Indigenous Approaches to Habitat Protection and Restoration: Experiences in Sato-umi and Other Community Initiatives

24 November, 2009
Philippine International Convention Center, Manila, Philippines
Summit Hall D

Convener:
Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)

Co-Convener:
International EMECS Center, Japan
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Preface

“Sato-umi” has often been recently referred in Japan. Although, a concept of “Sato-umi” is not officially defined, while the basic concept was initially proposed by Prof. Tetsuo Yanagi of Kyushu University in 1998; as “high productivity and high biodiversity in the coastal sea area with human interaction”. On the occasion of Sato-umi-spotlighted trend, then the concept of Sato-umi was described as Japan model for protecting and restoring enclosed coastal seas by the Japanese Government in the Strategy for an Environmental Nation in the 21st Century (2007) and the Basic Plan on Ocean Policy (2008). Under these policies, Ministry of Environment started a project to aid creation of Sato-umi in several local coastal areas in Japan.

International EMECS Center has been playing the role to spread the concept for the promotion of Sato-umi concept through convening international conferences such as EMECS 7 in 2006 in France and EMECS 8 in 2008 in China.

The co-hosting of this Sato-umi Workshop in The East Asian Seas Congress 2009 in Philippines with PEMSEA (Partnership in Environmental Management for the Seas of East Asia) was planned in order to encourage these activities.

The workshop was comprised of three parts from Part 1 to Part 3. In Part1, subtitled as “The Sato-umi concept and its application in Japan: lessons and application”, there were seven oral presentations from Japan. In Part 2, subtitled as “Indigenous knowledge and community based approaches in protecting, restoring and managing key habitats”, there were nine oral presentations from Thailand Indonesia, Vietnam, Malaysia, Korea and Philippines.

Part 3, subtitled as “Institutionalizing community-based efforts in habitat protection, restoration and management within an ICM framework”, was the panel discussion; Prof. Matsuda as coordinator, and Prof. Yanagi, Director McDonald and Prof. Ferrer as panelists. Panelists, presenters and participants all together exchanged their opinions actively and positively. Oral presentations and panel discussion brought fruitful results.

We wish to express our sincere gratitude to all who contributed to this workshop, especially to Professor Emeritus Osamu Matsuda of Hiroshima University, Professor Tetsuo Yanagi of Kyushu University, and Director Anne McDonald of United Nations University, Institute of Advanced Studies, Operating Unit Ishikawa/Kanazawa, who have developed this workshop as the members of its internal committee. And with special thanks to the staff of PEMSEA for managing laborious arrangement for this workshop.

Finally let us express our great appreciation to the Nippon Foundation for precious financial support for our workshop.

International EMECS Center
1. Outline

Theme
Indigenous Approaches to Habitat Protection and Restoration: Experiences in Sato-Umi and Other Community Initiatives

Date
November 24, 2009

Venue
Philippine International Convention Center, Manila, Philippines, Summit Hall D

Conveners
Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)

International EMECS Center, Japan

Sponsor
The Nippon Foundation
2. Background and Focus

Brief Introduction to “Sato-umi”

What is “Sato-umi”? Why much attention is paid to “Sato-umi” nowadays? Since in Japanese “Sato” means local village or community where people live their life and “Umi” means the sea, simple literal meaning of “Sato-umi” is the sea associated with village. In many seas of that kind, sustainable community-based management of the sea had long been made historically in Japan with traditional manner. However, during the phase of nation’s high economic growth after the World War II, this type of traditional coastal management was gradually deteriorated affected by changes of local community and life style of the people. During the same time, coastal environment, habitat and living resources were also seriously damaged by water pollution, eutrophication and land transformation based on urbanization and industrialization of coastal area. As a result, social demand to create and establish new type of “Sato-umi” defined as high biological productivity and high biological diversity in the coastal sea with human interaction has arisen and been strong. In other word, “Sato-umi Renaissance” is taking place to realize rich and healthy coastal sea. In Japan, community-based habitat restoration activities have been gaining ground in recent years partly because concept of “Sato-umi” was incorporated into official institutional systems of national policy.

The term and concept of “Sato-umi” is relatively new compared with “Sato-yama” in which “Yama” means forest and mountain in Japanese. “Sato-yama” is traditional land management system including local village, agricultural field and forest near by and therefore “Sato yama” is a term indicating such landscape including those components. So, although “Sato-yama” and “Sato-umi” have different historical and socioeconomic background, nowadays “Sato-yama” and “Sato-umi” is often used in pairs as a similar term indicating sustainable coastal and terrestrial management, respectively.

“Sato-umi” is originally one of the traditional Japanese practices of the coastal communities co-existing with nature at which people’s livelihood and their culture are deeply involved, productivity is sustained, biodiversity is protected and conserved while ecosystems are able to function and material cycling is maintained. These community efforts were undertaken through comprehensive and integrated management from land to coastal area. Combination of “Sato-yama” that focuses on forest and agricultural area with “Sato-umi” is expected to develop a Japanese model of integrated coastal management (ICM).

“Sato-umi” in the international society

New concept for coastal sea management called “Sato-umi” has been recently noticed
not only in its originated place of Japan but also in some international meetings held in both western and Asian countries. New concept of “Sato-umi” and some cases of its implementation had been presented in the 7th International EMECS conference held in Caen, France in 2006 and the new concept was highly evaluated in the reviewing session as “symbiosis among human communities and coastal/marine area - a more rational vision of co-existence”. As a next step, “Sato-umi Workshop” was held in the 8th International EMECS conference held in Shanghai, China in 2008 in order to deepen the concept collecting many similar cases of management and good practices from many countries. As a result of this workshop, it was made clear that there were many similar types of sustainable coastal management and community-based practices in the world. Indigenous knowledge, traditional culture and community actions have already contributed significantly in protecting and restoring several coastal, island environment and natural resources in several countries. And finally, outcome of the workshop was incorporated into the Shanghai Declaration adopted on the final day of the conference.

