

# RECENT SHIFT OF MANAGEMENT POLICIES OF THE SETO INLAND SEA, JAPAN WITH SPECIAL REFERENCE TO PROMOTION OF *SATOUMI* ACTIVITIES

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“The special law” on the environmental conservation of the Seto Inland Sea, Japan and governmental basic plan for the environmental conservation of the sea based on the law were both revised recently in 2015. Two major aims of the previous basic plan (1. conservation of water quality, 2. conservation of natural landscape) were reformed to broaden four new major aims (1. conservation and restoration of coastal environment, 2. conservation and appropriate management of water quality, 3. conservation of natural and cultural landscapes, 4. sustainable utilization of fish resources) in the revised basic plan. Historically, environmental management policy of the Seto Inland Sea had firstly made emphasis on water pollution control such as total pollution load control (TPLC). However, this kind of passive conservation policy is gradually being sifted recently to active conservation such as *Satoumi* which includes restoration of biodiversity, biological productivity, habitat and well balanced nutrient cycle between land and sea. Holistic approaches such as integrated coastal management (ICM), ecosystem-based management (EBM) and adaptive management were incorporated into new policy in Japan. These clear changes of management policies of the Seto Inland Sea will make change more detailed policy of every related prefecture and hence will promote *Satoumi* activities in near future.

*Keywords: environmental conservation, Satoumi, Seto Inland Sea*

## I. INTRODUCTION

### *Brief History of the Seto Inland Sea*

The Seto Inland Sea, the largest enclosed coastal sea in Japan, has long history in which plenty of ecosystem services have been provided. However, serious environmental changes due to land-based human activities occurred during the postwar reconstruction age after WWII. Rapid economic growth during 1960s to 70s was accompanied by serious water pollution, eutrophication and destruction of habitat such as tidal flat and sea grass bed in the shallow coastal areas [1]. Among many countermeasures, “the special law (Seto Inland Sea Law)” applied only for the Seto Inland Sea (Law Concerning Special Measures for Conservation of the Environment of the Seto Inland Sea) first enacted in 1973 played an important role. Major functions of “the special law” were area wide total pollution load control (TPLC) and suppression of land reclamation [2].

### *Brief Introduction to Satoumi*

What is *Satoumi*? Why much attention is paid to *Satoumi* nowadays? Since in Japanese “*Sato*” means local village or community where people live their life and “*Umi*” means the sea, simple literal meaning of *Satoumi* is the sea associated with local village or community. In many seas of that kind, sustainable community-based management of the sea had long been made historically in Japan with traditional manner. *Satoumi* is a traditional Japanese coastal ecosystem and landscape that used to be found in many coastal areas throughout Japan in days gone by.

However, during the phase of nation’s high economic growth, this type of traditional coastal management was gradually deteriorated affected by changes of local community and life style of the people. As a result, social demand to create a new type of *Satoumi* defined as high biological productivity and high biological diversity in the coastal sea with human interaction [3] has arisen and been strong. In Japan, community-based habitat restoration activities have been gaining ground in recent years partly because concept of *Satoumi* was incorporated into official institutional systems of national policy. Since *Satoumi* is originated in Japan but is sometimes said to be grown up in the Seto Inland Sea, *Satoumi* has close relationship with the deterioration of the sea and active conservation of the area by local people.

As a recent status of *Satoumi*, new concept for coastal sea management called *Satoumi* has been recently noticed not only in its originated place of Japan but also in many countries including both western and Asian countries. International edition of the books on *Satoumi* published by such international organization as United Nations University and Secretariat of the Convention on Biological Diversity (CBD) also contributed to expand *Satoumi* activities in the world [4],[5].

## II. CHANGE OF THE ENVIRONMENT AND ECOSYSTEM

TPLC system in terms of COD, Total Nitrogen (TN) and Total Phosphorus (TP) has given significant effects on the improvement of water quality. For example, number of the occurrence of red tide decreased from about 300 a year at the peak age to about 100 in recent years. Concentration of TN and TP in sea water also decreased and recently it cleared legal environmental standard in many areas of the Seto Inland Sea. However, since suppression of land reclamation does not mean total ban of land reclamation, effect of the policy was restricted. As a result, shallow area in particular of tidal flat and sea grass bed has been drastically lost during recent 50 years.

