

Problems on Sea Cucumber Conservation

Jun Akamine

Abstract

The global market for dried sea cucumber expanded in the late 1980s and this has created serious problems worldwide. One notorious example comes from the Galapagos Islands in Ecuador, which is known as “sea cucumber war.” Fishermen not only over-fish the endemic *Isostichopus fuscus* but also process the animal on the islands, which allows foreign species to scatter among the islands, negatively impacting the islands’ ecology. Thus, the Ecuador Government proposed that sea cucumber be listed in the CITES in 2003, which triggered international debates on how to conserve sea cucumber involving all kinds of stakeholders: fishermen, traders, researchers, conservationists, NGOs and fisheries agencies. This paper gives some thought to a matter how sedentary venthos species should be managed by communal efforts. I first explore the contemporary international debates on how to conserve sea cucumber with relation to conservation of sea cucumber foodways in Asia. Without understanding foodways in China and history of its development, it is difficult to design management plans. For example, among the 30 to 40 commercially traded sea cucumbers, northern China traditionally prefers only a few spiky sea cucumbers (*tsu-shen*) that are mainly harvested in temperate waters, including Galapagos species. Among the temperate spiky species, the Japanese common species, *Stichopus japonicus* is highly appreciated. The dried products from northern Japan are priced the most expensive in the world market because of the sharpest spikes. The price of *S. japonicus* in Hokkaido has been rising since 2000, which also creates several problems. To understand the problems and to find out the way to solve them, the second part of the paper will introduce a case study based on my fieldwork in Rishiri Island, Hokkaido, northernmost of Japan. Fishermen there have developed their qualitative brand through trial and error. Competing with strong market pressure and poaching, fishermen in Rishiri Island have developed communal rules that have been the results of exchange of ideas and practices with outside societies including traders. The case study will point out 1) the possibility that international intervention such as CITES may diminish these spontaneously developed self-regulated conservation efforts and 2) communal resource management may need support from the traders and management should not exclude traders. The latter is, especially, a new viewpoint for sustainable use of marine resources.

Akamine, Jun. 2010. Problem on Sea Cucumber Conservation. In *Globalization, Food and Social Identities in the Asia Pacific Region*, ed. James Farrer. Tokyo: Sophia University Institute of Comparative Culture.
URL: <http://icc.fla.sophia.ac.jp/global%20food%20papers/html/akamine.html>

Copyright © 2010 by Jun Akamine
All rights reserved

1. Introduction

Globalization can be defined as “the coming and going of things, capital, people, and information around the world at speeds that were unimaginable before.” It also means that local systems and ways of doing are gradually being weeded out as we adopt “global standards” in many areas. As an example, we can look at the effects that global environmentalism has had on various regions of the world since the concept became popular in the 1970s with such slogans as “Only One Earth” and “Earth the Spaceship.” After the 1972 United Nation Conference on the Human Environment in Stockholm, international environmental NGOs began to assert a need to protect endangered wildlife and ecologies around the world. These movements have crossed national borders and have forced people around the world to adapt to environmental conditions. For example, whalers in Japan are being pressured to diminish or even abandon their way of living (even if the tradition is inherited from their ancestors) if it does not fit the needs of global environmentalism.

With so many environmental issues surfacing every day, environmentalists have every reason to be concerned about the future of the Earth. At the 1992 United Nation Conference on Environment and Development (UNCED or the Rio Summit), wildlife protection was a top concern, and a convention agreement on Biological Diversity (CBD) was passed. Paradoxically, however, the biodiversity of conservation also requires the conservation of diversity of the cultures that exist within those ecosystems (Nettle and Romaine 2000; Dove, Sajise, and Doolittle 2005). This idea may be amplified in the sense that wildlife resources consumable as food should be evaluated from the viewpoints of various stakeholders, such as producers, distributive traders, and consumers who have their own customs and cultures.

