

[Introductory Note]

Recent Changes in the Seaweed Ecosystem along Kuroshio Current
-Towards Collaborative Rehabilitation of the 'Cradle of Fishes'-

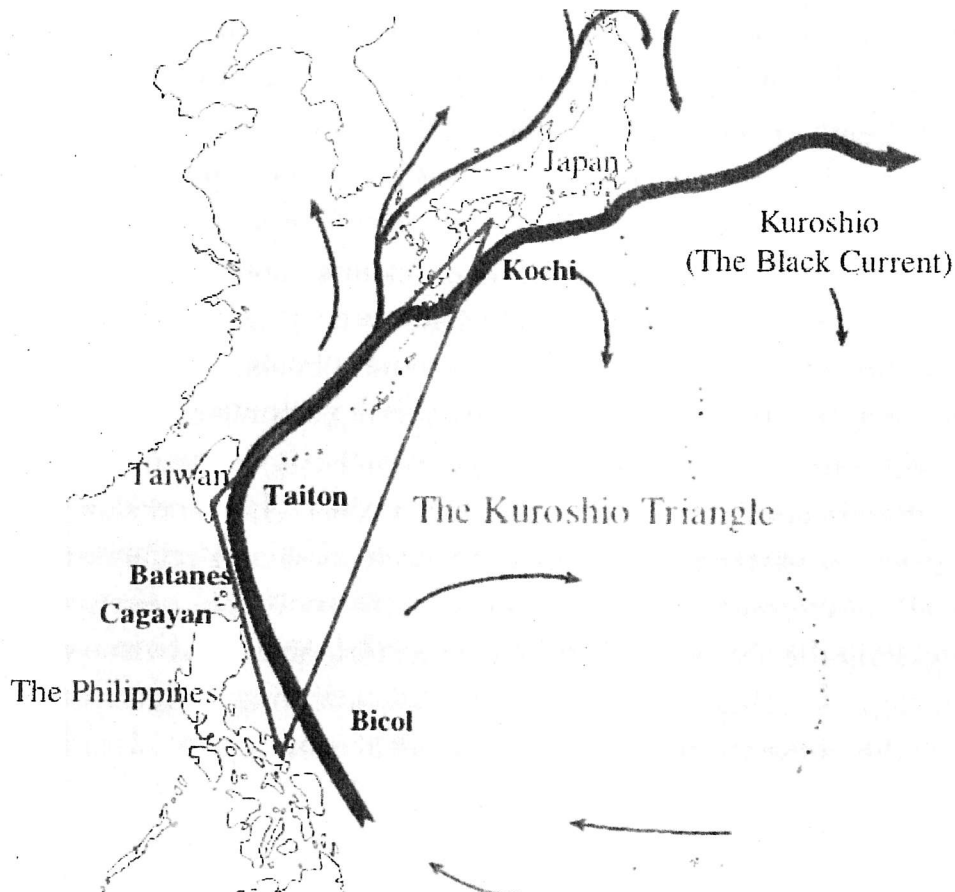
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Background

In coastal areas, especially along the Kuroshio Current flowing from the Philippines to Japan via Taiwan, the environment has been continuously affected by internal factors such as population fluctuations, industrial development, and daily life activities, and by external factors including climatic changes and global warming. These conditions interact in a dynamic manner, impacting the coastal environment and marine ecology.

The coastal area, particularly seaweed-bed plays significant role as breeding and nursing grounds for fish juveniles. Because of this function, seaweed-bed ecology has been called as 'a cradle of fishes'. However, since the ecosystem is delicate and fragile in nature, damages caused by



beach scorch (barren rocky shore), one of the indicators showing the stage of coastal environment conditions, are getting more serious. Ministry of Environment reports that due to the various factors including the beach scorch, the total area of seaweed-bed in our country decreased by around 30% during the 20 years from 210,000ha in 1978 to 150,000 in 1998. The speed of deterioration was accelerated during the later 10 years. It is also reported that this tendency is getting wider and faster not only in Japan but also in almost all Asian countries.

In addition, due mainly to global warming, seaweed species also shows changing tendency. For example, *Sargassum*, one of the most popular species because of wide distribution along the Kuroshio Current, tends to change so that the temperate ones have declined and have been replaced by the tropical species according to the survey results conducted since 1970's at Tosa Bay in Kochi. These changes caused by both internal and external factors are causing serious concerns regarding their effects on the sustainability of marine resources including fishes and other marine life in the near future.

Objectives

For the purpose of preservation of the marine environment, under the auspices of the United Nations Convention on the Law of the Sea, various activities are being conducted throughout the world. In Japan, The Basic Law of the Sea that was enacted in April of 2007 cast light on the recent deteriorating conditions surrounding the coastal area as well. In this connection, elucidation of its underlying causes and development of preventive measures constitute an important area of research to be done through collaborative activities, on a multi-country basis.