Change of pollutant load from land and change of water quality in the Seto Inland Sea due to TPLC system is very clear. The load of COD, TN and TP decreased during the year of 1979 to 2014. Generally, concentration of TN and TP in sea water is proportional to TN and TP load per unit area of the sea. It means that water quality in terms of TN and TP have been much improved.

While, biodiversity of the Seto Inland Sea seems to be decreased because species number of observed sea shore animals in Kure area decreased drastically from mid 1960s [6]. Tidal flat and sea grass bed around the Seto Inland Sea decreased mainly due to land reclamation and therefore artificial coastline increased. These indicate that habitat condition is deteriorated. Fish catch data indicate that fisheries production is decreasing after the peak age of mid 1980s. From these results, it can be said that ecosystem services available is decreasing in the Seto Inland Sea although water quality has been improved so far to some extent.

Major environmental and related problems in the Seto Inland Sea in recent years can be summarized as following.

In broad sense:

Deterioration of ecosystem, natural resources and ecosystem services

Decrease of biological diversity and biological productivity (fish catch)

Weakened relationship between human and the sea

In narrow sense:

Occurrence of red tides and oxygen depleted in bottom water

Deterioration of benthic environment and sediment quality

Disappearance of biological habitat for reproduction and spawning

Insufficient nutrient in laver (*Nori*) culture ground in winter

### III. PRESENT STATUS OF *SATOUMI*

#### *Satoumi in Japan*

Historically, *Satoumi* has evolved as traditional Japanese way of coastal management in which local communities co-existed with nature. In *Satoumi* concept, people's livelihood and their culture are deeply involved, biological productivity is sustained, biological diversity is protected and conserved while ecosystems are able to sustained and material cycling is maintained. These community efforts were undertaken through comprehensive and integrated manner from upland forest and rivers to coastal seas. Therefore, concept of *Satoumi* primarily provides holistic management of watershed including forest, local communities and coastal environments [7]. Combination of *Satoyama* that focuses on forest and agricultural land with *Satoumi* is also expected to develop a Japanese model of integrated coastal management (ICM) [8].

In many *Satoumi*-like coastal seas in Japan, sustainable community-based management of the sea had long been continued historically 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 due to social changes based on the economic development of the nation. During the same period, coastal environment, habitat and living resources were also seriously damaged by water pollution, eutrophication and land development based on urbanization and industrialization of coastal area [9]. Instead of obtaining efficiency and convenience due to industrial development, valuable natural capital such as natural environment, natural resources and natural landscape was lost. As a result, social demand to create and establish new type of *Satoumi* defined as high biological productivity and high biological diversity in the coastal sea with human interaction has arisen and gradually gained ground. In other word, "*Satoumi* Renaissance" is taking place in order to restore once lost rich and healthy coastal sea by community-based participatory activities. In other word, the sea where *Satoumi* activity is necessary, conditions of natural environment and ecosystem are so deteriorated as not to be able to recover by themselves without support by human behavior.

In Japan, community-based habitat restoration activities have been also gaining ground in

recent years [10], [11]. This is partly because concept of *Satoumi* was incorporated into official institutional systems of national policy such as the Basic Ocean Plan (2008) based on Basic Ocean Act (2007) and some national environmental strategies.

The Governor's and Mayor's Conference for Environmental Conservation of the Seto Inland Sea has been seeking new policy based on the concept of *Satoumi* since 2004. Some local governments out of Seto Inland Sea area also introduced *Satoumi* concept as official policy. For example, Shima city, Mie prefecture which has long promoted environmental restoration of Ago Bay [12] established an official Basic Plan for *Satoumi* Creation of the city in 2012 based on the concept of *Satoumi*.