In this paper, I would like to focus on the issue of sea cucumber foodways in Asia and discuss several sea cucumber (*Isostichopus fuscus*) conservation problems, as well as the conservation of its foodways. Sea cucumber foodways refer to persons employing dried forms of sea cucumbers. The process takes at least a month for drying and one week for re-constitution for cooking. Presently, the use of dried sea cucumbers in cooking is concentrated within the Chinese food diaspora. This includes China, Hong Kong, Taiwan, and Singapore, as well as Korea, Japan, and Chinese populations in Southeast Asia, United States, Canada, and Australia on the periphery. The use of dried sea cucumber in China began to spread only during the late Ming and early Qing dynasties between the end of the 16th century and the beginning of the 17th century. Since then, China imported dried products from neighboring countries and regions such as Japan, Korea and Southeast Asia and South Pacific Islands (Akamine 2007). Thus, historical development of sea cucumber foodways must be understood from a cross-border perspective.

The sea cucumber trade between China and its neighboring regions has a considerable history involving much change throughout its history. The first main change was the globalization of its production sites. Sea cucumbers nowadays are produced and exported to almost every point of the globe. For example, according to Hong Kong Import Statistics, Hong Kong, the international distribution hub for all kinds of dried marine products, imported 5,296 tons of dried sea cucumbers from 58 countries and territories in 2007. The second change is the mounting of international pressure on sea cucumber conservation. This is another side of globalization in the sense that the so-called “global citizens” are claiming that biodiversity is the common heritage of humankind and thus needs to be conserved.

Below I will explain the background of how the sea cucumber issue has gained topicality among the conservationist in the world in terms of the conflict between environmentalists and sea cucumber fishermen in Galapagos, known as the “sea cucumber war” (Stutz 1995). During the 1990s, the sea cucumber crisis led to a related slogan representing the environmentalists’ concern “If not the Galapagos, then what global ecological treasure can we protect?”(Camhi 1995).

Since sea cucumbers are coastal resources, it is in theory possible for local communities to manage these resources without any intervention from outsiders. I would like to consider further the significance of promoting resource management



Cooked *Stichopus japonicus* at a restaurant in Guangzhou, China.

at the local level by presenting a case study of dried sea cucumber production in Hokkaido, the northernmost part of Japan, where the highest grade of dried spiky sea cucumber fetches over 100,000 yen per kilogram at retail shops in Hong Kong, and examine how the local people have managed their resources in such a way as to maintain their fishing industry. I conducted all the interviews at Rishiri Island, Hokkaido, and the photographs are mine unless stated otherwise.

2. Background to CITES: Sea cucumber war

The Sea Cucumber War, which seemed almost imprudent, was made known across the world in an article published by the National Audubon Society, an environmental organization based in the United States (Stutz 1995). It refers to a confrontation between environmentalists and sea cucumber fishermen in the Galapagos Islands,

the place where Charles Darwin conceived his theory of evolution and became the holy ground of ecological science.

The environmentalists admitted that the Galapagos sea cucumber population was small, and its conservation was not necessarily an environmental issue. Rather, they were primarily concerned about the effects of sea cucumber fishing on the “holy” marine ecosystem of the Galapagos Islands (Jenkins and Mulliken 1999). Yet this exposé of sea cucumber exploitation in Galapagos led to heightened conservation efforts all over the world. In fact, since 2002 sea cucumbers have been at the center of debates at the CITES Convention (Convention on International Trade in Endangered Species of Wild Fauna and Flora) where sustainable use encounters protection of wildlife.

Isostichopus fuscus, a particular variety of spiky sea cucumbers that inhabits the coastal zone between Mexico and the northern part of Peru, began to be harvested in mainland Ecuador in 1988. But by 1991, the supply had become so exhausted that the fishermen had to move a thousand kilometers away from the continent to the Galapagos Islands to fish for *I. fuscus*. At the same time, yearly visitors to the islands topped 40,000 while the resident population rose to 10,000, thanks to an influx of Ecuadorians drawn by the promise of jobs in tourism. Considering that the population was just over 2,000 in 1960 when there was little tourism, one can imagine the tremendous changes to the environment in just thirty years. It was a foregone conclusion that outsiders would move in and fishermen would come in droves where there was money to be made (Bremner and Perez 2002).