And then another “Sato-umi Workshop” was organized in the EAS Congress 2009 which was held in Manila in 2009 in order to discuss “Sato-umi” from the view point of indigenous knowledge in Asian countries for farther understandings of “Sato-umi” and related practices. This “Sato-umi Workshop” in the EAS Congress was cooperatively organized by both PEMSEA and International EMECS Center with financial support of Nippon Foundation. From the view point of organization system, it is noticeable that PEMSEA tied an official non-state partnership with International EMECS Center in 2008, after that official cooperation and collaboration between both organizations started in many ways. Since PEMSEA has long experience in the implementation of ICM and International EMECS Center has some experiences in “Sato-umi” related activities, cooperation by both was expected to provide a good opportunity to find new approaches towards sustainable coastal management.

**Background of “Sato-umi Workshop” in the EAS Congress**

It might be quite significant in the process of internationalization of “Sato-Umi” that “Sato-umi Workshop” titled “Indigenous Approaches to Habitat Protection and Restoration: Experiences in Sato-umi and other Community Initiatives” was held in EAS Congress 2009 in the theme of “Habitat Protection, Restoration and Management (Theme 3)”. Thinking about overall theme of the Congress “Partnership at Work: Local Implementation and Good Practice”, the standpoint of “Sato-umi Workshop” can be made more clear.

Communities living along coasts and small islands have acquired invaluable
indigenous knowledge on how to live in harmony with nature in Japan. With long lasted traditional knowledge, these communities are able to sustain the continuous supply of natural resources without deteriorating the habitat and ecosystem. However, unfortunately, rapid economic development and indiscriminate exploitation of primary products and unsustainable consumption over the last several decades have seriously damaged the functional integrity of ecosystem and specific habitat such as seaweed bed and tidal flat demonstrated by decreasing biodiversity and fish catch and degraded social well being of these communities. These experiences in Japan may be applicable to many countries although the time of drastic change is different. Under these circumstances, “Sato-umi Workshop” was designed as one of well-timed program of the EAS Congress 2009.

**Major focuses of the workshop**

Major objectives of this workshop is to deepen the understandings on indigenous approaches to habitat protection and restoration through experiences in “Sato-umi” and other related community-based initiatives in many countries. The workshop was divided into three parts. In Part 1 titled as “the Sato-umi Concept and its Application in Japan: Lessons and Application” were presented in Part 1 by 7 presenters. 7 presentations included concept, 4 case studies in Japan, supporting activities for the creation of Sato-umi in Japan by central government and Satoyama Sato-umi Sub-Global Assessment in Japan. In Part 2 titled as “Indigenous knowledge and community based approaches in protecting, restoring and managing key habitats”, 9 presentations were made from varieties of groups and countries. Part 3 was discussion and conclusive session titled as “Interactive session/wrap-up: Institutionalizing community-based efforts in habitat protection, restoration and management within an ICM framework”. This interactive session was chaired by Prof. Osamu Matsuda with 3 invited panelists of Prof. Tetsuo Yanagi, Director Anne McDonald and Prof. Elmer Ferrer including the discussion with floor participants. This session aimed to seek applicability of “Sato-umi” from the international viewpoint and to strengthen the effective implementation of “Sato-umi” and related community-based activities under the variety of natural and socioeconomic conditions.

Chair of the Workshop
Osamu MATSUDA, Ph. D
Professor Emeritus, Hiroshima University, Japan
3. Program

10:30-10:35 Opening Address by Int'l EMECS Center
Introduction by Workshop Chair
Chair: Matsuda O., Hiroshima University (Professor Emeritus), Japan
Co-Chair: Yanagi T., Research Institute for Applied Mechanics, Kyushu University, Japan
Co-Chair: McDonald A., United Nations University, Institute of Advanced Studies, Operating Unit Ishikawa/Kanazawa, Japan

Chair: Yanagi T., Co-Chair: Matsuda O.

10:35-10:55 Concept and practices of Sato-umi in Japan and lessons learned
Yanagi T., Research Institute for Applied Mechanics, Kyushu University, Japan

10:55-11:15 Concept and practices of Satoyama Sato-umi Sub-Global Assessment in Japan
McDonald A., United Nations University, Institute of Advanced Studies, Operating Unit Ishikawa/Kanazawa, Japan

11:15-11:35 Case of Fushino River Estuary Initiatives in Japan
Ukita M.*, Sekine M.*, Yamamoto H.**, *Yamaguchi University, **Yamaguchi Prefecture, Japan

11:35-11:55 The Ago Bay Management Initiatives in Japan
Maegawa M.*, Uranaka H., *Mie University, Japan

11:55-12:15 Potential of urban wetland as a target of habitat restoration and management
Furukawa K., National Institute for Land and Infrastructure Management, Japan

12: 15-12:35 Community-based sea grass bed restoration and management in Seto Inland Sea:
Case of Akou Coast in Japan
Matsuda O., Hiroshima University (Professor Emeritus), Japan

12: 35-12:55 Supporting activities for the creation of Sato-umi in Japan
Muroishi Y., Yamada T., Ogawa N., Office of Environmental Management of Enclosed Coastal Seas, Ministry of the Environment, Japan

13:00-14:00 Lunch
14:00-16:20 Part 2: Indigenous knowledge and community based approaches in protecting, restoring and managing key habitats
Chair: McDonald A., Co-Chair: Yanagi T.

14:00-14:15 Implementing an ecosystem approach to coastal management through community based organizations: An example from the Andaman coast of Thailand
Soonthornnawaphat S., Silva J., IUCN, Thailand Programme, Thailand

14:15-14:30 Implementation of Tri Hita Karana, a local wisdom of Bali to maintain agricultural resources
Suprapta D. N., Director School of Postgraduate Udayana University, Indonesia

14:30-14:45 Developing a mechanism of mobilization of various human and material resources in planting, taking care and protecting urban green trees in Danang city
Hai T. C., Danang Department of Natural Resource and Environment, Vietnam

14:45-15:00 Community Involvement in Coral Reef Restoration Projects in the Gulf of Thailand
Yeemin T., Saenghaisuk C., Pengsakun S., Sutthacheep M., Marine Biodiversity Research Group, Department of Biology, Faculty of Science Ramkhamhaeng University, Thailand

15:00-15:15 Evaluation of Artificial Reefs in West Coast, Peninsular Malaysia
Ismail I., Noh K. M., Arshad F. M., Noh A. F. M., Institute of Agricultural and Food Policy Studies Universiti Putra Malaysia, Malaysia