#### *Satoumi in the international society*

New concept for coastal management called *Satoumi* 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. Major points of discussion on *Satoumi* so far done at international meetings were on the relationship between the original concept of *Satoumi* and already proposed related concepts such as ecosystem based management (EBM), community based management (CBM) and integrated coastal management (ICM). The first presentation on *Satoumi* by the author in the international meeting was made in 2005 at the PEMSEA (Partnership in Environmental Management of Seas of East Asia) meeting held in Korea, where strong attention to *Satoumi* was paid by Asian participants. In 2006, at EMECS7 (7<sup>th</sup> Conference on Environmental Management of Enclosed coastal Seas) held in Cean, France, concept of *Satoumi* and related local activities were introduced by Yanagi and Matsuda, respectively, with other case studies in Japan on Ago Bay. At the reviewing session of EMECS7, *Satoumi* was highly evaluated as symbiosis among human communities and coastal area.

In 2008, at EMECS8 held in Shanghai, China, specialized *Satoumi* Session was held in order to deepen the concept collecting many similar cases of management and good practices from various countries. As a result of this workshop, it was made clear that there were many similar types of sustainable coastal management, ecosystem-based management and community-based practices in the world. Indigenous knowledge, traditional culture and community-based actions have already contributed significantly in protecting and restoring coastal ecosystem, 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.

In 2009, another "*Satoumi* Workshop" was organized in the EAS-Congress 2009 which was held in Manila in order to discuss *Satoumi* from the view point of indigenous approaches to habitat protection and restoration in Asian countries for farther understandings of *Satoumi* and related practices. And then CBD-COP10 was held in Nagoya, Japan in October 2010 in which many *Satoumi* related activities were made. In EMECS9 which was held in Baltimore, USA, in 2011, *Satoumi* session was organized in order to disseminate the concept of *Satoumi* internationally.

#### IV. RECENT SHIFT OF MANAGEMENT POLICY IN THE SETO INLAND SEA

Environmental conservation and management policy firstly made emphasis on water pollution control. However, this kind of passive conservation policy is gradually being sifted recently to active conservation such as *Satoumi* which includes restoration of biodiversity, biological productivity, habitat and well balanced nutrient cycle between land and sea. Holistic approaches such as ecosystem-based management (EBM), integrated coastal management (ICM) are also being incorporated in new policy. In the recently revised governmental basic plan for the environmental conservation of the Seto Inland Sea (2015) based on “the special law”, 2 major aims of the previous basic plan (1. conservation of water quality, 2. conservation of natural landscape) are reformed to 4 major aims (1. conservation and restoration of coastal environment, 2. conservation and appropriate management of water quality, 3. conservation of natural and cultural landscapes, 4. sustainable utilization of fish resources).

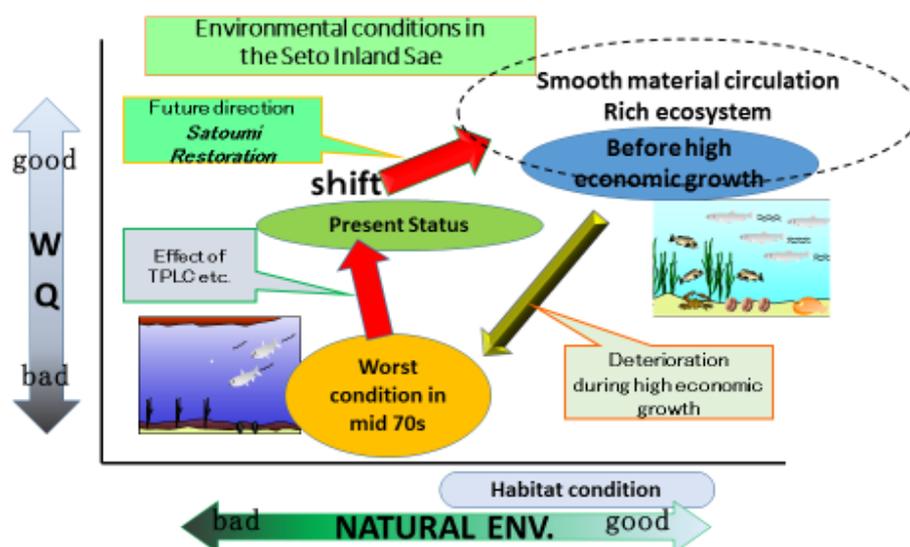


Fig. 1. Conceptual view on recent shift of environmental management in the Seto Inland Sea