Isostichopus fuscus at Galapagos. Photograph courtesy of Steve Purcell

Moreover, the fishermen went ashore and cut down the mangroves for wood to cook, then sun-dry the sea cucumber they caught, thus destroying the habitat for the most endangered of Darwin’s finches (Camhi 1995). Ships with livestock and domestic animals anchored so close to protected islands that they introduced non-native species such as rats, ants, and cockroaches, which accelerated the deterioration of the original ecosystem (Powell and Gibbs 1995). While waiting out the drying process, which takes

several weeks, the fishermen brought some provisions from home, but it was far more efficient for them to get their protein from the islands. Even giant tortoises, the symbol of Galapagos, were consumed as food (Nicholls 2006).

It is my understanding that the environmentalists started the war. Their theory was that biodiversity would be destroyed if sea cucumber resources dried up. Therefore, the fishermen who were randomly destroying the islands' ecosystem were not to be allowed on land. To capture giant tortoises (a prized symbol not only of the Galapagos Islands but also of the entire environmental conservation movement) for food was simply intolerable. Taking these stipulations into account, the president of Ecuador imposed a complete ban on sea cucumber fishing in the Galapagos in August of 1992.

Let us, however, look at the issue from the perspective of the fishermen. Until the early 1980s, tourism was undeveloped and there was no major capital being pumped into the industry. Fishermen made decent money as guides and ferry drivers for researchers and off-the-beaten-path travelers from developed countries. But as the eco-tourism business started to gain attention, the crude small boats of the fishermen were being replaced with fancier ones and suddenly the fishermen found themselves out of work. Furthermore, by the end of 1980s, the harvest of lobsters, for which the tourists seemed to spare no amount of money, was dramatically decreasing (Stutz 1995, MacFarland and Cifuentes 1996).

It was at just this point that the demand for *I. fuscus* surfaced. Since *I. fuscus* lived in shallow waters, all the fishermen had to do was walk along the rocks or dive just a little and they had an easy day's work. It was no wonder they jumped at this new income opportunity. What is more, *I. fuscus* had distinct spikes, which fetched high prices in the market, especially in northern China. While many fishermen continued to harvest despite the ban, they teamed up with politicians from the Galapagos Islands and people in the sea cucumber industry to petition the Ecuadorian government to reopen sea cucumber fisheries. Consequently, beginning in October of 1994, the government gave permission to harvest 550,000 specimens during a three-month experimental trial to survey resources. After just two months, however, the trial was cut off when it was discovered that an estimated one million sea cucumber had been collected (Shepherd et al. 2004).

Outraged, the fishermen stormed the Charles Darwin Research Station on Santa Cruz Island and threatened to slaughter the giant tortoises known as the Lonely George that were the darlings of the conservationists (Camhi 1995; Powell and Gibbs 1995; Stone 1995; Stutz 1995; Verrall 1995). It was this protest against the government and environmentalists around the world that marked the beginning of the war over sea cucumbers.

The "sea cucumber war" has become more complicated since CITES came into the picture after 2002. CITES is an international agreement between Governments,

and its aim is to ensure that international trade in wildlife specimens does not threaten their survival. However, it seems that CITES is currently interested more in the protection of wildlife than the original goal of sustainable use of the wildlife. This is partly because the NGOs that diffuse animal rights and animal welfare interests lobby the delegates (who are mainly from developing countries) of the CoP (Conference of the Parties) for the ban in exchange for economic support.

I dare not say that sea cucumber conservation is unnecessary. Rather I like to emphasize that the sudden CITES decision may damage the economic stability of coastal fishery cultures and villages worldwide. Since its enforcement, animals such as elephants, whales, great apes, and rhinos, have been subjects of protection under CITES. In the 1970s and 1980s, the idea of establishing protected areas and a ban on wildlife use were supported by many ecologists. However, there are many examples where, if the community cannot use the wildlife, they will also pay no attention to wildlife management, which in turn will lead to poaching. Out of this conflict, the idea of sustainable use of wildlife rather than a total ban seems gradually to be gaining strength (Hutton and Dickson 2000).



Dried *I. fuscus* at a retail shop in Chinatown, New York.

3. Sea Cucumber Fishing in Rishiri Island, Japan: The Case of the Semposhi Fisheries Cooperative Association (SFCA)

The first reference to sea cucumbers in the Semposhi Fisheries Cooperative Association (SFCA)'s business report after the World War II was in 1980. The amount of sales and sales prices of dried sea cucumbers were recorded for four years through 1983. In 1984, however, sales shifted to fresh sea cucumbers, because "drying sea cucumbers took too much effort for too little money." As one fisherman explained, "we wake up at four and head out at five. We come back between one and two in the afternoon with our catch. If we process it, we'd have no time for sleep."