15:15-15:30 Community-based management approach at work in the Muan Wetland Protection Area: Changing perception, changing practice and changing policy
Jang J. Y., Choi Y. R., Eco-Horizon Institute, Korea

15:30-15:45 When the cradle falls: A case of management failure in a community marine reserve in southern Philippines
Guzman A. B., Mindanao State University at Naawan, Philippines

15:45-16:00 Conceptual framework of organizing communities for effective mangrove management
Savaris J. P., Joven R., Rodney Golbeque and Edison Advincula Zoological Society of London, Philippines
16:00-16:15 Indigenous approaches to access, control and protection of coastal resources: A review of some Philippine Experiences

Ferrer E., University of the Philippines, College of Social Work and Community Development, Philippines

16:20-16:40 Coffee Break

16:40-18:10 Part 3: Discussion panel:

Interactive session/wrap-up: Institutionalizing community-based efforts in habitat protection, restoration and management within an ICM framework

Chair: Matsuda O.
Panelists: Yanagi T., McDonald A., Ferrer E.
Part 1: The Sato-umi concept and its application in Japan: lessons and application
4. Part 1 Summary

The title of part 1 is “The Sato-umi concept and its application in Japan: lessons and application”.

At first, T. Yanagi introduced the new concept of Sato-umi which is “the coastal sea with high bio-diversity and bio-production under the moderate human interaction”. He stressed the importance to arrange adequately the man-made habitat for marine biota in the coastal sea area in order to increase the bio-diversity on the basis of scientific knowledge and local wisdom. High bio-production (high fish catch) is the result of high bio-diversity. A question is raised from the floor; “Is there any experience of co-operation between scientists and local fishermen for the creation of Sato-umi in Japan?”. He introduced the examples of man-made tidal flats in the central part of Japan and rehabilitation of sea-grass beds in the central part of the Seto-Inland Sea based on the cooperation between scientists and local fishermen. Fish catch has increased in both areas.

A. McDonald introduced the trial of integrated environmental management from the forests to the coastal seas in the Noto Peninsula, the central northern part of Japan. She stressed the importance of the cultural background for the successful management. M. Ukita also introduced the successful experience of the integrated environmental management of the forests, rivers and estuaries in the watershed of Fushino river, the western part of Japan. He stressed the importance of the establishment of central committee for the management. M. Maegawa introduced the recovery of fishing ground in Ago Bay, the southern central part of Japan, where the self pollution by pearl oyster culture is very severe. He pointed out the importance of governmental guidance for the local management. K. Furukawa introduced an interesting trial of man-made small scale tidal flats in the urban area of Tokyo Bay. He claimed that such small scale tidal flats are very useful for the environmental education for the urban young students. O. Matsuda introduced a trial of creation of Sato-umi in the central part of the Seto Inland Sea by co-operation of some NPOs there. He stressed the importance to communicate well for many people there in order to negotiate the different stakeholders. Y. Muroishi introduced the main concept and budget system of the Ministry of Environment, Japan for the support of Sato-umi activities in Japan.

Part 1 could succeed to introduce the concept and importance of Sato-umi and some successful activities related to Sato-umi in Japan to the participants of this workshop. The main contribution of this part 1 for this workshop is to clarify the importance of the support of the environmental friendly primary industries, that is, the forest industry in the mountain, the agriculture in the field and the fisheries in the coastal sea. The
creation of the habitat for the marine biota is only possible under the good water quality and the good water quality in the coastal sea is a result of good management in forest and land by the environmental friendly forest industry and agriculture.

Chair of Part 1
Tetsuo YANAGI, Ph. D
Professor, Kyushu University, Japan
5. Part 1 Oral Presentation

Concept and practices of Sato-umi in Japan and lessons learned -----------------------15
  Yanagi T., Research Institute for Applied Mechanics, Kyushu University, Japan

Concept and practices of Satoyama Sato-umi Sub-Global Assessment in Japan ---29
  McDonald A., United Nations University, Institute of Advanced Studies, Operating Unit Ishikawa/Kanazawa, Japan

Case of Fushino River Estuary Initiatives in Japan ----------------------------------37
  Ukita M.*, Sekine M.*, Yamamoto H.**, *Yamaguchi University, **Yamaguchi Prefecture, Japan

The Ago Bay Management Initiatives in Japan -----------------------------------------42
  Maegawa M.*, Uranaka H., *Mie University, Japan

Potential of urban wetland as a target of habitat restoration and management -----48
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Community-based sea grass bed restoration and management in Seto Inland Sea:
  Case of Akou Coast in Japan --------------------------------------------------------54
  Matsuda O., Hiroshima University (Professor Emeritus), Japan

Supporting activities for the creation of Sato-umi in Japan ------------------------63
  Muroishi Y., Yamada T., Ogawa N., Office of Environmental Management of Enclosed Coastal Seas, Ministry of the Environment, Japan
A new concept for coastal sea management called “Sato-Umi”, defined as “High productivity and biodiversity in the coastal sea area with human interaction”, is proposed. To establish the Sato-Umi, it is necessary to realize comprehensive material cycling and appropriate fish resource management in coastal sea areas.

It is said that “Nature takes its best state without mankind”. Would it be true that no environmental problems would exist if mankind was not present on Earth? However, there would be no meaning to a discussion regarding environmental problems without the presence of mankind.

Nature does exist that takes its best state under mankind’s interaction. In Japan, it is called “Sato-Yama”. In Japanese, “Sato” means the area where people live and “Yama” means the forest. Sato-Yama is thus the forest near where people live. In 1987, the area of Sato-Yama in Japan was about 4,500,000 ha making up about 20% of Japan’s total area of forest of 25,000,000 ha.

In this paper we discuss a new concept for coastal sea management that is based on the ideas of Sato-Yama. Is it possible to create a “Sato-Umi” similar to Sato-Yama? In Japanese, “Umi” means the sea, so “Sato-Umi” is defined as “High productivity and biodiversity in the coastal sea area with human interaction” (Yanagi, 1998, 2007).

To establish the Sato-Umi, we first need to understand quantitatively material cycling in the coastal sea area. That is, we need to know the quantity of nutrients that are loaded from the coast, and what are the primary, secondary and tertiary productions in the area. We need to clarify what kinds of actions by mankind are permissible or prohibited in the coastal sea area from the viewpoint of increasing production and biodiversity. The important focus is to establish comprehensive material cycling in Sato-Umi.

