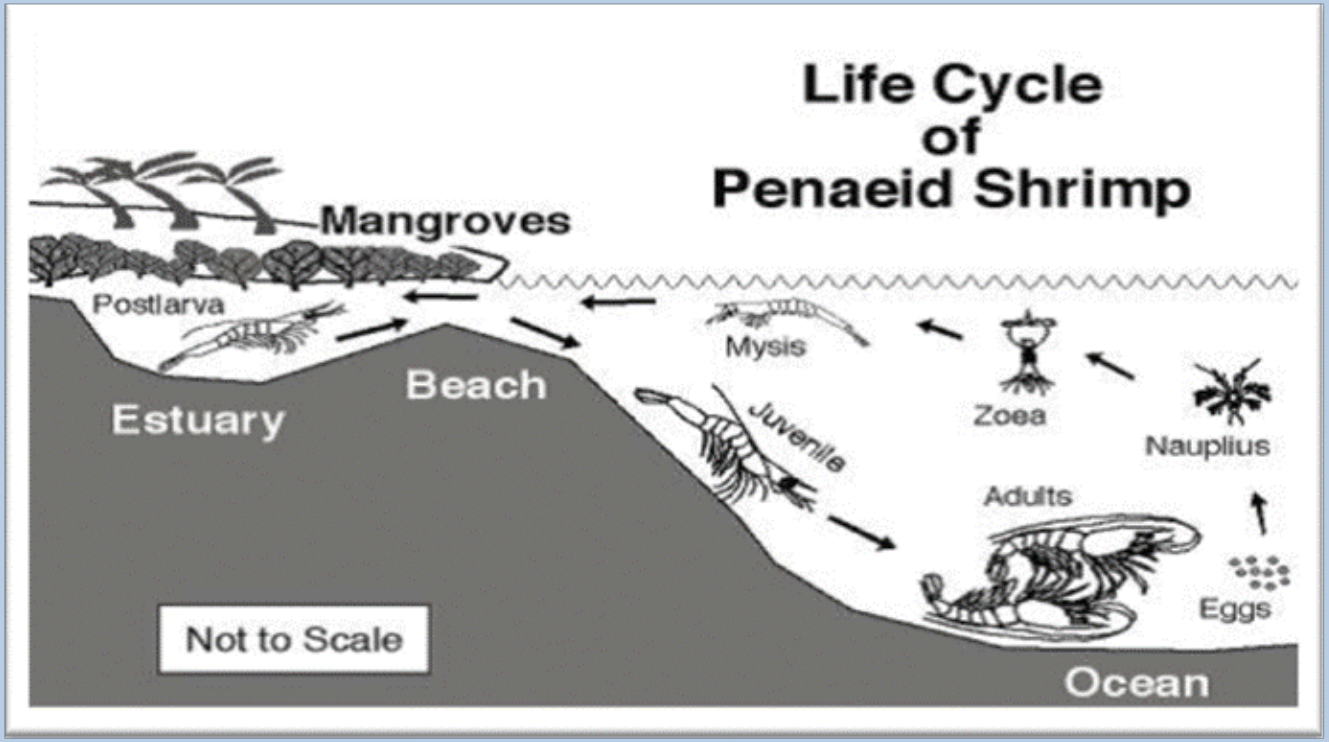
- Java
  Year 1985 : loss 70 %

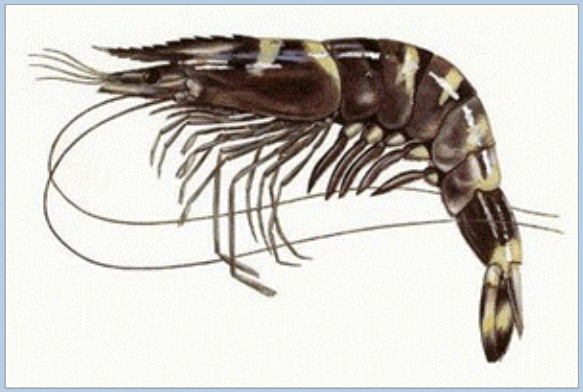


- Sulawesi :
  Year 1965 : 110.000 ha ⇨ Year 1985 : 30.000 ha (72.7 % loss)

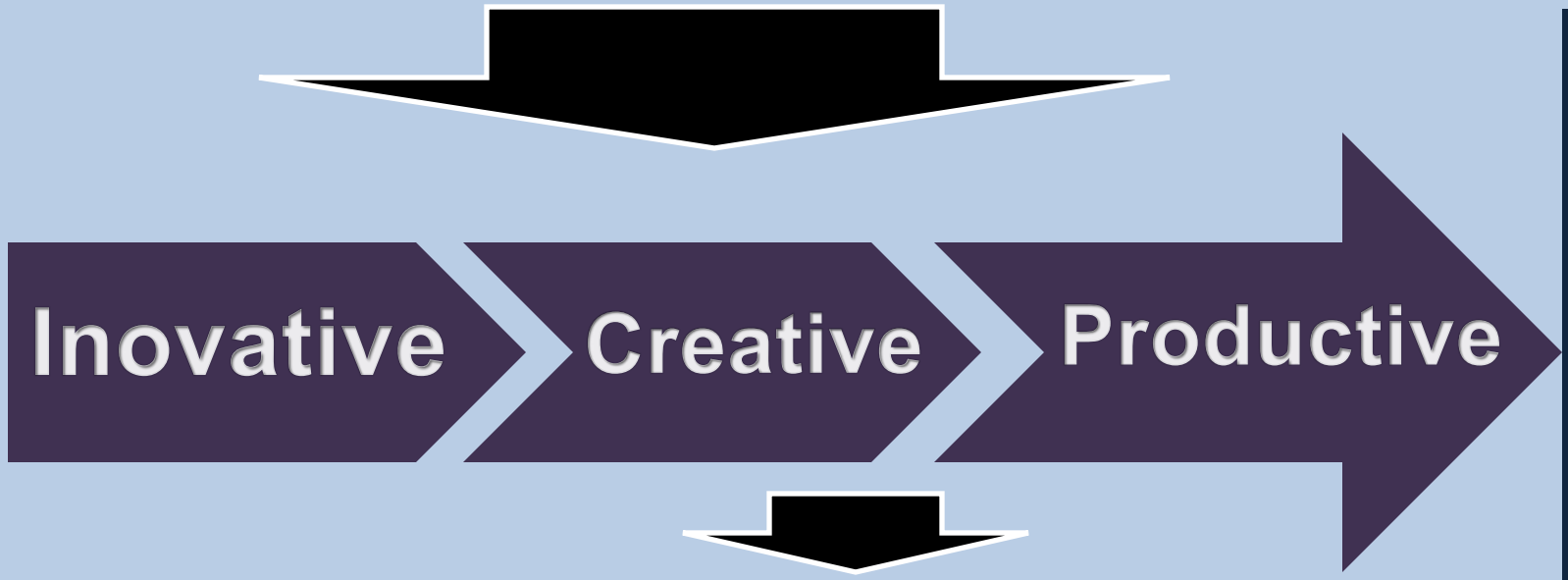
Negative Impact on :
Fisheries Resources Restocking,
Diversity Degradation
Environmental Degradation
Erosion, Pollution,


MANGROVE ROLE ON THE ENHANCEMENT OF FISHERIES RESOURCES

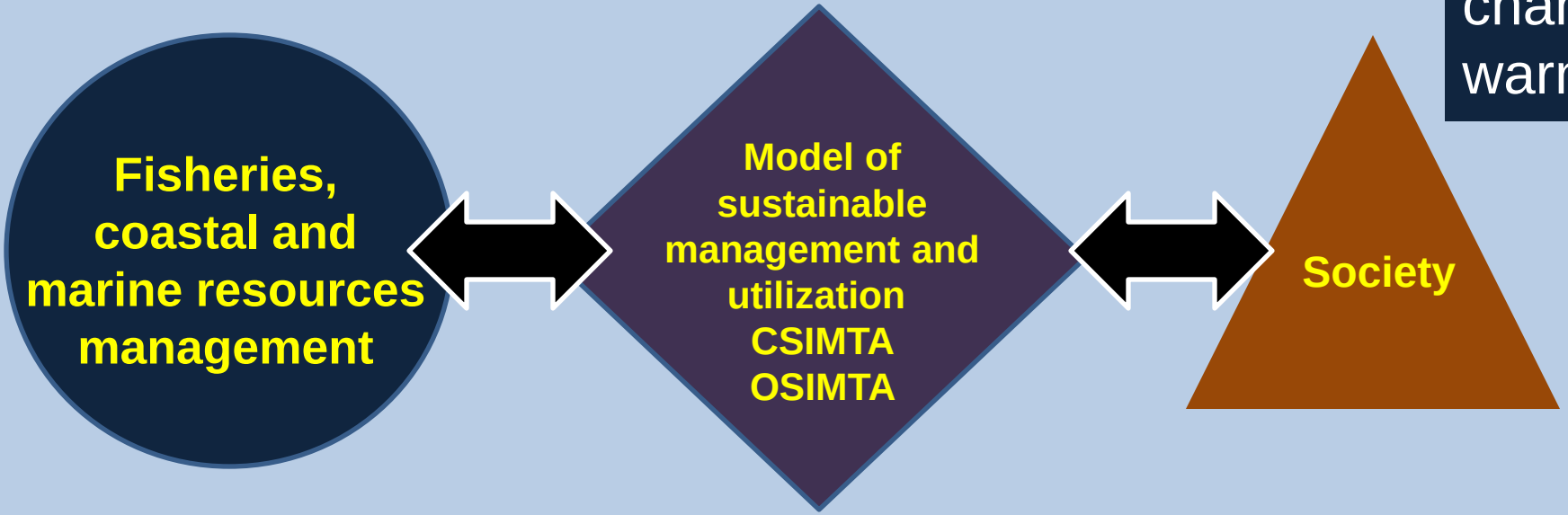




Technology Inovation



Technology and **Fisheries Product** Adaptive to the environment and climate change, global warming