Although it's not exactly clear what triggered the start of sea cucumber fishing in 1980, the opportunity was indirectly presented through local government support for the transplant and replenishment of northern hard-spined sea urchin (*Strongylocentrotus nudus*) populations. In the early 1970s, the Rishiri Island's Municipal Government launched a project of transplanting *nona*, or northern hard-spined sea urchin living in deep waters to shallower waters. As part of the project, the government provided funding for dredge-net boats to catch sea urchins living at depths of 20 to 30 feet and transfer them to shallow-water coasts. One dredge net was made in Suttsu, in southwestern coastal Hokkaido, and was brought to Rishiri Island, where it was copied by local ironworkers. However, the dredge net did not retain the sea urchins well, and in fact it broke off their spines. Consequently, with each passing year, the shells of the sea urchins also got smaller and smaller. What the nets did manage to catch were more sea cucumbers than sea urchins.

While the details of this project need further investigation, it is certain that sea cucumbers opened the door to dredge net fishing in Rishiri Island. The SFCA's annual report of 1980 reflects the first time dried sea cucumber production was conducted on a trial basis after the sea urchin transfer project ended. At the same time, veteran fishermen within the community taught sea cucumber drying methods to young members of the SFCA. The drying method was something like this: First, the workers boiled a large iron pot filled with seawater, scrap iron, and sagebrush. Only iron pots could be used because stainless pots were not able to change the color of the sea cucumbers into shining black. After thirty minutes, the water turned dark and the iron scraps and sagebrush were removed. The sea cucumbers were then gutted and placed in the pot. After adding the iron scraps again, the sea cucumbers were simmered for about forty minutes and then smoked with sagebrush for approximately two hours. If the weather was bad, the smoking time was extended up to three hours. Moreover, if it rained in Semposhi, people would drive to a sunny area to dry their sea cucumbers. However, so much sagebrush was used in the Semposhi district that the supply was depleted. Despite successful catches, the fishermen could not make ends meet with dried sea cucumber. As a consequence, they switched to selling raw sea cucumber in 1984 and continue to do so today.

Dredge net fishing began full operation in 1984 when sales turned to raw sea cucumber. The town of Rishiri provided financial support, and dredge nets were made to order by seven or eight fishermen at iron factories in Otaru. Presently, dredge nets are made locally in two factories on the island.

In the SFCA case, it is apparent that sea cucumber fishing was established in Rishiri Island around 1985 and that the dredge netting of sea cucumbers boomed as a by-product of the northern sea urchin transport project.



Stichopus japonicus
fished around Soya.

4. Resource Management at the SFCA

Dredge net fishing of sea cucumbers by the SFCA began in 1984, but it was not until 1988 that a sea cucumber unit was established within the SFCA. At this time, resource management was actively practiced and catches were limited to sea cucumbers weighing at least 80 grams.



Drying *Stichopus japonicus* at Soya, Hokkaido.

In 1989, the weight limit was raised from 80 to 100 grams and sea cucumbers less than 10 centimeters in length were to be thrown back to the sea. The next year, in 1990, the bar was again raised to 130 grams. In 1999, the SFCA implemented a self-regulatory 50-ton limit to its total catch in the interest of conserving resources. This generally acceptable number was based on market conditions and the calculation that each boat would be allowed 0.5 tons.

Since 1984, the SFCA has engaged in the fresh sea cucumber trade, but it was long expected that the sea cucumbers would be shipped to mainland Hokkaido to be processed and dried for export. This is partly because there is almost no demand for fresh sea cucumber in Japan during the summer. (Domestic demand for fresh sea cucumber is limited only in winter around the new year.) In fact, the size and weight restrictions implemented by the SFCA were influenced by the fact that the sea cucumbers would ultimately be dried. If the sea cucumbers were too small,

buyers would bargain for cheaper prices. Although it could be sold as a fresh product because of its tender texture, small sea cucumbers were difficult to process and they fetched only low prices at market. These conditions led the SFCA to return not only small sea cucumbers, but also “anything damaged” to the sea. Beginning in 2002, each boat collected these small or damaged sea cucumbers and lined them up each day for return to the summer fishing grounds in the spring and alternatively to the spring fishing grounds in the summer.