We have suffered from Minamata disease, red tide, hypoxia, fish catch reduction and so on in the coastal seas all over the world.

The basic reason is that human beings, who live on land, do not understand the sea.

We have to more deeply understand the coastal sea.

How can we associate with the coastal sea?

Some people say “Nature is at best without Human”.

Is this true?

There exists the nature which is at best under the interaction with human.

It is the “Sato-Yama”, (the forest near the village) Sato: village in Japanese Yama: forest in Japanese

Sato-Yama in Japan 4,500,000 ha and 20% of the total forest area in 1987
Definition of “Sato-Yama”

Sato-Yama is the forest with high productivity and high bio-diversity under the interaction with human activities.

People plant oak at Sato-Yama and cut them every 20-30 years for charcoal and mushroom cultivation. Dropped leaves are used for the fertilizer.

Flora is rich at Sato-Yama due to its brightness. Insects gather for honey of flower and oak. Small animals come for acorn of oak. Periodical human disturbances are good for biodiversity.

High-biodiversity

Sato-Yama published in (2001)

Deciduous broadleaf trees.

People work there. High productivity.

Rich flora and fauna
Sato-umi

Umi: the sea in Japanese
Sato-umi: the coastal sea with high productivity and high biodiversity under the human’s interaction.

In order to realize “Sato-Umi”, we first have to understand quantitatively the material cycling in the coastal sea.

8th EMECS (Environmental Management in Enclosed Coastal Seas) at Shanghai on 29 October, 2008

• Special Session on “Sato-Umi” in the 8th EMECS at Shanghai, China
• T. Yamagi (Kyushu University, Japan) “Definition of Sato-Umi”
• J. Greer (Maryland Sea Grant College, University System of Maryland, USA) “Resolving Oyster Conflicts in the Chesapeake Bay: The Concept of Sato-Umi”
• J.F. Decrotoy (University of Hull, U.K.) “Managing anthropogenic impacts on the diet of estuaries in North-Western Europe through integrated coastal zone management”
• W.K. Chang (Korea Maritime Institute, Korea) “National Initiative on Environment Management in Coastal areas of Korea”
• J. Fang (Yingzhou Sea Fisheries Research Institute, Chinese Academy of Fisheries Science, China) “Development of integrated multi-trophic aquaculture in China”
• P. Songsangjinda (Coastal Aquaculture Research Institute, Department of Fisheries, Thailand) “Silvoaquaculture: an ecosystem-based management for sustainable coastal aquaculture in Thailand”
• B. Mosse (Pattimura University Ambon, Indonesia) “Sasi laut: History and its role of marine coastal resource management”

The Shanghai Declaration

October 30, 2008

...At EMECS 8 we learned an informative new concept, sato-umi, which signifies “high productivity and biodiversity of a coastal sea as result of, and in harmony with, human activity”......Sato-umi places increased emphasis on promoting positive interaction between humankind and our coastal enclosed seas......It may be realized through concerned, continuous environmental conservation programs. Sustainable economic return through ecosystem-based resource management and agricultural practices are other aspects of sato-umi.......Finally, sato-umi places a high premium on an education that connects young people with the natural world and provides them opportunity to learn through hands-on experiences how their sincere concern for the natural world relates to the well-being of their community, family, and themselves.

Written by Wayne Bell (Maryland, USA)
The Shanghai Declaration
October 30, 2008

At EMECS 8 we learned an informative new concept, sato-umi, which signifies "high productivity and biodiversity of a coastal sea as result of, and in harmony with, human activity". Sato-umi places increased emphasis on promoting positive interaction between humankind and our coastal enclosed seas. It may be realized through concerned, continuous environmental conservation programs. Sustainable economic return through ecosystem-based resource management and agricultural practices are other aspects of sato-umi. Finally, sato-umi places a high premium on an education that connects young people with the natural world and provides them opportunity to learn through hands-on experiences how their sincere concern for the natural world relates to the well-being of their community, family, and themselves.

Written by Wayne Bell (Maryland, USA)

Sato-yama and Sato-umi
(high productivity and high bio-diversity under the interaction with human activities)

Material cycling in Sato-umi

Thick, long and smooth material cycling (Comprehensive material cycling) must be established in Sato-umi for high productivity and high bio-diversity.

Red tides

Red tides mean the thick material flow but the short and no-smooth material flow because the big biomass of dead phytoplankton consumes the dissolved oxygen in the bottom layer and results in hypoxia and fish mortality. They are not good for Sato-Umi.
Eutrophic or oligotrophic coastal seas

In the eutrophic coastal sea, we have to reduce the nutrient load from the land.

In the oligotrophic coastal sea, we have to increase the nutrient supply from the aphotic layer by the artificial upwelling reef.

COD load and red tides in the Seto Inland Sea, Japan

1973: Law on Measures for the Environmental Preservation; COD load decrease to 1/2

Change in COD load and the occurrence number of red tides in the Seto Inland Sea, Japan

Artificial upwelling reef

H=10m, L=20m

Field experiment was carried out in the Seto Inland Sea, Japan in 1987.
Effect of artificial upwelling reef arrangement

1987 before

1989 after

Yanagi and Nakajima (1991)

Importance of bio-chemical processes

Hayashi and Yanagi (2002)

Coastal sea as a habitat

- It is very important for the coastal sea as a habitat for marine biota in order to establish the comprehensive material cycling there.
- Because the bio-chemical material flux is very large in the coastal sea.

Biodiversity and Human interaction

Connell (1978)

Kokubu et al. (2007)
We have to provide good condition for marine life in Sato-Umi.

Fishery resources management is also very important for the establishment of Sato-Umi.

New technology is developed: Fishing gear to avoid small fish catch

Sato-Umi = Commons

Commons: system for co-use and co-manage of resources or resources themselves (land or plants)

It is situated between nature and human.

Nature is humanized in Commons and Human must be naturalized in Commons.

Then human’s and nature’s sustainable developments are possible in Commons.
Humanized nature

- Many examples such as gentle-sloped coast of Kansai International Airport

Mud ecosystem has changed to algae-bed ecosystem there by human activity.

