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Environmental education related to coral reefs

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1 Maritime culture and education

When talking about the maritime culture in Japan up to the early modern age, the well-developed traditional use of coastal areas is known world-wide. However, in spite of this cultural climate in an island country, the industrial activities and development of modern society have caused significant degradation of the coastal areas that should serve as cultural settings. This is a result of an increasing disrespect for traditional culture and an overemphasis on modernization and economic growth since the Meiji Restoration. As a result, traditional culture cannot be expected to be effective, and a new way of life has developed in which people have turned their backs on the sea as a source of culture. One cause of the decline in maritime culture up to now must be its exclusion from modern education. This omission is a contributing factor in the rise of various types of pollution.

The need for environmental education in the public education system in Japan has been recognized as an approach to addressing the environmental pollution issue that became obvious by the 1960s with the rapid economic growth of the post-WWII period. Environmental education was provided in individual schools at various levels, while the issue of environmental pollution was considered in relation to individual regional matters. However, education treated pollution events as exceptions and the emphasis was on subjects that favored development. While some attempts at social education, including citizen courses on the environmental pollution issue, achieved significant results during this period, most civic actions focused on solutions that minimized the problems, leaving them to future generations. Thus, there were only a few general books and other educational materials available, and those were difficult to use in environmental education or were heavily biased in content. There is, therefore, room for research and overall reorganization.

The situation is no different in Okinawa Prefecture, a center of coral reef distribution. During the rule of modern

Japan after 1879 and of the U.S. military in 1952-1972, education meant no more than a course in the school curriculum with nothing at the level of the general public. After its reversion to Japan in 1972, Okinawa was integrated with the Kyushu block, administered together with Kagoshima Prefecture, including the Amami Archipelago in the north of the Ryukyu Islands. This reduced the importance of the geographic and climatic features of coral reefs, and there were few opportunities to include coral reefs in public education. Moreover, while the Japanese Archipelago extends north to south from the subarctic to subtropical zones (45°33'N to 20°25'N), science education curricula are standardized to the temperate zone where the population is concentrated. This is problematic, because education establishments are not uncommon in coral reef regions.

This chapter describes recent environmental education programs that focus on the integrated understanding and conservation of coral reefs.

2 Current state of school education

As mentioned above, it cannot be said that much time was spent on education about coral reefs in Okinawa, but some notable activities were developed. What systematic approaches were seen in school education (Ohwan 2003), however, were not in a curriculum but were either based on the efforts of individuals or took considerable time to be incorporated into a curriculum. This situation is expected to change following the implementation in 2002 of the so-called New Teaching Guidelines. These include a period for integrated study, making it possible to find enough time for experiential study outside the school, not limited by the framework of conventional subjects. However, there are not many schools with enough experience to make the best use of this opportunity, and most still lack direction. Against this background, this section describes some attempts to find a new direction, and compares them with examples from other areas.

1. An approach taken in Nago and Sakieda elementary schools

One systematized approach has been taken by Nago Elementary School in the city of Nago (Yasuda in press). Its aim is the students' acceptance of the coral reef islands and their natural environment as part of their lives, through steps carried out over seven years from the start in the adjoining Nago kindergarten to graduation from elementary school. The goal is the establishment of an attitude of caring for nature as part of the culture through closer interaction with nature, an emphasis on play and recreation, and the opportunity to absorb knowledge of the natural environment by doubling the work-study in the latter half of the curriculum (Nago Elementary School and Nago Kindergarten 2001).

The first graders enjoy playing with kindergartners on the safely managed artificial public beach and, after they become second graders, they have fun with tidal organisms on the same beach. The third graders touch marine organisms in the touching pool in the aquarium and listen to explanations, while wanting to visit the natural coast nearby. They go to the coast immediately after that, to feel the breath of nature and living organisms in their hands. The fourth graders, after prior scientific study, relate the living organisms and their habitat to the geographical features of coral reefs. The fifth graders aim to understand the physical distance between coral reefs and other island habitats, and to attain a concept of the diverse and close relationships between them, by ascending a river in Yambaru, the northern forest on Okinawa Island. As a conclusion to the above study, the sixth graders go to the mouth of an urban river, interact with local people through cleanup activities, and observe coral reefs and the people who live near them. They become junior high school students with an awareness and understanding of the transition of human activities and what accompanied it. These steps are expected to nurture an understanding that cannot be gained from a transient event such as an occasional cleanup activity.