How do people who reside in the neighboring countries deal with the situation, and how do they cope with the coastal environmental problems which are affecting each country beyond the border? This workshop aims at enhancing our understanding towards the protection and rehabilitation of the coastal environment, with special reference to seaweed-based ecosystem along the Kuroshio Current in the Philippines, Taiwan and Japan. The workshop is being convened with the following objectives: 1) to understand the present status of the seaweed ecosystem; 2) to identify

problems and constraints, and 3) to exchange academic views on priority collaborative study areas for providing recommendations and strategies on seaweed-based ecosystem rehabilitation and protection within the targeted period.

Preparatory works by GSKS, Kochi University

With the above mentioned background and objectives in mind, Japan (mainly in Kochi), Taiwan and the Philippines, three countries which face the Kuroshio, were focused upon. More specifically, the effects of internal and external factors in adjacent shore areas on island environment were observed and compared with special reference to seaweed bed ecology. In our preliminary survey during the last 2.5 years from March 2005 to September 2007, the status of beach scorch and its effects on coastal resources were examined at sites selected in Kochi Prefecture and adjacent coastal areas, several spots in Taiwan and the Philippines. Results for these areas in three countries linked by the flow of the Kuroshio were observed in a comparative manner.

Data obtained is planned to serve as basis for cooperative research between related countries after reviewing them in consultation with counterpart's agencies with the aim of promoting sustainable development relevant to coastal management and preservation.

Preliminary survey at selected sites:

During the past years, 1) ecological survey of the status of seaweed beds, associated fishes and coral reefs; and 2) socio-economic survey of the status of land and resource utilization including the effects of land use were carried out by two groups:

1) Selection of research sites

In Kochi:

Tosa Bay area (Kochi City)

Coastal areas of the Kashima-jima region (Otsuki Town)

In the Philippines:

Cagayan Province in the northern part of Luzon

Albay Province in the southern part of Luzon

In Taiwan:

Green Island at Taiton (under consideration)

2) Group organization

Group A: Ecological survey of the status of seaweed-beds and fishes associated:

In designated survey areas, sites in which socio-economic activity shows differing effects on seaweed ecology, artificial reefs, and aquatic animal species inhabiting seaweed beds and reefs were subjected to investigation for identifying species composition and relationships among these species, and the status of the ecology of these areas and relationship to human activity.

Group B: Socio-economic survey of the status of land and resource utilization:

In the designated survey areas, the status of agriculture and forestry-related activities, public works-related construction and the like in the context of land utilization, as well as that of fisheries and tourism related activities and other industries and activities relating to resource management in shore areas were mainly observed.

3) Collaborating organizations

Japan:

Graduate School of Kuroshio Science, Kochi University

Taiwan:

National Sun Yat-sen University(NSYSU) in Kaohsiung

The Philippines:

University of the Philippines(UP Diliman & Visayas)

Bicol University(BU) Tabaco Campus

Bureau of Fisheries and Aquatic Resources(BFAR), Department of Agriculture, Cagayan

Expected output

The results obtained through our preliminary survey will be disseminated to the relevant professionals concerned with environmental preservation, and will serve as a basis for the further promotion of regional

development, especially in coastal areas of both countries.

More specifically, the following results are expected to be obtained:

- 1) The current state of marine environments, especially relating to the status of beach scorch, in maritime areas facing the Kuroshio will be elucidated. In particular, comparative data indicative of the extent of environmental degradation will be obtained and made available.
- 2) Factors responsible for changes in the maritime environment will be identified, and underlying causes relating to the factors will be elucidated.
- 3) The inter-relationships among mountain/village/river/ocean entities will be elucidated, and academic/technical data relevant for promoting sustainable regional development will be obtained and made available.
- 4) In consideration of environmental preservation in coastal areas of both Japan and the Philippines, fundamental data relevant to the formulation of policy covering both maritime areas and specific regions will be obtained and made available.
- 5) Specific policy recommendations and plans of action relevant to the situation in the 3 countries will be formulated for the consideration of the respective governments and regulatory authorities.

I. General Overview of Multi-country Conditions During Discussion

- 1) All countries have appreciation of protection of the marine ecosystem for sustainable development of marine resources for livelihood of coastal population dependent on them.
- 2) However, there is considerable difference in the social and economic situation of coastal communities in the 3 countries and the actual options available for policy and action plan choice may differ greatly from country to country.

II. Items for Workshop Discussion on November 22

- 1) Discussion on items 1 to 5 above with regard to relevance and adequacy.
- 2) Prioritization of research subjects by country
- 3) Implementation plan of research activities covering topics mentioned in Items 1 to 5 above
- 4) Areas for collaborative research activities