Artificial sea-weed beds

Larvae of rockfish migrate in the whole area of Osaka Bay from the artificial sea-weed beds.

Artificial sea-weed beds are developed on the gentle-sloped coast of Kansai-Airport

Kansai International Airport

Artificial gentle-sloped coast.

Human naturalization

Human naturalization is to follow the natural rhythm by pressing down the human’s desire.

We have to understand the natural rhythm at first.

Marine science is important for understanding the natural rhythm.

Fishermen in Japan have many rules for preservation of fish resources in order to follow the natural rhythm.
Many rules are necessary for sustainable development of Sato-Yama

This is naturalization of human in Sato-Yama.

Conservation or Preservation

Sato-Umi does not preserve the coastal sea but conserve the coastal sea.

It is a way of “Wise Use” of the coastal sea.

Sasi

- The strict rules in Satoyama is similar to “Sasi” in the Southeast Asia countries.

“Sasi” is rules for the natural resources management in the Southeast Asia.

Human and Nature

EU and USA

Japan

Marine Culture

Sato-umi

MPA

Separation of human and nature

Co-existence of human and Nature
Appropriate zoning

<table>
<thead>
<tr>
<th>Forest</th>
<th>Sea</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Needle-leaf forest</td>
<td>Japanese ceder, Japanese cypress</td>
</tr>
<tr>
<td>2) Sato-yama</td>
<td></td>
</tr>
<tr>
<td>3) Chinju-no-mori</td>
<td>Ever-green-leaf trees</td>
</tr>
<tr>
<td>1) Aqua-Culture</td>
<td>sea weed, oyster, yellow tails</td>
</tr>
<tr>
<td>2) Sato-umi</td>
<td></td>
</tr>
<tr>
<td>3) MPA (Marine Protected Area)</td>
<td></td>
</tr>
</tbody>
</table>

Nutrients cycling

- Nutrients: N:P:S = 16:1:10
- Nutrients: N,P>Si

- Tidal Flat
- Sea-grass bed
- Phytoplankton
- Benthic diatom
- Fish

- Past
- Now
- Multiple paths
- Thick material cycling
- Simple path
- Narrow material cycling
- Red tide
- Hypoxia
- Akasuka Fishermen Union
- Artificial Tidal Flat and Clam
- Culture of clam juvenile
- Artificial tidal flat

Decrease of river discharge due to dam construction

- V ≈ 10R
- Weaken estuarine circulation → Red tide and Hypoxia generation
Harvest variation

Year-to-year variations in clam harvest and price

Decrease of sea-grass bed area

Hinasecho Fishermen Union

Reproduction of sea-grass bed

Sea-grass bed reproduction areas

Expanding sea-grass bed
Holistic governance from the top of the mountain to the sea

- Material cycling
- Resource management
- Social system innovation (production-consumption)
- Change of value
- Technology innovation

Fishermen and Citizen

- Fishermen are the main players for the creation of Sato-umi
- However, the population of fishermen is only 0.1% of the total population in Japan.
- The close collaboration of fishermen and citizen (99.9%) is necessary for the creation of Sato-umi.

Fish Productivity in the Seto Inland Sea
Reduce of fish catch in the Seto Inland Sea

Its causes
1) Regime shift
2) Variability of oceanic condition
3) Overfishing
4) Destruction of shallow sea
5) Marine pollution, eutrophication

8th EMECS (Environmental Management in Enclosed Coastal Seas) at Shanghai on 29 October, 2008

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- T. Yanagi (Kyushu University, Japan) “Definition of Sato-Umi”
- J. Greer (Maryland Sea Grant College, University System of Maryland, USA) “Resolving Oyster Conflicts in the Chesapeake Bay: The Concept of Sato-Umi”
- J.P. Decrotoy (University of Hull, U.K.) “Managing eutrophication in megatidal estuaries in North-Western Europe through Integrated Coastal Zone Management”
- W.K. Chang (Korea Maritime Institute, Korea) “National Initiative on Environment Management in Coastal area of Korea”
- J. Fang (Yellow Sea Fisheries Research Institute, Chinese Academy of Fisheries Science, China) “Development of integrated multi-trophic aquaculture in China”
- P. Songsangjinda (Coastal Aquaculture Research Institute, Department of Fisheries, Thailand) “Silvo-aquaculture: an ecosystem based management for sustainable coastal aquaculture in Thailand”
- B. Mosse (Pattimura University Ambon, Indonesia) “Sasi laut: History and its role of marine coastal resource management”
In 2000, then United Nations Secretary-General Kofi Annan called for a scientific-based assessment of the state of the world’s ecosystems. The following year, the Millennium Ecosystem Assessment (MA) was initiated and for the next 4 years over 1,300 experts across the globe were asked to assess the changes in ecosystems and the consequences of those changes to human well-being. Published in 2006, the MA framework has since been applied to continued ecosystem assessment analyses as follow-up work to the MA.

Efforts in Japan to join other sub-global ecosystem assessment work gained momentum in 2006 and scoping for a Japan Sub-Global Assessment (Japan SGA) was initiated by the Ecosystem Assessment programme at the United Nations University-Institute of Advanced Studies (UNU-IAS). In the fall of 2007, geographically delineated assessment teams referred to as clusters were formed and the Satoyama Satoumi Sub-Global Assessment (Japan SGA) began. The findings are to be published in the months leading up to the Tenth Conference of the Parties to the Conventional on Biological Diversity (COP10) in Nagoya, Japan in October 2010 in an effort to contribute to global discussions of biodiversity and sustainability.

This paper will introduce the governance structure of the Japan SGA along with the conceptual framework of the MA. This will be followed by exploration of the scoping process, specifically why satoyama and satoumi were selected as the focus for the Japan SGA, examining evolving working definitions of the concepts. Satoyama satoumi concept examination will be followed by a look at assessment efforts of the Hoku-Shinetsu Cluster. Working closely with non-academic stakeholders to collect data of satoyama satoumi over the last 50 years, this cluster applies a bottom-up approach. The strengths, limitations and potentials of multi-stakeholder bottom-up assessments will be identified in hopes to provide insight into future potentials of bottom-up
approaches to ecosystem assessment in areas where financial and human capacity may be limited.