In parallel with that, children of the fourth grade or higher experience marine leisure activities such as banana boat rides, coming in contact with the adult world and developing their recreation experience in nature from memories of playing on the beach in lower grades. The fifth and six graders try sea kayaking and dinghy sailing as marine sports, and realize that experiencing the richness of nature is important in forming a personality. In

addition, acquiring safety skills through sports is expected to increase their familiarity with nature and to deepen their understanding of it. In New Zealand and other countries that boast a rich maritime culture, such marine sports and recreation are now popular, and, together with tradition, they play a key role in the acquisition of this knowledge and insight (Tani *et al.* 2003). It is thought that such an attitude toward play and learning contributes to a culture of environmental conservation and to educational activities at the level of the general public.

While the development of a long-term curriculum corresponding to children's development was partly owing to the size of Nago Elementary School, which has some 100 students per grade, there is a concentrated effort to involve the entire region in a smaller school. In the Sakieda Elementary School in the city of Ishigaki, which has fewer than 20 students, a year-long experiential study of the environment of the region was planned as a large unit of 100 hours, aimed at improving the prevailing low level of awareness of the richness of nature (Ohmine 2003). The motivation to visualize and implement the plan came from local residents, who had a high level of awareness and involvement in environmental education. In addition, the cooperation of the Ministry of the Environment Okinawa Amami District Nature Conservation Office, the Okinawa Prefectural Institute of Health and the Environment, local fishermen, environmental not-for-profit organizations (NPOs), eco-tour organizers, and others was a critical factor.

This background has allowed the development of thinking on environmental studies. The case of Nago Elementary School is expected to create a new awareness of the environment and to establish it as cultural property in the process of raising children in the regional society. The supportive framework of the Ministry of the Environment, which serves as the backbone of these activities, is described below.

2. Activity of the Ministry of the Environment

The International Coral Reef Research and Monitoring Center was established by the Ministry of the Environment at Ishigaki Island in Okinawa. This institution develops educational materials and conducts joint programs with elementary schools on coral reef matters, in addition to public services such as providing information on a website and giving explanations to visitors.

Educational materials include 'Coral reefs in Yaeyama'

(Nature Conservation Bureau Ministry of the Environment 2002b), which provides a brief introduction to the coral reefs of the region; a teachers' guide for educating children about coral reefs (International Coral Reef Research and Monitoring Center 2002a), and 'The coral book for kids' (International Coral Reef Research and Monitoring Center, Ministry of the Environment) which contains a coloring book and puzzles that children can enjoy while learning. These materials are distributed to local schools. The teachers' guide includes various examples of teaching activities. It consists of a pre-site program (for classroom lectures before going out in the field), an on-site program (field guidance for observation, learning, and snorkeling, etc.), and a post-site program (for activities based on the on-site program), to be used in combination in any kind of situation.

Using this teaching guide during the period of integrated study in elementary school, an education program on coral reefs was started in fiscal 2002 with the support of the Ministry of the Environment. This program was applied in Sakieda Elementary School (3-6 graders, totaling nine students) in fiscal 2002 and in Shiraho Elementary School in Ishigaki (5 and 6 graders, totaling 44 students) in fiscal 2003, respectively. At the end of the program, students presented their year's accomplishments to the local people. The expected outcomes of this program are: 1) the students come to recognize the beauty and diversity of coral reefs through snorkeling, which is often avoided in school programs for safety reasons; 2) the flexible application of a variety of programs, made possible by the cooperation of teachers, experts, and ministry officials; and 3) the encouragement of overall community understanding, and an awareness of coral reefs as their own community property, through the public presentations to local residents.

The effective application, dissemination, and continuation of this program will require the implementation of training sessions for teachers, the provision of necessary support and advice, and the establishment of a backup framework involving local residents.

2. Environmental Class in Hentona High School

In the Okinawa Prefectural Hentona High School an environmental class was established in fiscal 2001 with the aim of sharing the social challenge of the accumulated environmental problems with the school students and developing the next generation's behavior based on nurtured understanding. The school, however, has experienced problems in developing a curriculum, maintaining

a laboratory, and counseling on college choices, and is searching for solutions (Yamashiro 2003). The background of the situation is that social attitudes as a whole toward environmental problems have not been settled. Therefore, the systematization of environmental education has just begun, and certified teachers and established guidelines are needed. It is a problem not only in school education but in social education as a whole.

3 Current state of social education

The Act for Arranging Integrated Recreational Areas (the law for integrated resort area maintenance) was enacted in 1987 to review the leisure sector of the nation. Under this law, large-scale resort development was planned nationwide, but the plans did not predict social and economic changes, and one after another were frustrated by heavy debt. The basic policy was finally reviewed in 2004 (Kyodo News Service, Feb. 25, 2004). The enactment of the law specified the whole of Okinawa Prefecture, which aims to base its development on sightseeing, as a designated area for the 'Okinawa Tropical Resort Plan'. In 2004, when the basic policy of this law was reviewed, 202 of the 341 facilities included in the resort plan remained undeveloped (Ryukyu Shinpo, Feb. 26, 2004).