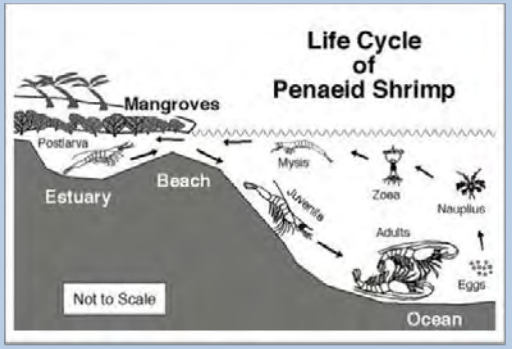
UNDERSTANDING SATO UMI CONCEPT

What and How is Sato Umi Concept :

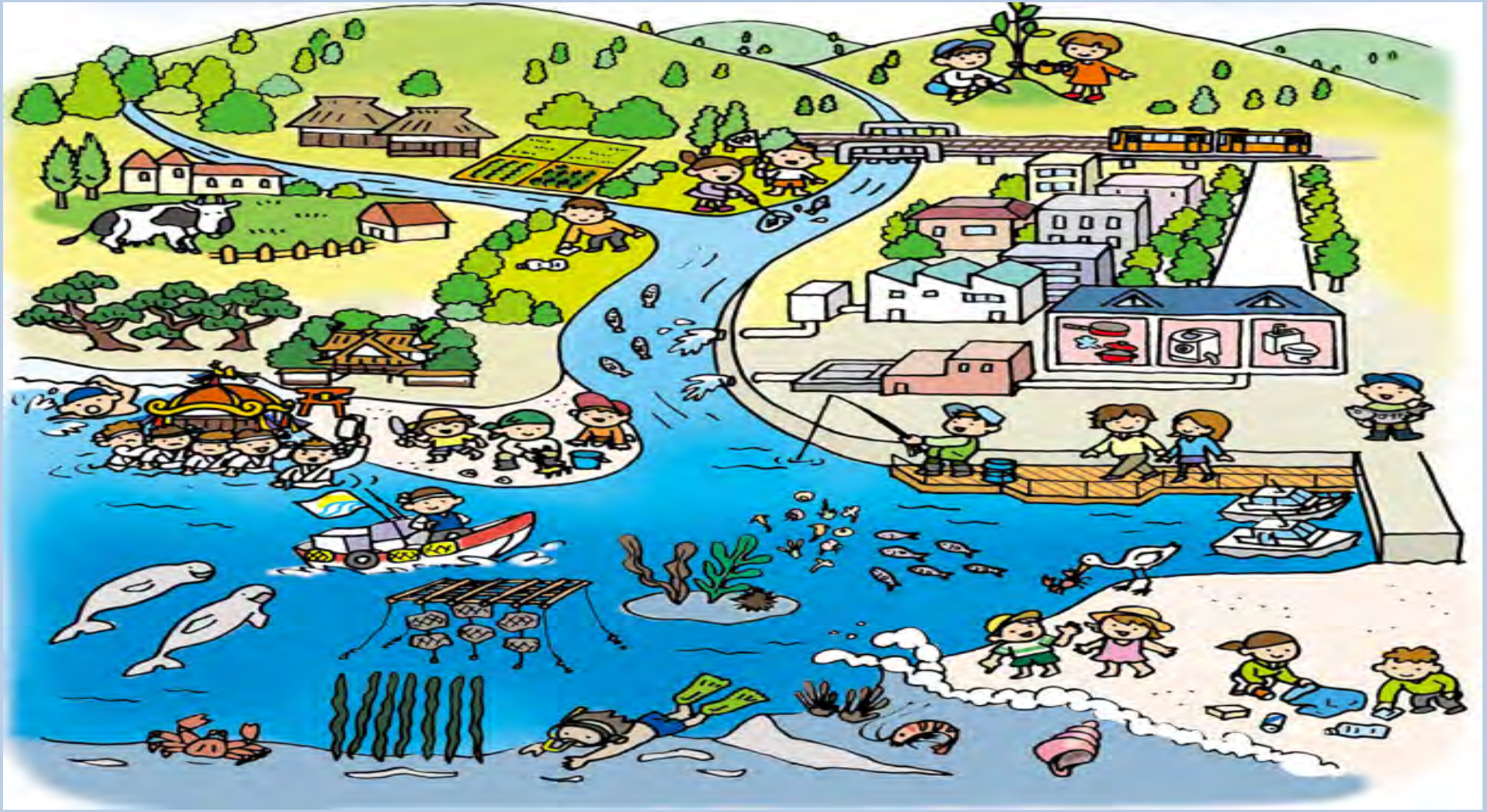
The concept of management and utilization of fishery resources in the coastal area by involving the community actively to:

- ❑ Increasing 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

Material cycling in the coastal sea



PROFILE OF FISHERIES RESOURCES AND COASTAL MANAGEMENT ON THE BASE SATO UMI CONCEPT



SATO UMI AND LOCAL COASTAL MANAGEMENT POLICY OF WEST JAVA GOVERNMENT

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

Harmonization, Stabilization, Rehabilitation, Restoration, Reforestation, Adaptation, Education

Improving

Environment
Natural Resources
Product Variance
Coastal Communities

Gempita-SPL/SFiCom-Gapura

Sustainable Utilization of Fisheries, Coastal and Marine Resources for the Society- Movement Action Program for Northern Coastal Area of West Java

- Coastal environment and natural resources degraded due to the rapid deforestation of mangrove and high exploitation of the land utilization by intensified shrimp culture.
- Low productivity and biodiversity
- Decreasing of the land carrying capacities and multi variance of fish diseases
- Human poorness and limited field work

Illustration of GAPURA Action and Environmental Situation

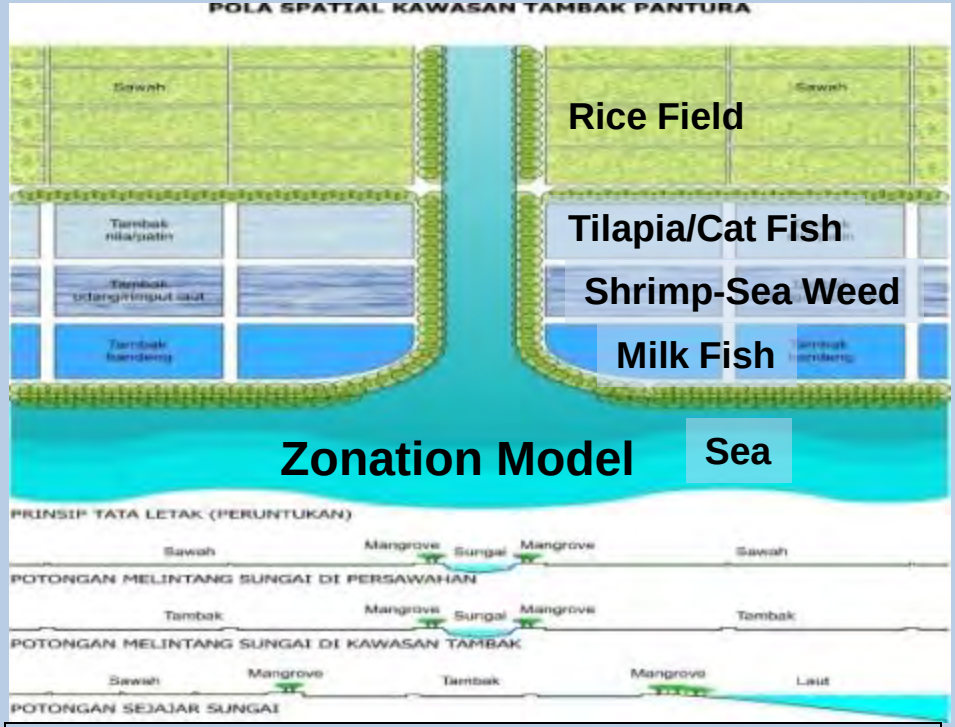


Illustration model of the revitalization effort of the brackish water pond area through the mangrove ecosystem rehabilitation, development of the aquaculture technology and introducing the primary commodities of the fisheries product : Shrimp, Milk Fish, Tilapia, Seaweed and oysters.

Tilapia

Shrimp

Gracilaria

Green Muscle

OBJECTIVE AND TARGET OF GAPURA

Objective :

- ✓ Increasing field work to improve the community welfare in the northern coastal area of West Java
- ✓ Accelerate rehabilitation of the coastal ecosystem
- ✓ Improving infrastructure facilities in the coastal area
- ✓ Increasing the diversity product of fisheries, added value and their competitiveness.