Conceptual view on future direction of environmental management in the Seto Inland Sea is presented in Fig.1. This figure shows past, present and future environmental condition are indicated on X-Y axis in which horizontal axis shows natural environmental condition such as habitat condition and vertical axis shows water quality. Recent shift means that not only improvement of water quality but also more active conservation such as restoration of deteriorated habitat and promotion of *Satoumi* activity are necessary. This shift of management policy may help to realize smooth material circulation and rich ecosystem.

#### V. SATOUMI IN NEAR FUTURE UNDER NEW POLICY

In close relation to *Satoumi*, ecosystem-based management (EBM), community-based management (CBM) and ICM were so far discussed in the international meeting. Since *Sato* means community and *Satoumi* also focuses on relationship between human and nature, *Satoumi* can be

a type of diversified CBM. *Satoumi* is also focusing on biological diversity and biological productivity, and therefore, *Satoumi* can be a part of EBM. Besides, combination of *Satoyama* and *Satoumi* can be a type of ICM including both land and sea. Similarities and differences among *Satoumi*, CBM, EBM and ICM should be made clearer with easy-to-understand manner in near future.

As an outcome of the specialized *Satoumi* session of EMECS8 in 2008, the Shanghai Declaration adopted on the final day of the conference incorporated *Satoumi* as follows. “*Satoumi* places increased emphasis on promoting positive interaction between humankind and our enclosed coastal seas. That interaction can take many forms. It may be realized through concerned, continuous environmental conservation activities. Sustainable economic return through ecosystem-based resource management and agricultural practices are other aspect of *Satoumi*.” “Finally, *Satoumi* 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.” And the Declaration was concluded by saying “We must act on the principle that land, water, and people are integral components of the world’s coastal seas. Economy and environment are intertwined with art and nature. All are bound together by education. This is the lesson of *Satoumi*. This will help us keep our course on today’s troubled waters. This is what we wish to pass to the next generations. This is our commitment. This is our promise.” This message is still very true at present and in the way forward.

As a result of the “*Satoumi* Workshop” of EAS-Congress 2009, understanding of *Satoumi* deepened in relation to indigenous knowledge and community-based management in Asian countries. During the discussion session of the Workshop, *Tri Hita Karana*, Balinese philosophy of life was presented from a participant from Indonesia. In Bali, outlook and philosophy is called *Tri Hita Karana*, which literally translates as the Three Causes of Prosperity, bringing about harmonious relationships: Human to God, Human to Human, and Human to Nature. Since *Tri Hita Karana* has something in common with *Satoumi*, comparative discussion between *Tri Hita Karana* and *Satoumi* is very suggestive to the relationship between human and nature giving new insight into *Satoumi* in future.

As a result of EMECS9 2011, the Baltimore Declaration has been adopted in Baltimore, Maryland USA, on the shores of Chesapeake Bay. The declaration was saying that “The adapting of our activities to regional environmental conditions is tacit acceptance that we are integral components of coastal ecosystems. We strongly believe that this recognition is long overdue: throughout history mankind has modified the ecology of enclosed coastal seas for better or for worse, and they have in turn influenced the economy, culture, and prosperity of coastal communities. The innovative concept Sato-umi (= *Satoumi*), high productivity and biodiversity in the coastal sea with human interaction, is an example of this perspective. We encourage policy makers to adopt the point of view that, by taking actions to benefit our enclosed coastal seas, we are also benefiting ourselves.” This is also very suggestive to *Satoumi* activities in near future.