When the sea cucumber unit in SFCA first imposed the 80-gram weight limit in 1988, the aim was to conserve resources and also make a greater profit. But ever since the fishermen started trading fresh sea cucumbers, one of the major marine products processing plants in Hokkaido has submitted several complaints. At one point, they requested the SFCA to make shipments using barrels that were labeled with the name of the boat that made the catch. Although the SFCA made an effort to retain moisture and shipped at a ten percent premium, or *ire-me*, the buyers still complained about poor quality and demanded a higher premium. If the SFCA agreed, they knew that they would eventually face the same demands again. Therefore,



Undersized *Stichopus japonicus* sorted out for release back into the sea.

instead of raising the premium, they negotiated with the buyers to resolve their complaints. For example, both sides have now agreed that water should not be put in barrels and that sea cucumbers should be divided up at sea and then checked again on land for size. One member of the sea cucumber unit boasted about nurturing the high quality Semposhi brand, explaining, “It’s not a matter of gains or losses. If you cheat, it comes back to you.”

Resource management by the sea cucumber unit was not limited just to size restrictions. In 2001, six members of the sea cucumber unit and the SFCA’s sales representative went to observe the sea cucumber business in Aomori Prefecture. However, the sea cucumber fishing waters in Aomori were unfortunately too shallow to be compared to Semposhi, where dredge nets were dragged at depths of 60 to 70 meters. Moreover, Aomori was focused on fresh food products and not on dried products, so they kept small, soft sea cucumbers and tossed the large ones back to sea. Still, the Semposhi fishermen were impressed that the town of Yokohama had standardized fishing equipment and regularly checked for violations. As a result of this visit, the Semposhi sea cucumber unit was also inspired to re-examine the

spawning period of sea cucumbers. Presently in Hokkaido, sea cucumber fishing is banned in the Soya Sea Area, where Rishiri is located, from May 1st to June 15th during what is believed to be the spawning period. However, some fishermen raised the possibility that in their area sea cucumbers were actually reproducing in July and August, leading to further investigation.

These fishermen are currently still appealing to the Hokkaido Provincial Government to change the regulations related to fishing season dates. In response, informational meetings were held in two towns in 2005, but the Hokkaido government has been slow to act on the appeals. Fishermen who attended both meetings said, “the content was the same as the data from Sarufutsu, facing the Sea of Okhotsk,” and “the Sarufutsu [data] are exactly the same as the results from Semposhi [and that] anyone who fishes for sea cucumbers could tell you that.” The SFCA argued that they have been proactive about conserving resources. For example, when they learned that starfish were predators to sea cucumbers, they stopped throwing back the starfish that came up in their dredge nets.

Previously, fishing boats had been unrestricted. But in 1999, the number of boats was limited to only ten, and at the same time the 50-ton limit on a total catch was implemented. Until that year, there were twelve boats operating, but one fisherman passed away and another retired. Presently, there are eleven dredge net fishing boats in SFCA. The eleventh boat was added in 2005 when the SFCA recommended a novice fisherman in his early 50s to the sea cucumber unit when the man demanded that he needed money to support his three children. The sea cucumber unit felt an obligation to support a fellow cooperative member, not to mention that the price of sea cucumbers was on the rise. During my fieldwork, one of the members of the SFCA lost a family member. Since three sea cucumber fishermen in the same area had to attend the funeral and were unable to fish even though conditions were calm and favourable, the entire sea cucumber unit took the day off. They explained, “We have this organization to work together; the 50-ton limit is in place so that everyone uses resources equally. Otherwise, everyone would just operate on their own.”

5. Conclusion

The case study of SFCA illustrates how sea cucumber fishing and self-regulation in local community works. Although Rishiri Island is only one of many places in Japan where sea cucumbers can be harvested, it is known for its exceptional high quality even within the high quality market of Hokkaido. Its success can be attributed to the pride of local fishermen who have striven to meet the insistent demands of buyers, yet maintain a sustainable industry.