Target :

- ➢ Increasing business activities, field opportunity, fisherman and farmer income through optimalization of the brackish water pond utilization (36.000 Ha)
- ➢ Rehabilitation of coastal ecosystem through reforestation of the mangrove area with 1.500.000 of trees, 150 units artificial reef and 175 units fish shelter
- ➢ Infrastructure development and rehabilitation of the production centre area through improving 180 km of the road and irrigation, 300 units housing complex, 15.km erosion - abrasion protector and 30 units of fish landing and fishing harbor
- ➢ Increasing production and productivity of fisheries commodities : Shrimp/Prawn 45.000 ton, Milk fish 21.000 ton, Seaweed 354.000 ton, Tilapia 96.000 ton and Green Muscle 14.400 ton

Source : Department of Fisheries and Marine Affair of West Java Province

APPROACHING OF GAPURA ACTION

1. ***To Improve Business System of Fisheries*** , Improving structure and business linked of the production input subsystem, aquaculture business, post harvest, marketing and the others business supporting system i.e. financial support institution.
2. ***Environmental Rehabilitation***, Harmonization of the nature and human activities
3. ***Institutional Approach*** , Involving individual, organization and economic institution in relation of the input and output production including financial and capital institution, social economic, regulation and public awareness.
4. ***Involving of Local Wisdom***. Accommodation and development of local wisdoms to harmonize various innovation in implementation GAPURA program to the society and community of the coastal area.
5. ***Welfare Approach***, The GAPURA program should have orientation to improve the society welfare to expanding their income.
6. ***Regional Approach***, Implementation program of GAPURA should be oriented to stimulate the regional growth through the development of the primary commodity of fisheries and optimalize land utilization.

These approaches are aimed to set up and build a business system in aquaculture, increasing the competitiveness and developing sustainable utilization of the brackish water pond in the coastal area

Source : Department of Fisheries and Marine Affair of West Java Province

SATO UMI AND NATIONAL PROGRAM OF 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

Harmonization, Sustainability, innovation, Productivity, Effectivity, Optimation Education

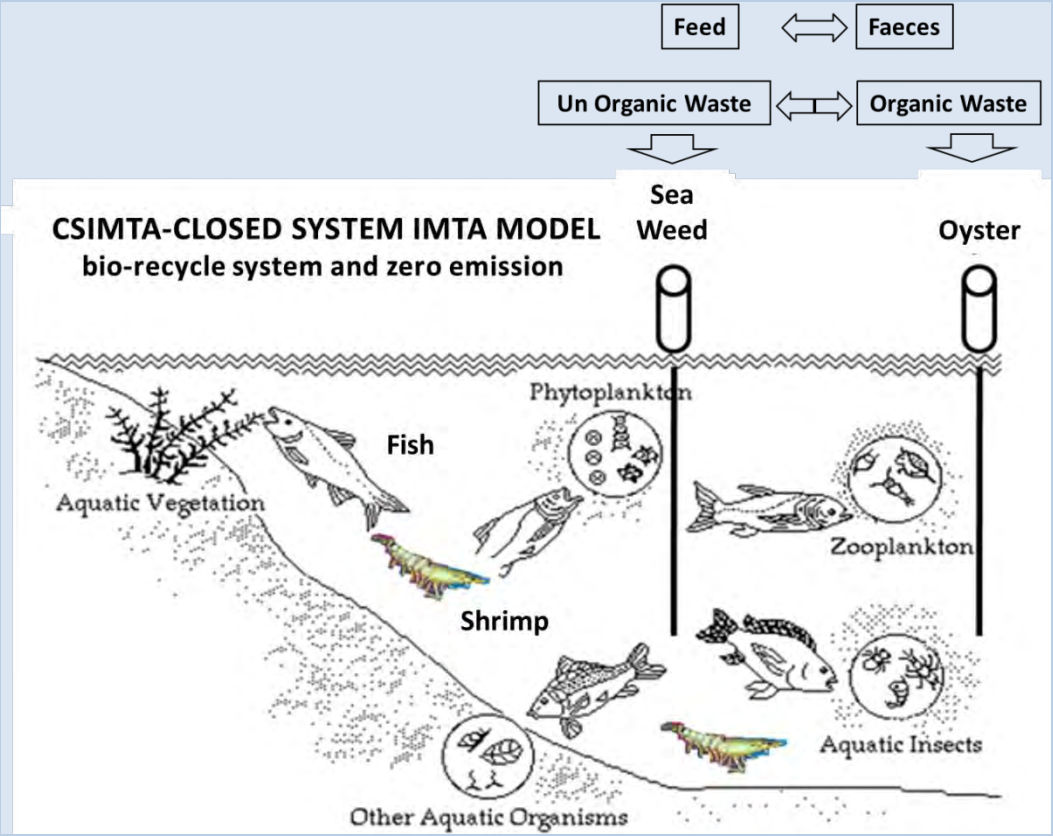
Improving

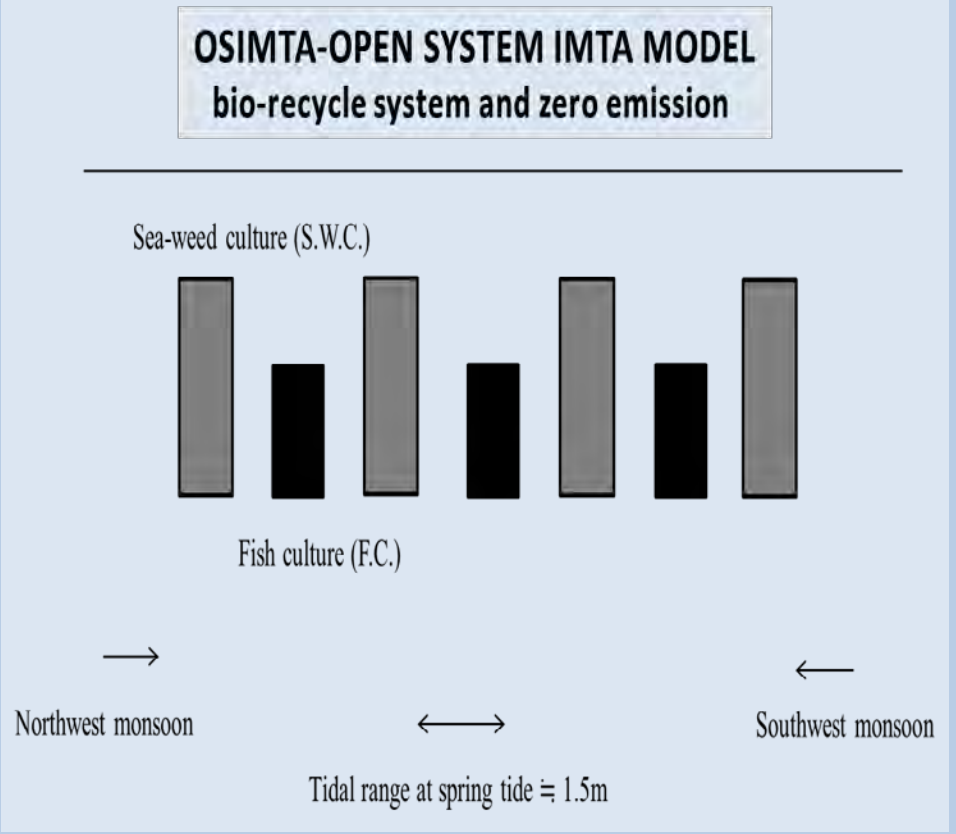
- Environment
- Natural Resources
- Product Variance
- New Economic Growth Center
- improving the welfare of coastal community,

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.