From these above, next possible step of *Satoumi* might be as follows. Integration of science

into management decisions and managing habitats through application of biological information from all available data sources is necessary. Recognizing the importance of ecological networks from forest, river to the sea including human dimension is also necessary. A comprehensive management of the material flow from hilltop to the coastal environment is essential for successful coastal management. Managing coastal habitats by participatory activities of people based on increasing public awareness, adopting appropriate legislation and enforcement is also essential. Coordination across sectors to improve governance and efficiency, and addressing trans-boundary issue are most important in the future management of *Satoumi* both in domestic and international context. In order to restore once lost rich and healthy coastal sea in the deteriorated area, *Satoumi* can play a role of active conservation measures to restore deteriorated ecosystem [13]. Valuable coastal area such as tidal flat and sea grass bed which were already lost by land development were historically a kind of commons or shared space for people. And therefore to take back such kind of common space for people is also important role of *Satoumi* in future.

## Kagawa's Vision for the Creation of *Satoumi*

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1. Introduction to *Satoumi*: Why Now?
  2. Purpose: Objectives of the Vision
  3. Current Status and Issues: Changes in the Seas of Kagawa
  4. Approach to the Creation of the Ideal *Satoumi* for Kagawa
  5. Directions for the Project: (1) Characteristics of *Satoumi*  
(2) Six Key Points for Carrying Out the Projects

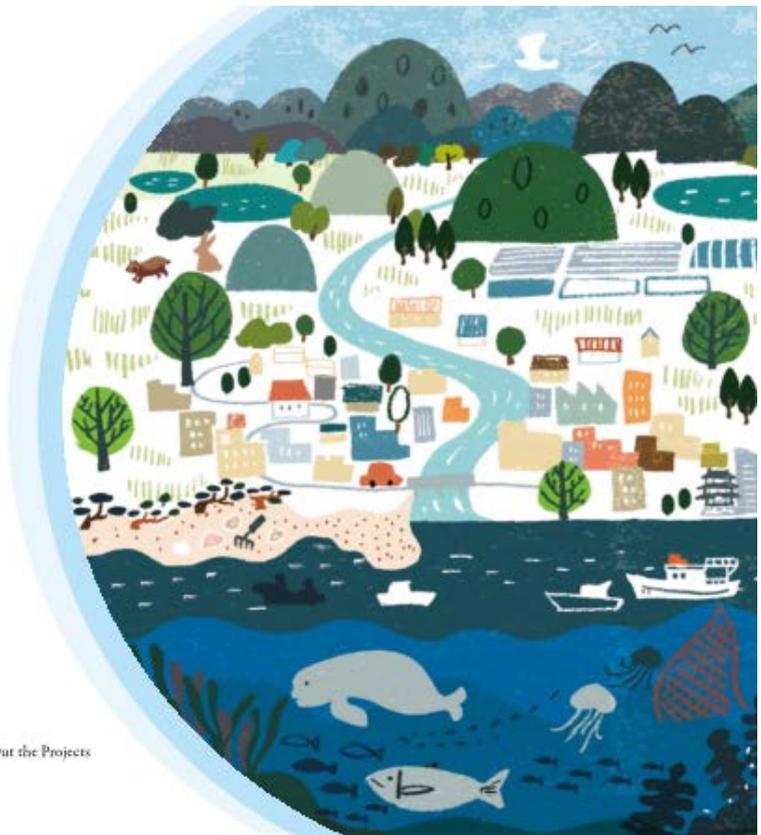


Fig.2. Kagawa prefecture established new vision for the creation of *Satoumi* in 2013

Based on the revised special law and national basic plan on the Seto Inland Sea, every local government of prefecture around the Seto Inland Sea is requested to revise the environmental management plan of the prefecture level by the end of 2016. This new management plan of each prefecture level is to reflect the concept of recent shift directly and will contribute to promote *Satoumi* activities. In the case of Kagawa prefecture, the prefectural government has ever promoted *Satoumi* as an official policy (Fig. 2). This *Satoumi* policy of Kagawa prefecture will be

incorporated into the revised prefecture plan based on the revised special law. This kind of enhanced policy will promote local activities for the creation of *Satoumi* in near future.

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