One of the overarching aims of the Japan SGA is to link the findings to effective comprehensive policy making both at the local, regional and national levels in Japan. Further, the Japan SGA aims to link their findings to other SGA efforts around the globe, contributing to global discussions of sustainable resource use and conservation based on culturally diverse approaches which effectively combine traditional ecological knowledge with environmentally sound science and technologies. Whether or not the Japan SGA achieves these aims cannot be answered until the report is completed in 2010, however for the purposes of this paper, the potentials of satoyama satoumi assessments in Japan will be explored in hopes to identify common challenges and solutions of sustainable marine resource use, management and conservation that integrate locally-specific and universally applicable approaches.
Concepts and practices of SATOYAMA SATO-UMI Sub-Global Assessment in Japan

Habitat Protection, Restoration and Management (T3)
Indigenous Approaches to Habitat Protection and Restoration: Experiences in Sato-Umi and Other Community Initiatives

SATO-UMI WORKSHOP
Anne McDonald, Director
United Nations University-Institute of Advanced Studies, Operating Unit Ishikawa-Kanazawa

ECOSYSTEM SERVICES: the benefits people obtain from ecosystems & constituents of wellbeing
(modified from Millennium Ecosystem Assessment 2005)

constituents of wellbeing: security, basic materials for a good life, good social relations, freedoms and choices

MA Conceptual Framework
(modified from Millennium Ecosystem Assessment 2005)

constituents of wellbeing: security, basic materials for a good life, good social relations, freedoms and choices

JSGA Governance
(modified from UNU-IAS Japan SGA Secretariat governance structure 2008)
JSGA scoping process:
why the interest in satoyama satoumi today?
why satoyama satoumi?

nostalgia driven attempts to re-capture past traditional rural landscapes? or attempts to look to past traditions of resource management and human societies relations with nature as potential keys to unlocking the challenges of the future?

i) interest in satoguma satoumi landscapes and recognition of their potential as a prototype for a sustainable system has grown beyond conservation ecology circles to include policy makers and citizens concerned with the socio-cultural and environmental impacts of contemporary lifestyles in Japan.

ii) this growing interest in satoguma satoumi landscapes is in a sense reflective of the gradual shift in focus of the nature conservation movement; specifically that from conserving designated protected zones and/or remote areas separate from human settlements to conservation wherein human intervention in nature is recognized as an integral element. This has led to analysis of habitat modification and environmental degradation patterns observed through satoguma satoumi landscapes. Of particular interest to researchers is human intervention within satoguma satoumi environments and its impacts on species diversity, sustainable resource extraction, use and management.

defining SATOYAMA

satoyama
historical background: from feudal era to contemporary japan

i) first written reference to satoyama was in Miscellaneous Stories of Kiso Mountain, a book published in 1739 by forest manager Hyoemon Terauchi during the feudal Tokugawa Era (1603-1867). The book recorded the livelihoods of rural mountain woodland communities and used the term satoyama to describe the human managed mountainous landscapes surrounding those rural communities.

ii) the term satoyama, along with the nature views, lifestyles, cultural values, traditional knowledge and resource management practices embodied in the term, were introduced by forest ecologist Tsunahide Shide in the 1960s as agricultural woodlands. Shide's revival of the satoyama concept was in part a counter reaction to the fuel and chemical fertilizer revolutions of the 1960s and the impacts rapid economic development was having on the social, cultural and natural landscapes of Japan.

iii) satoyama has since evolved and is used in differing contexts. Among neo-traditional conservationists, satoyama often broadly refers to traditional rural landscapes and has become for many a symbol of human-managed landscapes where humans and nature coexist in a harmonious symbiotic relationship. As ecologists explore habitat modification and human use of natural landscapes, the satoyama concept has evolved to include what is described as satoyama landscapes comprising of satoyama, cultivated lands (Arashimaya), and reservoirs (traditional man-made irrigation ponds referred to as aramise and natural wetlands in uchui); all elements linked together as part of the traditional agricultural land use system of Japan.
defining SATOUMI

satoumi background

sato 里 = village + umi 海 = sea

i) satoumi concept was first proposed by Dr. Tetsuo Yanagi of Kyushu University in 1998. Dr. Yanagi defined satoumi as a coastal area where human interaction has resulted in a high degree of productivity and biodiversity, and where a deep relationship between human life and traditional culture has led to the coexistence of humans and nature.

ii) original focus of satoumi was the Seto Inland Sea area: communities working together with researchers and policy makers to assess human impacts on the coastal marine environments and ecosystems.


iv) Satoumi Creation Project initiated by the Japanese Ministry of the Environment (MOE) in July 2008. Currently 6 pilot projects in Japan, collected data from pilot projects to be used as the basis for a national Satoumi Manual.

JSGA efforts: defining satoyama satoumi for global discourse:

satoyama satoumi ecosystem assessment report (Japan sub-global assessment report, JSGA) working definition of satoyama and satoumi (24 July 2009)

satoyama and satoumi can be defined as dynamic social-ecological coupled production systems comprising of a mosaic of different ecosystem types producing synergy of a bundle of ecosystem services for human wellbeing. OR simply defined as: multi-functional socio-ecological production landscape

satoyama is rural landscape for agricultural and forestry production and livelihood comprising of communities, farmland, secondary forest, plantations, grassland, ponds, and irrigation and drainage systems.

satoumi is coastal landscape for fishery production and livelihood comprising of seashore, tidal flats, seaweed beds and grounds

characteristics of satoyama and satoumi
diverse mix of ecosystem types producing a bundle of ecosystem services, depending on specific depending on social, economic, and ecological parameters. In short, they are context and/or place specific.

unu-ias led satoyama satoumi ecosystem assessment efforts

linking the past to the present & to the future
integrating traditional ecological knowledge/local wisdom with science and linking these findings to effective integrated policy design

SOME QUESTIONS asked of JSGA contributors:

i) what is the historical context of satoyama & satoumi?

ii) what is the current state of satoyama & satoumi today?

iii) over the last 50 years, what are the drivers of degradation? (abandonment + overgrowth, overutilization and land-use change-driven degradation included)

iv) how does/can satoyama & satoumi contribute to sustainable resource management and biodiversity?
UNU-IAS led Satoyama Satoumi Sub-global Ecosystem Assessment Clusters