Development of Sato Umi Sustainable Aquaculture Model

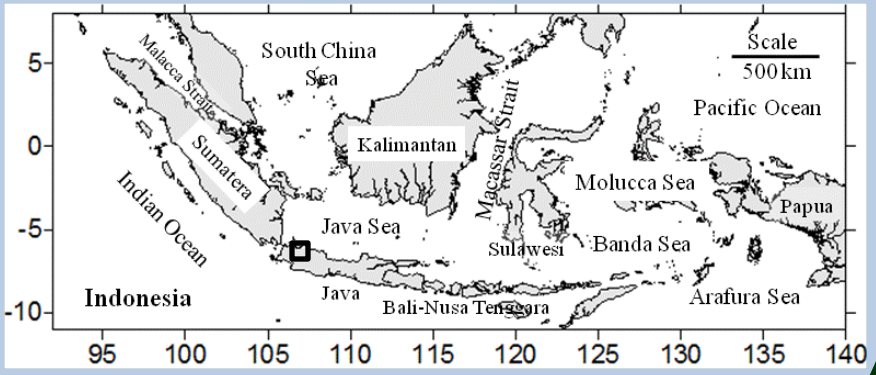


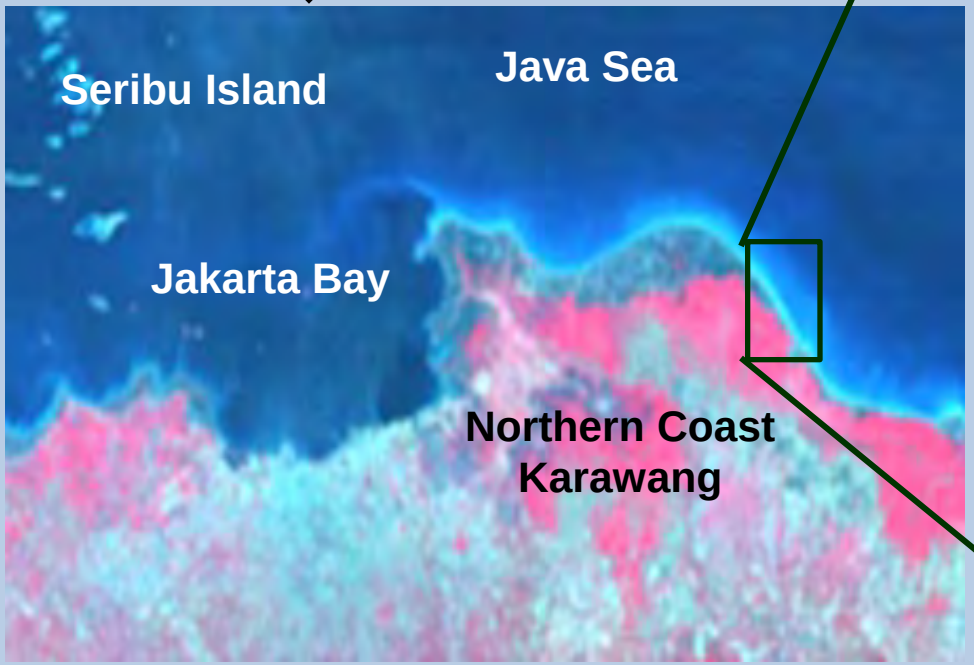


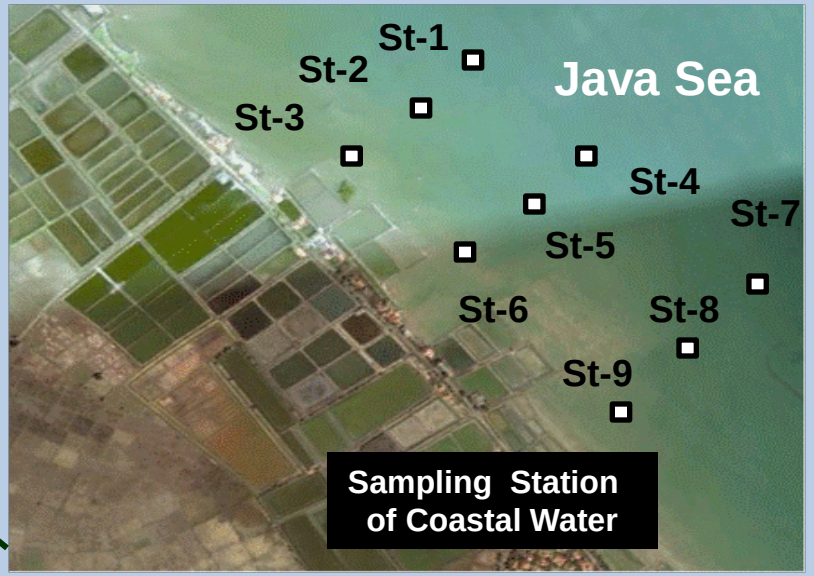
Brackishwater Aquaculture

Onshore Marine Aquaculture

SITE LOCATION- CLOSED SYSTEM IMTA







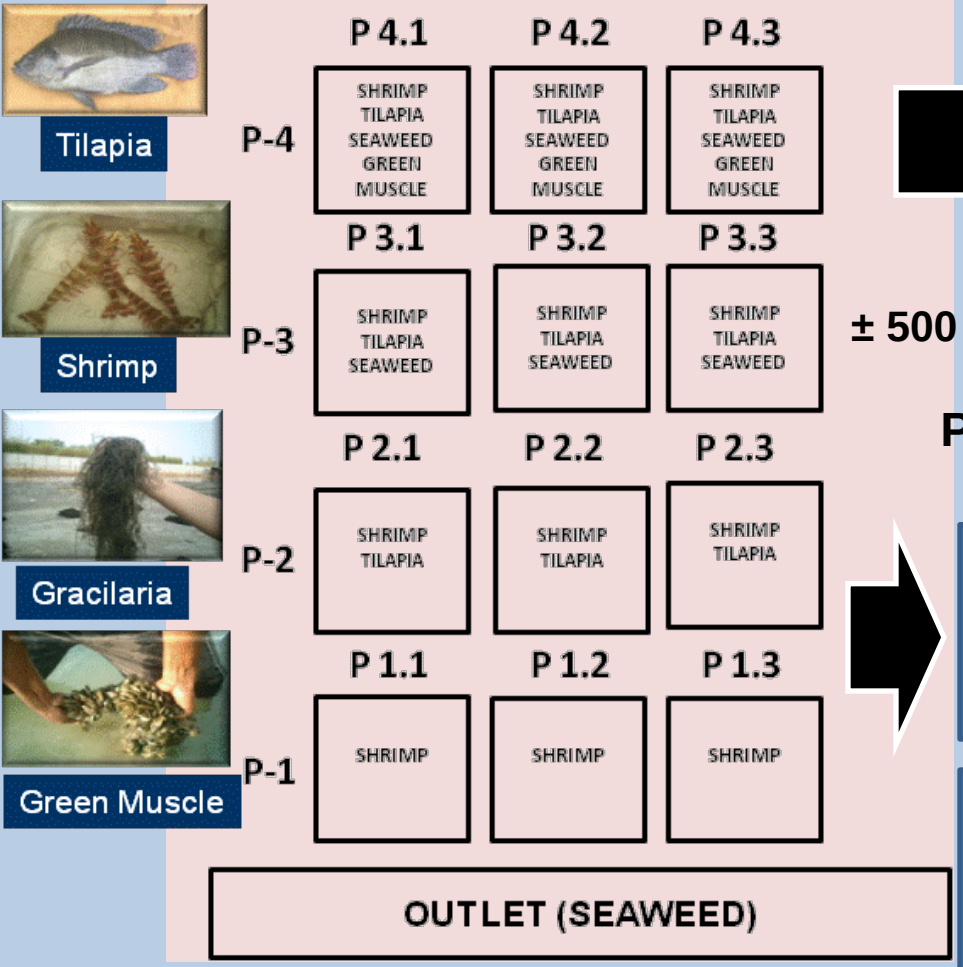
Water Quality Sampling and Analysis of Brackishwater Pond and Coastal Water of Northern Coast of Karawang

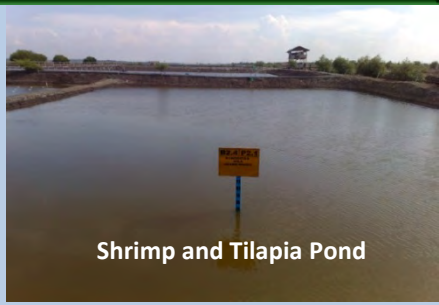







EXPERIMENTAL DESIGN
INTEGRATED MULTI-TROPIC AQUACULTURE (IMTA) : Bio-recyling-System





Prototype IMTA

TILAPIA
SHRIMP

TILAPIA
SHRIMP
SEAWEED
GREEN
MUSCLE

PHYSICAL-CHEMICAL Water Quality Profile of the Treated Breackishwater Pond

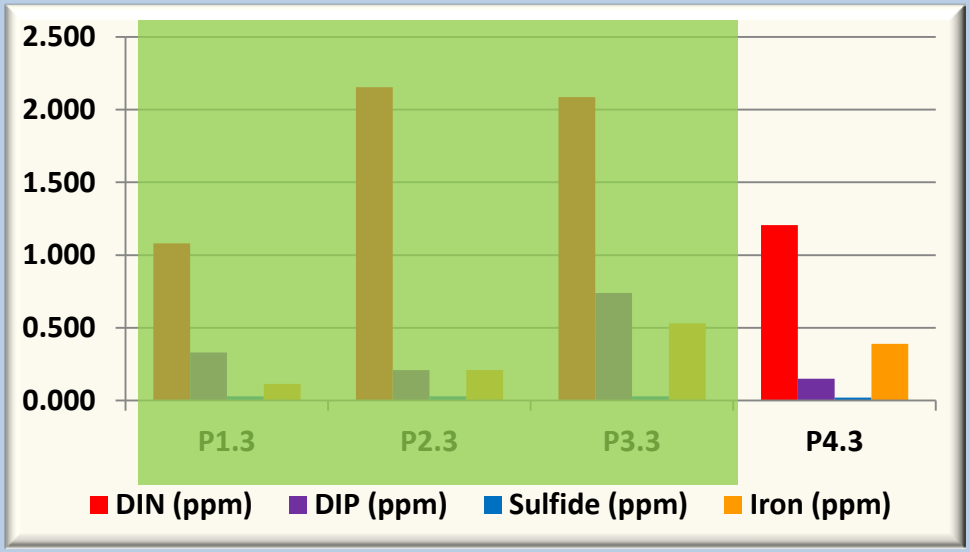
Physical

Treatment	Temp (o C)	Salinity (ppt)	pH	DO (ppm)	Turbidity (NTU)	TSS (mg/l)	BOD_5 (mg/l)
P-1	30.81	24.94	7.92	6.02	121.83	36.5	1.66
P-2	30.77	23.11	7.87	6.16	127.46	22.33	0.71
P-3	30.92	22.48	7.90	6.43	157.08	22.83	0.24
P-4	30.94	22.91	7.91	6.47	177.67	18	1.18