While the debate has been divided and further investigation of the issue is needed, another example of local self-management can be seen in the cooperative attitude between the SFCA and the sea cucumber unit regarding the issue of admitting new fishermen. It is an issue that is specific to sea cucumber dredge net fishing, as spoon-net fishing by small surfboats is open to all; for example, catch landings of sea cucumber by spoon-net fishing within the SFCA were 4 metric tons and 2.5 metric tons in 2006 and 2007 respectively. Fishing in Rishiri Island has tended to concentrate on coastal resources such as kelp and sea urchin; both have developed strong communal identities that have also been applied to sea cucumbers.

Self-management by local communities via an adaptive, trial and error system, continues. It been made possible because the people of this area believe all coastal space belongs to the community, and they are thus conscious of the need to ward their own waters. It is difficult to compare the Japanese case with the Galapagos case, since they seem to share nothing in common. However, there is one thing to be sure: the Galapagos case is an unfortunate example of open-access fishing where no one takes spontaneous care of the resources. The Ecuador Government and environmentalists have been trying to exclude fishermen from the Galapagos waters but have not yet been successful. Though it may be a radical change of perspective, the Ecuador Government could follow the Hokkaido example and provide for its people a nationwide social welfare system that can secure livelihoods. Providing fishermen with certain authority and responsibility to manage their own resources would be a key, as the Japanese Fisheries law practices have proven.

CITES should be called upon only if every effort at conservation is made and there is still a fear of exhausting resources. Rather than depending on sometimes-arbitrary rules imposed by governments and organizations, local fishermen should tap into the power and knowledge that is inherent in their communities.

References

- Akamine, Jun. 2007. *Namako and Iriko*: Historical overview on holothuria (sea cucumber) exploitation, management and trade in Japan. In *Food and foodways in Asia: Resource, tradition and cooking*, ed. Sidney Cheung and Tan Chee-Beng, 23-36. London: Routledge.
- Bremner, Jason and Jaime Perez. 2002. A case study of human migration and the sea cucumber crises in the Galapagos Islands. *Ambio* 31(4): 306-310.
- Camhi, Merry. 1995. Industrial fisheries threaten ecological integrity of the Galapagos Islands. *Conservation Biology* 9 (4): 715-719.
- Dove, Michael, Percy E. Sajise, and Amity A. Doolittle, eds. 2005. *Conserving nature in culture: Case studies from Southeast Asia*. Monograph 54. New Haven, Connecticut: Yale University Southeast Asia Studies.
- Hutton, Jon and Barnabis Dickson, eds. 2000. *Endangered species, threatened convention: The past, present and future of Cites, the Convention on International Trade in Endangered Species of Wild Fauna and Flora*. London: Earthscan Publications, Ltd.
- Jenkins, M. and T. A. Mulliken. 1999. Evolution of exploitation in the Galapagos Islands, Ecuador's sea cucumber trade. *TRAFFIC International Bulletin* 17 (3). (<http://www.traffic.org/bulletin/archive/january99/galapagos/index.html>)
- MacFarland, Craig and Miguel Cifuentes. 1996. "Case study: Ecuador." In *Human population, biodiversity and protected areas: Science and policy issues*, ed. Victoria Dompka, 135-188. Washington, DC: American Association for the Advancement of Science.
- Nettle, Daniel and Suzanne Romaine. 2000. *Vanishing voices: the Extinction of the world's languages*. Oxford: Oxford University Press.
- Nicholls, Henry. 2006. *Lonesome George: the Life and loves of a conservation icon*. New York: Macmillan.
- Powell, Jeffrey R. and James P. Gibbs. 1995. A report from Galápagos. *TREE* 10 (9): 351-354.
- Shepherd, S.A., P. Martinez, M.V. Toral-Granda and G.J. Edgar. 2004. The Galapagos sea cucumber fishery: Management improves as stock decline. *Environment Conservation* 31(2): 102-110.
- Stone, Richard. 1995. Fishermen threaten Galápagos. *Science* 267 (5198): 611-612.
- Stutz, Bruce. 1995. The sea cucumber war. *Audubon* (May-June 1995): 16-18.
- Verrall, Maggie. 1995. Darwin's islands under threat. *Nature* 373 (6514): 465.