- Integrative approach: involving stakeholders from the beginning; addressing strengths and weaknesses of MA, specifically end-user involvement.
- Policy maker involvement in data gathering: i) limitations = policy prescriptive dangers, raised expectations; ii) potential strengths = assess policy making capacities of public, private, and non-profit organizations, link to end-user involvement.
- Limited human capacity leads to exploring partnerships with parallel initiatives. 
  - JADE Satoumi Creation Project in Nanao Bay, Ishikawa Prefecture—establish standing committee with members from academia, local-based marine environment and fisheries research stations, prefectoral and municipal government, river network-related NPO, fishermen cooperative, dive organization. 
  - Partner with education for sustainable development programme developed in Nanao Bay.
- Partner with other research initiatives: UNU-IAS Operating Unit and Ishikawa Community Development Division (preference for projects on transmission of traditions from satoyama and satoumi in Noto Peninsula). 
- Outreach activities: working with media: i) video briefs production of satoyama and satoumi in partnership with UNU Media Studio, collaborating with various partners, including those working in marine ecosystems.

JSGA Hoku-Shinestu Cluster Report
i) bottom-up approach
ii) Satoyama & Satoumi integrated approach

Source: UNU-IAS SGA Secretariat
Contact: Maiko Nishi at UNU-IAS

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- Policy maker involvement in data gathering: i) limitations = policy prescriptive dangers, raised expectations; ii) potential strengths = assess policy making capacities of public, private, and non-profit organizations, link to end-user involvement.
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Source: UNU-IAS SGA Secretariat
Contact: Maiko Nishi at UNU-IAS
ama-san: women free divers of hegura island, ishikawa
hereditary fishing rights & collective resource management
CASE OF FUSHINO RIVER ESTUARY INITIATIVES IN JAPAN

Masao UKITA*, Masahiko SEKINE* and Hajime YAMANO**
*Yamaguchi University, Japan, **Yamaguchi Prefecture, Japan

The studied area is located near the west end of Honshu Island and faced to Suo-nada, the west part of Seto Inland Sea. Tributary area of Fushino River is 322 km², the length is 30km. Population in the basin is 108 thousands. The area of Yamaguchi estuary is about 1700 ha. There exists tidal flats totally ca.350 ha.

Prior to focus on the river mouth area, we made the plan in 2003 for integrated management of the river basin, from forest to sea. The important keywords were, ‘local production and local consumption’, ‘think of the source when drink water’. Then, we followed the Nature Restoration Program of the Ministry of Env. The basic concepts are, ‘cooperation of local stake-holders’, ‘based on scientific knowledge’, and ‘adaptive implementation’. In 2004, we established the Conference for Tidal Flats Restoration of Fushino River Estuary consisting of citizens, academics, organization representatives, local governments totally 60. The environmental section of Yamaguchi Pref. mainly fulfills the office works.

The present important issues of the estuary are the decrease of fishery production especially short necked clam, the decay of sea grass fields, and the protection of endangered species like horse shoe crab. These problems are caused by the change of people’s activities such as forestry, agriculture, life style, waste treatment, construction works, land reclamation, nearby industries, global warming, fishery itself and so forth, during this half century.

Main works for restoration program are, trying to restore short necked clam by various ways, planting sea grass, surveying horse shoe crab distribution. Cleaning beach, cleaning river upstream and planting tree are also conducted by the cooperation of local people upstream and downstream. We issues local money ‘Fushino’ to stimulate those activities. As the results, the area of sea grass field has been gradually recovering. The net-covering on the tidal flat soil of plowed area was effective for the clam shell production to prevent the damage by eagle ray or gilthead.

Ongoing tasks are, further scientific study on the cause of the changes, study on the traditional Satoyama and Satoumi systems in the past, increase of participants and administrative support, promoting environmental friendly fishery, forestry and agriculture, and slow life with more free time in people’s mind.
Case of Fushino River Estuary
Initiatives in Japan

Masao Ukita*, Masahiko Sekine*,
and Hajime Yamano**

*Yamaguchi University, **Yamaguchi Prefecture

Fushino River
Area: 322 km²
Length: 30.3 km
Mountain height: ~ 688 m
Population: 163,000
Estuary: 1,700 ha
Tidal flats: 350 ha

There are wide tidal flats Naka-gata, Shinchi-gata and Minami-gata etc.,
totally 350 ha. We can find many kinds of birds, and endangered species
horseshoe crabs are still alive.
Changes of the river basin

• Population increase 117,000('60) → 163,300('00), mainly causing to the 3rd industries. While population working in the 1st industries decreased.
• Farmland decreased with urbanization.
  Paddy field 70 km² (1965) → 30 km² (2000)
• Agriculture: modernized (irrigation system, machinery use)
• Sewage treatment proceeded. 18% ('85) → 67 (%) '01)→75% ('05)
• Construction works: Shinkansen(-'75), Highway(-'83), two dams (-'88) (tributary area <5% of the basin), other river constructions to prevent disaster.
• Land reclamation 340 ha since 1947 to 1969.
• Gravel mining in mountain areas and previous sand mining in the river mouth area.

Possible cause of clam shell decrease
• Decrease of nutrient, N, P and others Fe etc.
• Sediment changed finer (increase of fine particles supply, and decrease of sand supply)
• Influence of eagle rays (Aetobatus flagellum) as predators, relating to global warming
• Network of larva supply was damaged by land reclamation and abused fishery

Change of fishery production in Yamaguchi estuary

Topographic map in 1902
Land reclamation area and period

50 years ago
Moderate mixing
Organic fertilizer
Cascade use
At present
Strong mixing
Inorganic fertilizer
Each by each use

Change of the style of paddy field increasing turbidity
Various changes relating the productivity of estuaries:

- Land development
- Construction for flood control
- Dam
- Artificial forest not well managed
- Decline of Salo-yama
- Change of paddy fields
- Intake
- Urbanization
- Change of Pollutant load
- Coastal construction
- Predation by Eagle rays
- Increase of fine particle soil
- Sink of sand and gravel
- Well
- Increase of fine particle soil
- Land reclamation
- Tidal flat
- Decrease of estuary circulation

Changes of main factors during 50 years relating to the decay of fisheries in Yamaguchi estuary:

Importance of cross sectional networks:

- Wetland
- Paddy field
- Flood water
- Soil bank
- River channel
- Bank with concrete
- Shelter in flood time
- Spawning and nursery place
- Decrease of wetlands
- Disconnection of river with paddy field

Networks of ecosystem in river basin (Two dimensions):

- Brooks in forest
- Ponds for Pooling water
- River bank with natural fluctuation
- Wetlands
- Lost of the continuity of organisms from river basin to the estuary
- Tidal flat
- Eelgrass field
- Paddy fields
- Waterways in residential area
- Waterways in Farm

Original figure after Kurio Takatsuki (Tokyo Kyoei Co.Ltd.)