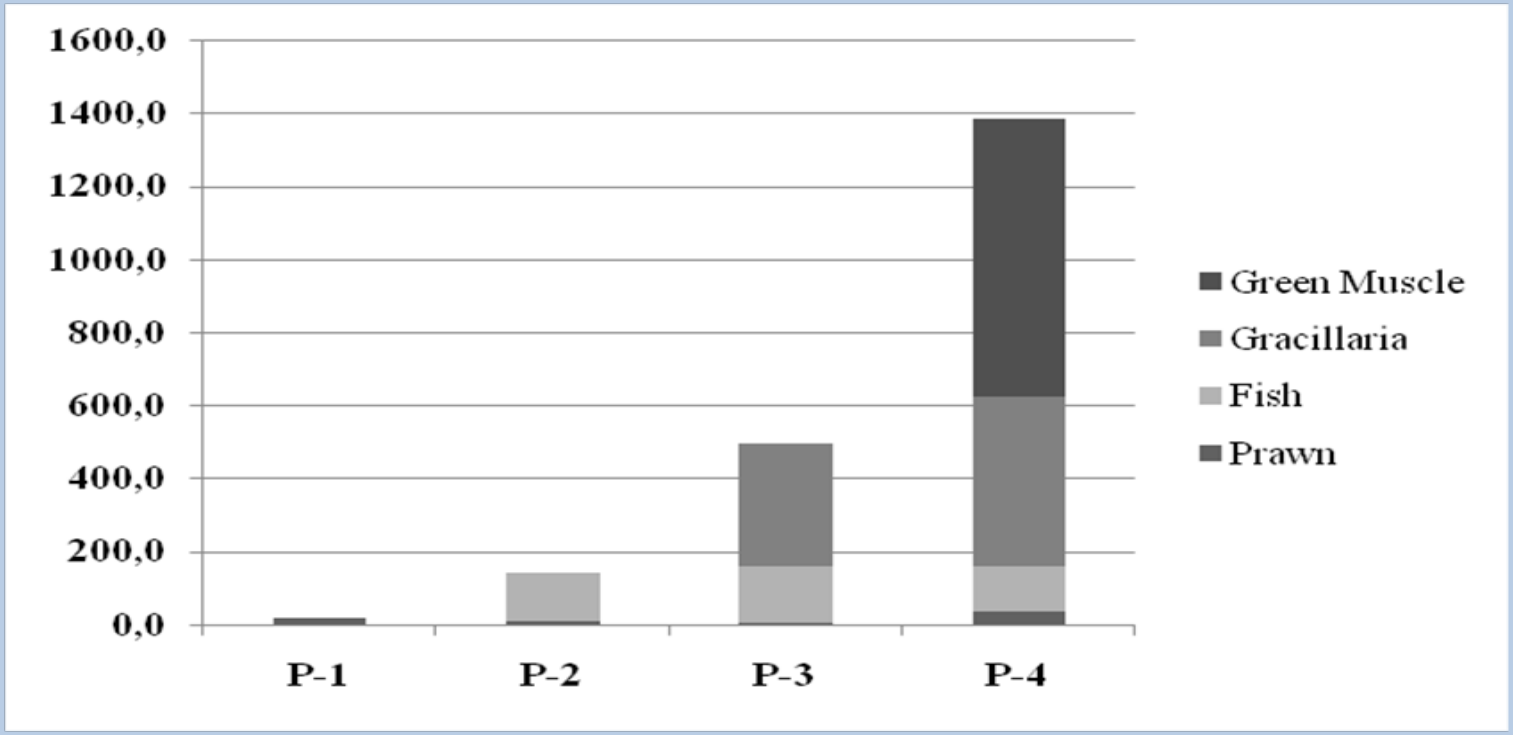



Chemical

Treatment	DIN (ppm)	DIP (ppm)	Sulfide (ppm)	Iron (ppm)
P1.3	1.081	0.33	0.03	0.12
P2.3	2.154	0.21	0.03	0.21
P3.3	2.086	0.74	0.03	0.53
P4.3	1.207	0.15	0.02	0.39

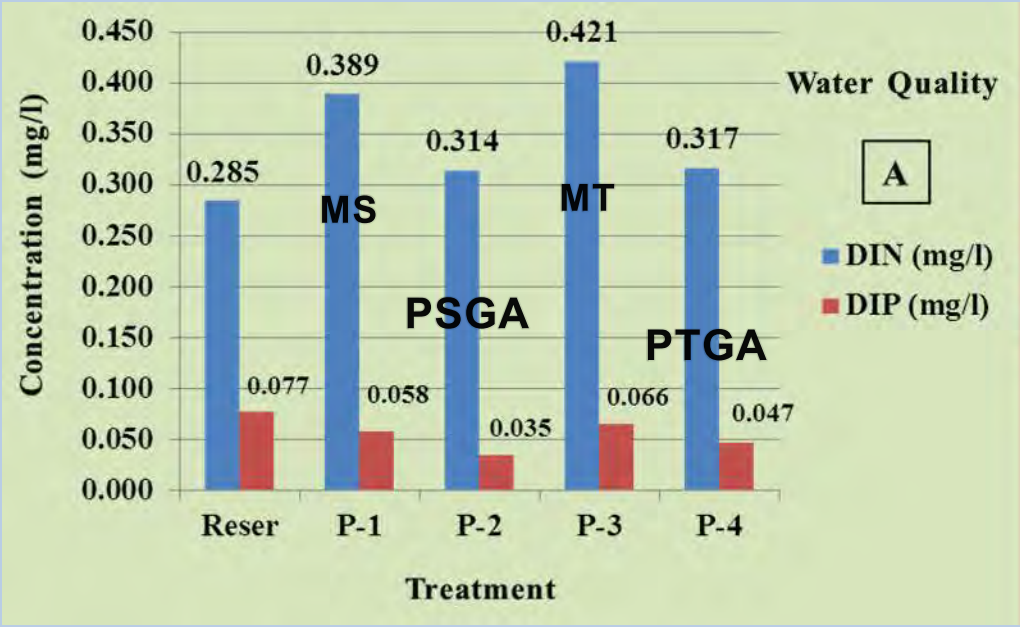



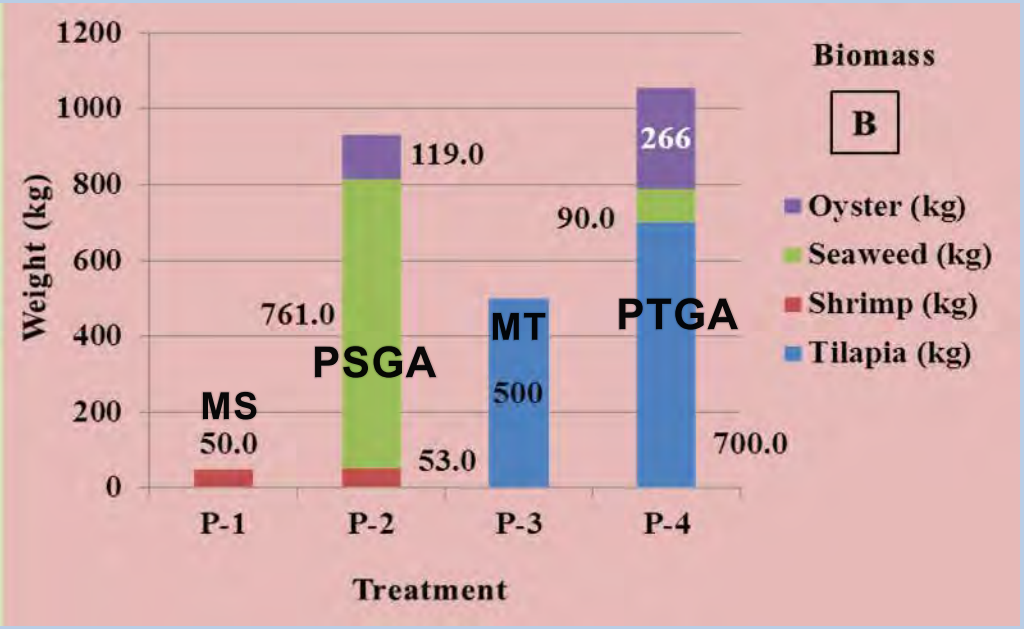
Total Biomassof the Treated Farm in Brackishwater Pond

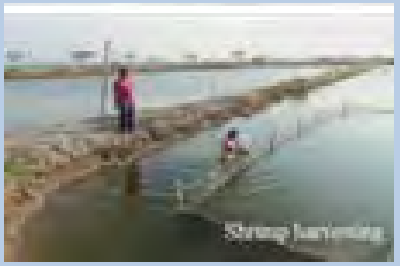


Demonstration Plot of BPPT-PICES-I

The **FIRST** experiment result by using a large pond of 4000 m2 with 4 (four) ponds treatment of Shrimp (P-1) and Tilapia (P-3) ponds only as a monoculture system, and Shrimp + Gracilaria (seaweed) + Anandara, sp (oysters) of P-2, and Tilapia + Gracilaria (seaweed) + Anandara, sp (oysters) of P-4 as the IMTA model with water resources from the similar reservoir pond as a control has provided a good result in a good water quality stability i.e. DIN and DIP of the IMTA (P-2 and P-4) are lower than monoculture (P-1 and P-3)