The social and economic situation that emerged from the review of the law was one of economic stagnation and the frustration of many plans when the expected numbers of tourists were not realized. In Okinawa Prefecture, however, inbound tourist numbers continue to increase and exceeded 5 million in 2003 (Ryukyu Shinpo, Jan. 16, 2004). This shows that tourists find the charm of Okinawa outside the many facilities planned under the law. The charm is the distinctive and vividly developed culture and the natural environment of the coral reef islands.

Eco-tourism, in which tourists experience nature and culture, is a key element in recent sightseeing in Okinawa. Many of the school excursions from the Japanese mainland have adopted observation of coral reefs with professional guides as a part of environmental studies. Some of these school excursions have produced excellent supplementary readers and a website (Seishin Girl High School*). It should be noted that contributions to these activities have been made by local municipalities, such as prefectural museums, and the Environmental Health Department of Okinawa Prefecture, through publications produced for local nature study, as well as general books

on nature (Ikehara 1984, Nishihira 1991, 1992).

A fusion of conventional nature observation and eco-tourism is expected to develop as environmental education for citizens. However, the natural sightseeing experience of many school excursions and general tourism easily fall into so-called 'mass tourism', disturbing the environment through unregulated use, even in coral reef regions such as Yabiji Reef of the Miyako Archipelago (Ryukyu Shinpo, Apr. 10, 1998). Eco-tourism originally developed as a new use of natural resources that escaped development in developing countries. It is based on various rules, the main feature of these being the restriction on entrance to an area. It is surprising that Okinawa lacks a system and teachers to properly address the increasing demand for a nature experience among citizens. Fortunately, various groups including NPOs, Okinawa Prefecture, and other municipalities have started to examine the rules and to encourage teachers, but the process has only just begun.

4 Views and problems in the future

At Chamonix, in the French Alps, a national training school has been established for mountain guides. The guides trained there are expected to have high levels of cultural understanding and ethics, as well as excellent mountain climbing skills. In addition to mountain climbing safety and rescue, they play a key role in local education and nature conservation in the alpine environment. This is related to the fact that the guides have a good understanding of the natural environment of the region and that sightseeing in the mountains is an important part of the regional economy. The mountain guides are therefore leaders in the local society. Over time, a regional consensus has established that the environment and culture should be conserved and that the way of life should be maintained entirely by these resources. By promoting this idea, protected areas (eco-museums) have been established in various parts of France (Tsuchiya 1999). The National Trust in Britain, which was ahead of the rest of world in the field of developing protected areas, also focuses on education related to the environment and culture. In addition, national park rangers in the United States may have various qualifications, including doctoral degrees, and are leaders in environmental education with a high level of authority and involvement in park management, from the early planning stages. They are key persons in national parks and the surrounding areas. In

these cases, there is commonly an established consensus about an environmental culture, and education is included in the management operations of authorized organizations. From a broader perspective, the close relationship between coral reefs and islands should be considered as a valuable environment for humans. The above examples should be referred to in that context.

When considering environmental education about coral reefs, teachers should be required to have qualifications similar to those of mountain guides and park rangers. The system that is required to develop such teachers does not yet exist. In building such a system, the cooperation of various groups of sports and recreation guides, the Maritime Safety Agency, fire departments and other crisis-management bodies, medical institutions, educational and academic experts, and NPOs may be indispensable.

Helpful examples of individual safety management skills include the practice of the Nago Elementary School mentioned above, the experience of swimming while fully clothed to simulate a drowning emergency that is tried in various places, and the Water Wise Movement which proved successful in New Zealand, introduced by Tani *et al.* (2003). Moreover, the standardization of what should be taught in such a system and the development of necessary teaching materials are pressing needs. The Great Barrier Reef Marine Park Authority of Australia*² and the Florida Keys National Marine Sanctuary of the United States*³ have produced educational programs and many publications on coral reefs. In Japan, the Ministry of the Environment produced the educational program (International Coral Reef Research and Monitoring Center, Ministry of the Environment 2002a).

In Okinawa, an educational system that involves many teachers has been established in the field of the traditional performing arts, and it is expected to be enhanced by the opening of the national theater in 2004. Moreover, there are also many excellent sports instructors for juveniles in Okinawa. Now that the Environment Basic Law has highlighted the promotion of environmental education, there is a splendid opportunity to establish a new culture of marine environmental education in the coral reef regions of Japan.

Referenced websites:

*1: <http://www.nd-seishin.ac.jp/bio/index.htm>

*2: <http://www.gbrmpa.gov.au/index.html>

*3: <http://www.fknms.nos.noaa.gov/>