Original figure after Yukihiro Shimatani Kyushu Unv.
**Dispersion of clamshell larva in Suo-nada using the model by CMES Ehime University**

**Spring**

Yamaguchi estuary

0630-0000day06hr

131.0 131.9 132.8

92.7

**Autumn**

1107-0000day06hr

131.0 131.9 132.8

92.7

After N. Tezuka (National Research Institute of Fisheries and Environment of Inland Sea)

Similar situations were experienced in restoring eelgrass field though of smaller scale.

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**Importance of the network for seed or larva supply**

Spring Autumn

For 2 weeks

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**Conclusion**

- To restore 'Sato-yama' and 'Sato-umi', we need the reconstruction of social system of environmental friendly fishery, forestry and agriculture. Self supply rate of these primary industries should be enhanced.
- We should recognize the importance of ecological networks from forest to sea. We are all connected including human beings, e.g. through micro-nutrients flow.
- We’d better establish new philosophy of environmental ethics relating to biodiversity.
Ago bay is semi-closed small inner sea located in Shima city, central Japan. This bay is famous for pearl oyster culture during one hundred years or more. All areas of Shima city including Ago bay are specified as national park. In recent years, organic loads of pearl oyster culture and drainages from coastal area increased gradually. So, frequent red tide and oxygen deficient waters occurred, and seriously damaged to pearl oyster culture and other fisheries.

From 2002 to 2007, Ago bay restoration project was carried out as “Environmental Restoration Project on Enclosed Coastal Sea”. The aim of this project was making better life through wise and sustainable use of coastal environment. In this project, we could develop important conservation techniques and systems for environmental restoration, such as construction of artificial tidal flats, recovering seagrass beds, continuous monitoring system and environmental simulation model of the bay. Many efforts were pay to corroboration with local populace, such as fishermen and regional public office. Outcomes of the project were pronounced to various academies, and applied to the many other regional and national projects. Also, report associations in region were held every year, and many populaces were participated in the association. In 2006 Shima city office announced the integrated plans for total conservation programs in Ago bay, such as effectively use of the results of the project, promoting pearl oyster culture and sightseeing industry, and applying to the environmental studies in the region.

After the project, environmental research center for closed sea was opened in fisheries research station of Mie prefecture, and worked as total managements and developing of the results of this project as an aspect of the administrative measure of Mie prefectural office. In addition, committee for the promotion of environmental restoration in Ago bay was started. This committee was established for reproduce the symbiosis relations between Ago bay and the regional citizens through an environmental restoration and maintenance of biological diversity and beautiful bay area, as an aspect of regional movements. In this committee, many participants were joined, such as Shima city office, fisherman union, several groups of NPO, representatives around Ago Bay area, researchers of Mie prefectural research station,
Mie and Yokkaichi University, Mie fisheries high school and others.

Around Ago bay area, social and economical circumstances changed drastically in recent years. Then, biological circulations and purification cycles were damaged by the excessive organic loads accumulating in the bay. Nowadays, we must have actions for symbiosis between natural environment and industry in region, as a new concept of the coastal sea management named “Sato Umii”, as the coastal sea with high productivity and high biodiversity under the mankind's interaction.
The Ago Bay Management Initiatives in Japan
Miyuki Maegawa, Hideto Uranaka

Current state and problems of Ago Bay
Ago Bay Restoration Project
2002-2007

Construct Large Scale Artificial Tidal Flat

- Area: 7200 m²
- Ground level: DL+1.2~0.8 m
- Slope: 2.5 m / 50 m
- Mixing ratio: 30%, 50%

Restoration Concept of Shallow Area in Ago Bay

Desirable tidal flat ecosystem

- Adding the nutrient (Using the dredged sediment)
- Reducing the nutrient (Promoting the water exchange)

Low ↔ Nutrient in sediment → High
Development of a new method for recovering *Zostera* bed in collaboration with fishermen

1. Collecting mature fronds
2. Selection
3. Encase seeds in *Zostera* mat

400,000 seeds!

**Advantages of *Zostera* mat**

1. All parts are made by natural materials (iron, jute and cotton) Environment-friendly technique.
2. The mats can successively be set from the boat on the sea bottom by connecting with cotton ropes. Low labor costs and no diving efforts.
3. Fisherman can do all procedures of the routine works.

After 3 months

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**Ago Bay Environmental Monitoring System**

- Monitoring Buoy
- Mouse of the Bay
- Raft system
- Inner Bay

**http://www.agobay.jp/agoweb/index.jsp**

Real time service

Internet System

Cellular Phone

Ago Bay Environmental Dynamic Model
Committee for the Promotion of Nature Restoration in Ago Bay from 2008

Aim
This committee was established for reproduce symbiosis relation between Ago-Bay and the citizen through a natural restoration of biologically abundant beautiful bay, which was famous for the cultured pearl and was the center of Ise-Shima National Marine Park.

Members
• Three groups of NPO around Ago Bay
• Fisherman Unions in Ago Bay (Fisheries, Pearl Oyster Culture)
• Representatives around Ago Bay region
• Staffs of Shima City Office
• Staffs of Mie Prefectural Research Center
• Scientist of Mie University and Yokkaichi University
  Total 25 groups and 8 members

Current works from 2009
3. Restoration of tidal flat and algal bed in Ago Bay by JST.
For the future of Ago Bay

1. Decrease the organic loads from land area.
2. Not to accumulate the organic matter on the bay bottom.
3. Abundance of biological diversity and progress of natural purification capability.
4. Transport organic matter to land ecological cycle from bay area.
5. Take good care of Ago Bay.

Thank you and please come to Ago Bay