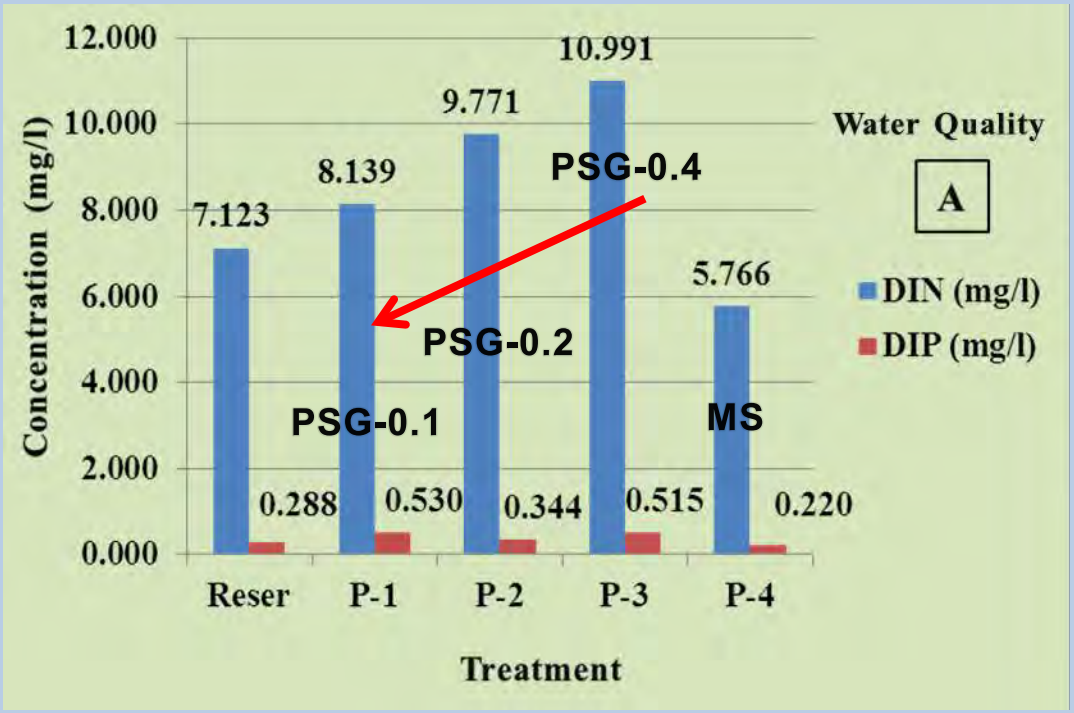


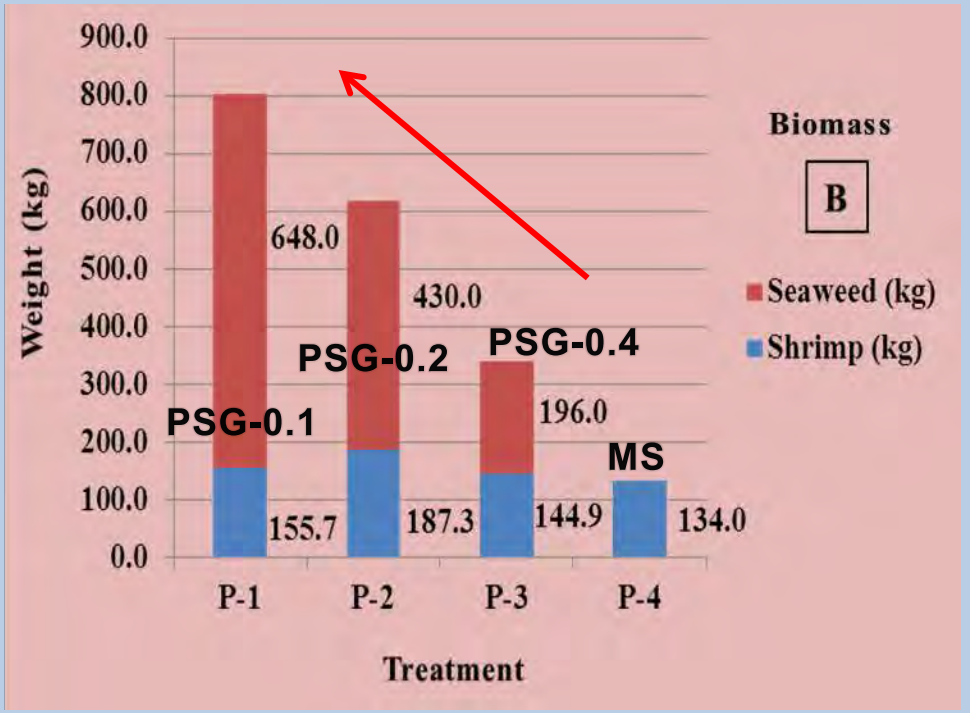




Demonstration Plot of BPPT-PICES-III

The **SECOND** experiment with slight differ on the treatment in which P-1, P-2 and P-3 are the IMTA with shrimp and various density of seaweed with 0.1 kg, 0.2 kg and 0.4 kg per m^2, respectively and monoculture of Shrimp (P-1) shows that DIN of the IMTA pond tends to decrease when seaweed production increase.



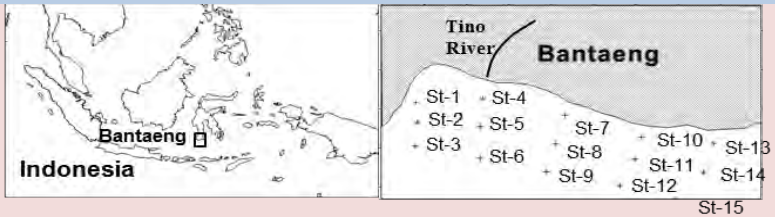


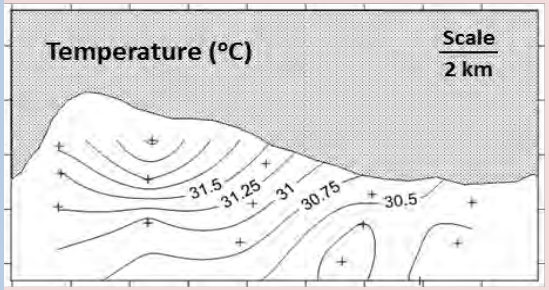


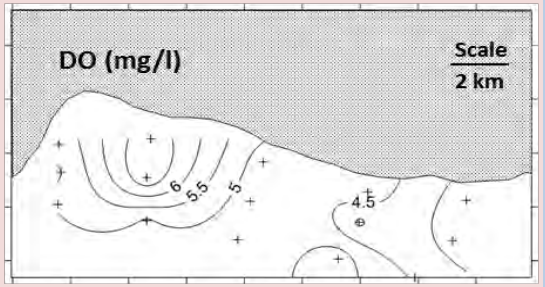


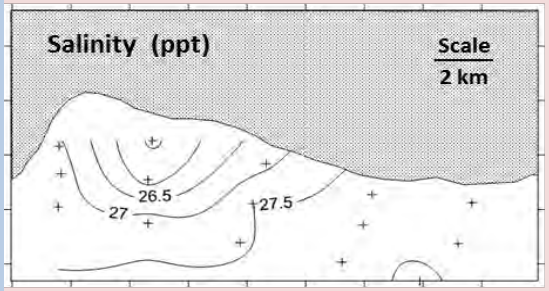
Site Location of Open System Model IMTA

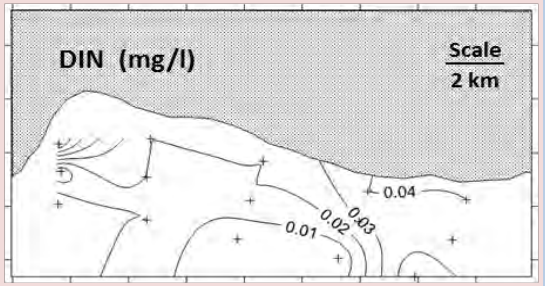
Water Qualitiy and Marine Aquaculture of OSIMTA Model

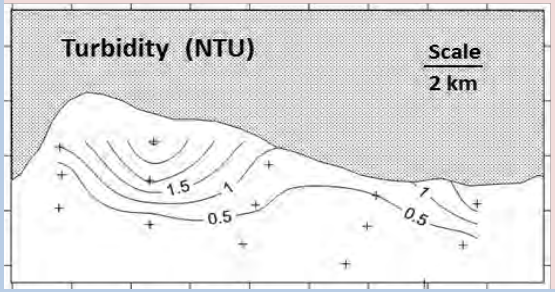


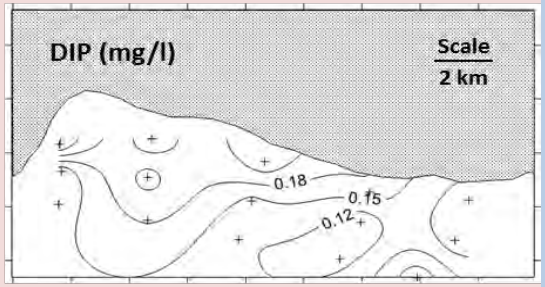


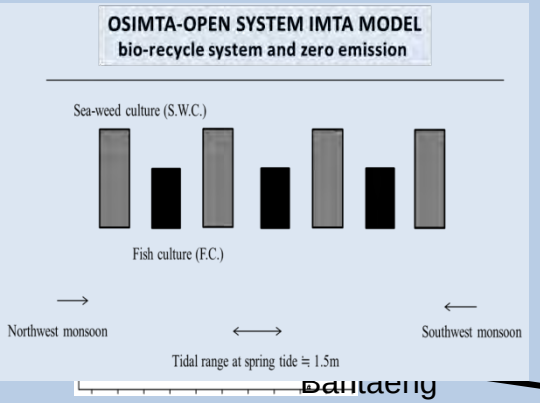




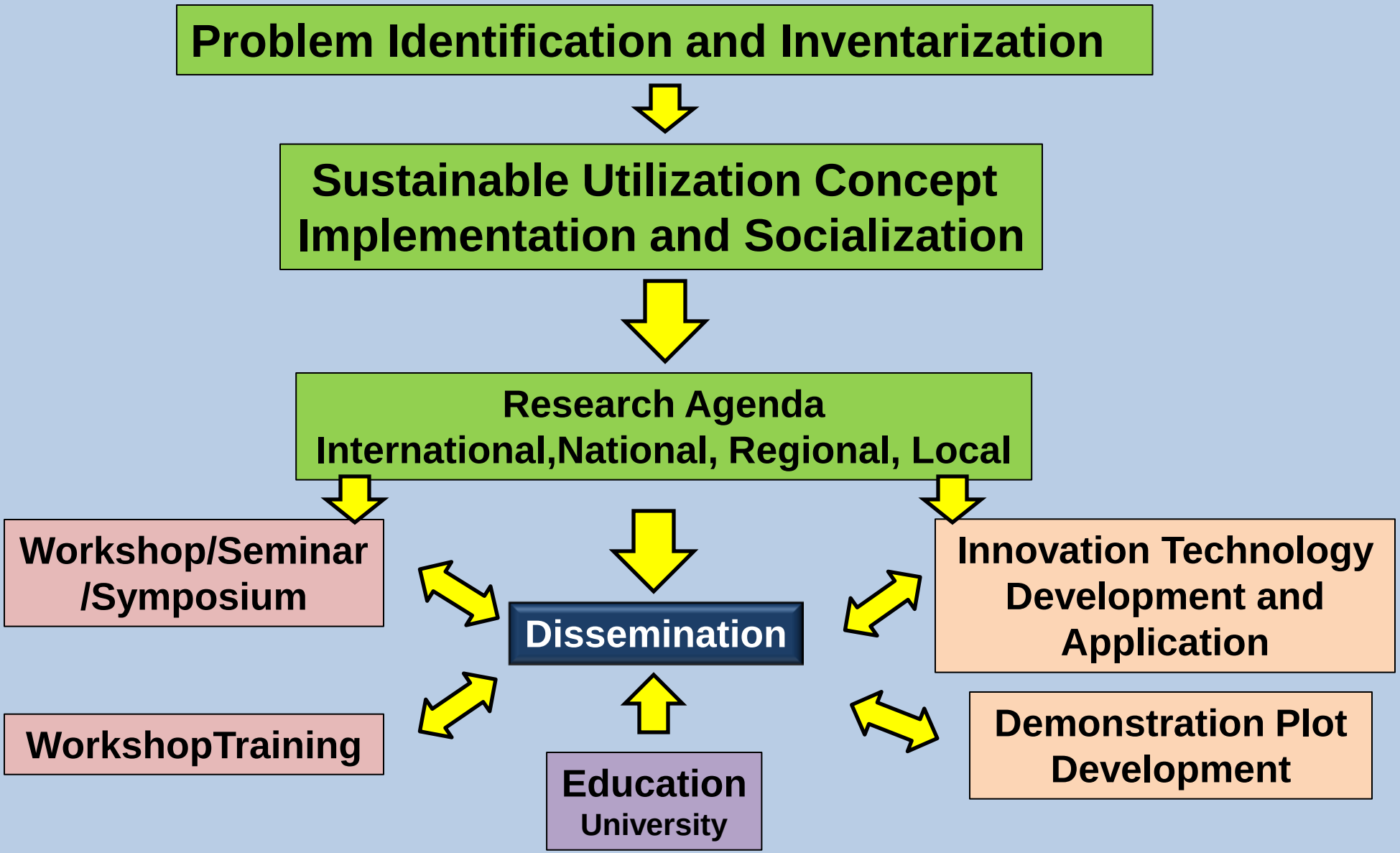




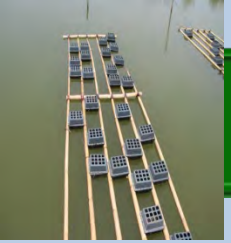




SATO UMI DISSEMINATION STRATEGY



Sylvo Fishery and IMTA Karawang



Sylvo Fishery and IMTA-Pekalongan

Fisheries at Bantaeng, South Sulawesi






DISSEMINATION ACTIVITY

DISSEMINATION ACTIVITIES

Workshop


BPPT


BPPT


BPPT


MAFF


INTERNATIONAL WORKSHOP ON SATO UMI - GEMPITA SPL - G
Concept and Model for Sustainable
Aquaculture and Coastal

Field Trip

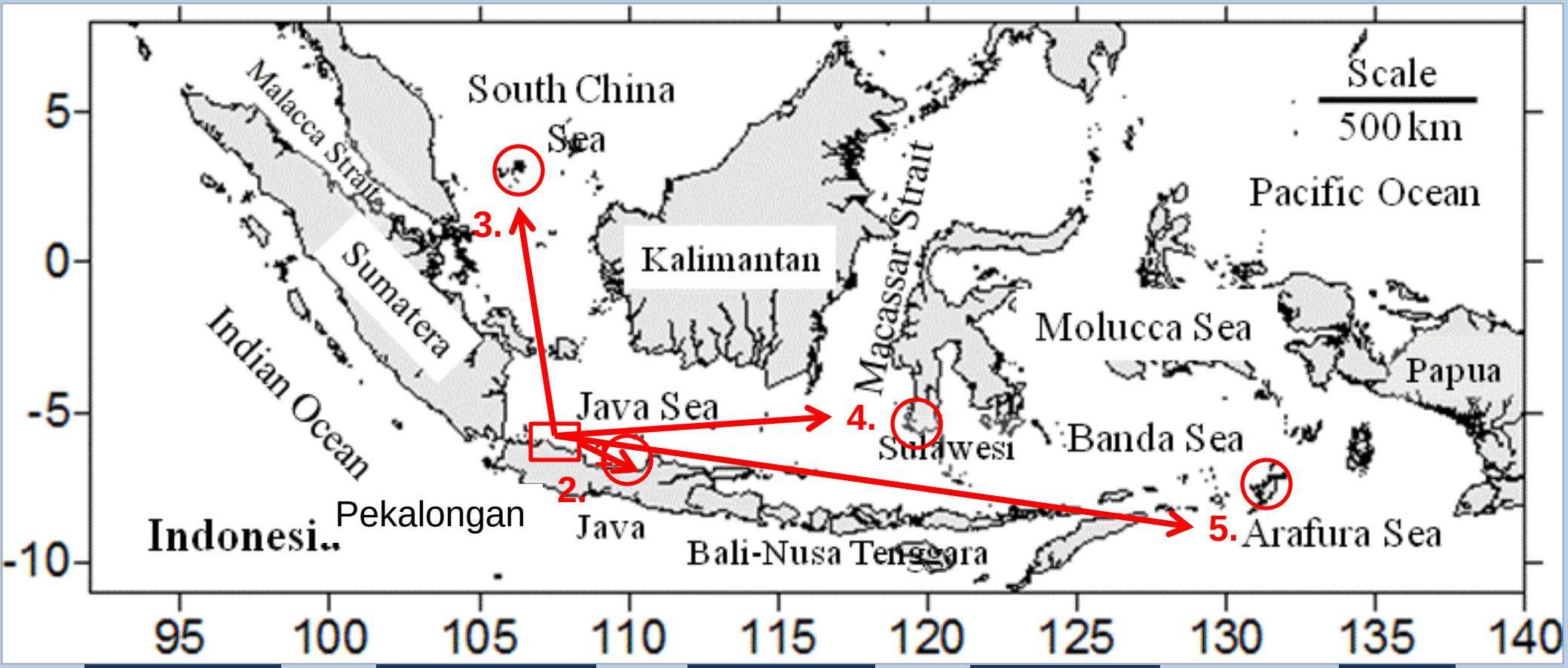
DISSEMINATION ACTIVITY TRAINING

Workshop at Bantaeng, South Sulawesi

Workshop and Field Trip at Seribu Island Jakarta

MANGROVE ENHANCEMENT AT NORTHERN COASTAL AREA OF KARAWANG

Expansion Dissemination Program



1. Karawang

2. Pekalongan

3. Anambas

4. Bantaeng

5. Tual

PRESS INFORMATION ON SATO UMI IMPLEMANTATION

Sato Umi BPPT - Поиск в Go

https://www.google.ru/search?newwindow=1&client=firefox-b&dcr=0&q=Sato+Umi+BPPT&oq=Sato+Umi+BPPT&gs_l=psy-ab.3..0i2

Most Visited Getting Started

Google Sato Umi BPPT

Все Картинки Новости Карты Видео Ещё Настройки Инструменты

Результатов: примерно 1 370 000 (0,50 сек.)

BADAN PENGKAJIAN DAN PENERAPAN TEKNOLOGI - Sato Umi ...
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Indonesia Terapkan Konsep Sato Umi

JAKARTA, KOMPAS - Indonesia akan menerapkan konsep Sato Umi dari Jepang untuk mengelola sumber daya perikanan, pesisir, dan kelautan berkelanjutan. Kerusakan daerah pantai di Indonesia meluas.

BPPT to apply "satoumi" concept

Wed, March 13 2013 19:15 | 128 Views

(ANTARA/Izaac Mulyawan)

"This concept uses technological, social, economic, and environmental approaches."

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Jakarta (ANTARA News) - The Agency for Assessment and Application of Technology (BPPT) plans to apply "satoumi", a new concept from Japan at four districts in Indonesia, according BPPT official.

Satoumi is defined as marine and coastal landscapes that have been formed and maintained by prolonged interaction between humans and ecosystems.

"This concept uses technological, social, economic, and environmental approaches," BPPT director for the center of agricultural technology Nenie Yustiningsih said at International Workshop "Satoumi-Gempita SPL-Gapura" International Workshop here on Wednesday.

She explained that with such a concept, damaged and abandoned coastal areas could be restored.

hectares of coastal areas into fish ponds was expected to be productive and beneficial to the fishermen.

Nenie noted that the BPPT would apply the concept in the districts of Karawang, West Java; Bantaeng, South Sulawesi; Anambas, Riau Islands, and Tanah Bumbu, South Kalimantan.

Meanwhile, BPPT director for studies on production technology of fisheries and livestock Suhendar I Sachoemar said the concept was introduced by Japanese scientist Tetsuo Yanagi.

He said Tetsuo Yanagi has introduced the concept of Integrated Multi-Trophic Aquaculture (IMTA) that provides the by-products, including waste, from one aquatic species as inputs for another.

Suhendar noted that the IMTA concept will recycle both organic non organic wastes in the forms of nitrogen and phosphate to become fertilizers and food for other so that the entire operation becomes more socially acceptable, economically profitable and environmentally benign.
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BPPT Kembangkan Konsep Perikanan Baru

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Badan Pengkajian dan Penerapan Teknologi (BPPT) bekerjasama North Pacific Marine Science Organization (PICES), Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF) dan Fisheries Research Agency of Japan (FRA) akan kembangkan suatu konsep baru SATO-UMI.

Ini merupakan gerakan pembangunan, pengelolaan dan pemanfaatan sumberdaya perikanan, pesisir dan kelautan secara bijaksana, seimbang dan harmonis, terintegrasi dan lebih produktif.

Kegiatan tersebut akan melibatkan masyarakat secara aktif dalam konsep Gerakan Masyarakat Peduli Kelestarian-Sumberdaya Perikanan, Pesisir dan Laut (GEMPITA-SPL) dan Gerakan Pembangunan Pantai Utara Jawa Barat (GAPURA).

Jadi SATO-UMI tersebut pendekatannya ada tiga yaitu masalah sosial, teknologi, dan kelestarian sumber daya. Intinya mengawinkan teknologi kearifan lokal, sosial dan ekonomi, ungkapnya.

Menurutnya, konsep SATO-UMI, selain di Jepang sendiri juga sudah diterapkan di Guatemala, Filipina, dan selanjutnya akan diterapkan di Indonesia. Kalau di Indonesia, SATO-UMI pendekatannya melalui budidaya dengan melibatkan masyarakat.

M. Makino dari FRA-Japan, dalam kesempatan tersebut juga menggambarkan keuntungan penggunaan konsep SATO-UMI tersebut. Menurutnya manfaat SATO-UMI tidak hanya dari sisi periknanannya saja tetapi juga dari unsur-unsur lain seperti pelestarian lingkungan, selain itu juga dapat ditanami rumput laut, sehingga akan meningkatkan pendapatan masyarakat, termasuk industri-industri di sekitarnya.

(*/redaksi@wartaekonomi.com)

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Konsep Sato Umi Budidaya Perikanan Ramah Lingkungan

Rabu, 13 Maret 2013 | 16:59

[JAKARTA] Badan Pengkajian dan Penerapan Teknologi (BPPT) menawarkan konsep terbaru pengelolaan, budidaya perikanan, pesisir, kelautan berkelanjutan melalui teknologi produksi perikanan budidaya ramah lingkungan atau Integrated Multi-

BPPT TERAPKAN SATO UMI-GEMPITA SPL, KONSEP PENGELOLAAN SUMBERDAYA PERIKANAN, PESISIR DAN KELAUTAN RAMAH LINGKUNGAN

Category: Berita Teknologi Agroindustri & Bioteknologi

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Indonesia memiliki sumberdaya perikanan, pesisir dan laut yang sangat potensial, menyediakan dan dapat dijadikan andalan untuk meningkatkan perekonomian masyarakat terutama nelayan. Sayangnya, pemanfaatan yang kerap berlebihan dalam hal sumberdaya (over exploitation) di hampir seluruh wilayah, terutama di Indonesia bagian barat dan juga timur. Karena itu diperlukan konsep pengelolaan sumberdaya alam yang berkelanjutan memperbaiki kondisi sumberdaya alam dan lingkungannya.

Demikian antara lain disampaikan Deputi Kepala BPPT Bidang Teknologi Agroindustri dan Bioteknologi (TAB), Listyani Wijayanti pada acara International Workshop On Sato Umi-Gempita SPL-Gapura di BPPT (13/2). Konsep yang dikenalkan menurut Listyani tidak hanya menjadikan sumberdaya perikanan, pesisir dan laut tersebut sebagai objek dari kegiatan manusia, tetapi menjadi subjek yang dibutuhkan manusia dan perlu dikelola dengan baik dan bijaksana.

Untuk itu BPPT bekerjasama dengan North Pacific Marine Science Organization (PICES), Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF) dan Fisheries Research Agency of Japan (FRA) akan mengembangkan dan menerapkan konsep terbaru pengelolaan sumberdaya perikanan, pesisir dan kelautan yang disebut Sato-Umi.

Sato-Umi merupakan konsep pengelolaan sumberdaya perikanan secara berkelanjutan dimana intervensi manusia dalam pengelolaan sumberdaya perikanan di wilayah pesisir dan laut dapat meningkatkan produktivitas dan keragaman jenis sumberdaya perikanan.

BPPT sendiri menurut Listyani telah mengembangkan konsep serupa dalam membangun, mengelola dan memanfaatkan sumberdaya perikanan, pesisir dan kelautan secara bijaksana dengan melibatkan masyarakat secara aktif, yaitu Gempita-SPL (Gerakan Masyarakat Peduli Kelestarian Sumberdaya Perikanan, Pesisir dan Laut) atau SFICoMS (Sustainable Utilization of Fisheries, Coastal and Marine Resources for the Society).

"Bersama dengan Sato-Umi, konsep Gempita-SPL akan terus dikembangkan untuk mendukung kegiatan pembangunan sumberdaya perikanan, pesisir dan kelautan secara harmonis dan berkelanjutan di Indonesia. Seperti pengembangan dan pemasyarakatan teknologi produksi perikanan budidaya ramah lingkungan, Integrated Multi-Trophic Aquaculture (IMTA), berbasis sistem biosirkulasi (biocycle system) untuk lahan tambak terbangkalai (idle)," ungkapnya.

Pada kesempatan yang sama, Direktur Pusat Teknologi Produksi Pertanian (PTPP) BPPT, Nania Yuliningsih mengatakan bahwa Sato-Umi merupakan suatu konsep yang tidak hanya teknologi saja. "Ada tiga pendekatan Sato-Umi, pertama dari sisi budidayanya, kemudian penangkapan dan masalah sosial. Yang akan dilangkan di Indonesia yaitu pendekatan melalui budidaya dengan melibatkan masyarakat. Untuk konsep lain yang sudah dilangkan seperti di Guatemala dan Filipina. Inti dari Sato-Umi ini adalah mengawinkan antara teknologi, kearifan lokal, sosial budaya dan ekonomi," terangnya.

Nania menegaskan dalam jangka pendek penerapan konsep Sato-Umi ini akan segera dilaksanakan di Indonesia. Diharapkan dari workshop tersebut akan dihasilkan petunjuk teknis dan aplikasi konsep Sato-Umi di Indonesia. Akan ada empat daerah percontohan yaitu Karawang, Anambas, Teluk Sumbu dan Bantaeng.

Dalam Workshop yang mengambil tema Konsep dan Model Baru Pengelolaan Sumberdaya Perikanan, Pesisir dan Kelautan Secara Berkelanjutan dengan Fokus Utama Budidaya Perikanan tersebut juga dilakukan penandatanganan Letter of Intent (LoI) antara BPPT dan PICES mengenai Penerapan Sato Umi-Gempita SPL di Indonesia. (SYRA/humas)

SUMMARY

- To improve and optimize the utilization of marine culture and brackish water pond area that is caused by environmental damage due to the excessive exploitation by intensive aquaculture activities, limitation of seed, capital, technology and face the challenges of climate change and global warming, it is time for Indonesia to apply SATO-UMI Concept.

- The Integrated Multi Tropic Aquaculture (IMTA) on the bases of bio-recycle system and Sato Umi concept should be applied for sustainable aquaculture :

  - Close System Integrated Multi Tropic Aquaculture (CSIMTA) Model for brackish water pond
  - Open System Integrated Multi Tropic Aquaculture (OSIMTA) Model for Marine Culture Area

- In the future, developing aquaculture models using the biorecycle system to reduce and minimize the inorganic and organic waste from the remaining feed, faeces and the other sources will be useful to maintain sustainable aquaculture in the coastal area.

SUMMARY

- Three demonstrations pond experiment of the IMTA (Integrated Multi Tropic Aquaculture) on the basis of bio-recycle system using 4000 m2 and 1000 m2 have been developed with providing good result for water stability and productivity.

- DIN and DIP are lower than monoculture. In the total biomass of the IMTA shows also a good performance on total biomass, compare to the monoculture system. The almost similar result in water quality stability and biomass performance was also found on the second and third experiment using smaller pond of 1000 m2 with slight differ on the DIN and DIP performance.

- To disseminate SATO-UMI concept, the international workshop and training on SATO-UMI for sustainable aquaculture has been conducted in 2013 (Jakarta), 2014 (Karawang-West Java) and Pekalongan (Central Java), 2015 and 2016 in Jakarta and Bantaeng (South Sulawesi), respectively.

- The objective of the workshop is to inspire and give new spirit to manage coastal and marine resources optimally, harmonious and productive to improve human well-being.

Thank You