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Land Reclamation and Coastal Fisherfolk in Japan
"Like Shooting Your Own Father"

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Japan, renowned as a leading nation in marine fisheries, is also well known for its success in retaining and maintaining traditional, community-based resource management of its coastal areas. Despite such distinction, and though cooperation and harmony continue to be stressed in research on Japanese fisheries, Japanese coastal areas remain beset with conflicts and crises. The graying population and lack of successors, pollution and eutrophication, coastal land reclamation and the difficulty of a maritime way of life ensures a shrinking population of fishers in Japan. Further, the industrialization of Japan continues to cause both intra- and inter-sector conflicts as well as environmental crises throughout the nation, furthering malaise and speeding the decline of fishing and aquaculture populations in Japanese communities today.

This paper compares the effect land reclamation has had on fishing cooperative (FCA) members in two regions of Japan: the Northeast's Matsushima Bay and the Southwest's Ariake Kai. Using a combination of ethnographic fieldwork and discourse analysis for research methodology, both an on-going conflict and a past conflict are presented. The Ariake case, labeled a boondoggle by the international press and described to be "like shooting your own father" by a fisher, highlights the difficulty of balancing competing stakeholders and economic policy. The Matsushima case provides a look at the successful adaptation of the management regime. Though the differing political climates of each case contrast starkly, land reclamation results in similar problems for members of Japan's fishing cooperative associations: declining harvests and declining populations.

Introduction

Japan, through its sea tenure regime whereby contemporary Fishing Cooperative Associations (FCAs) are extensions of traditional village institutions (Cordell 1989; Ruddle and Akimichi 1984; Ruddle 1989) and are supported by the legal system, has proven successful in the management of coastal resources (Ruddle 1992). Though some overfishing of stocks takes place, chaos does not reign as it does in much of the world's coastal fisheries. However, as Iida (1998) points out, establishing rules is only one key to success in resource management. Not all Japanese FCAs have been successful in sustaining resources and the livelihoods of FCA members. Some FCAs have been limited by internal struggles (see, for example, Barret and Okudaira 1995) while others face struggles imposed from outside forces (see, for example, Befu 1980; Marra 1986; McKean 1981). Concern about eutrophication (increase in nutrients), land reclamation,

and coastal pollution continues to grow and the problem has become a world wide one (NOAA 1998).

This paper introduces two cases where FCA members are faced with land reclamation projects: the Ariake Sea, located in southwestern Japan, and the Matsushima Bay region, located in northeastern Japan. Both areas house large numbers of FCA members who fish and cultivate seaweed. Currently, the Ariake Sea region is witnessing an on-going conflict over a massive land reclamation project with a significant amount of national media attention; the Matsushima Bay region experienced protests to lesser projects in previous decades that largely went unheard in the larger society. These cases were chosen because, despite contrasts in region and political climates, the issue of land reclamation is a serious one which affects all coastal fishers. Coastal areas serve as nurseries for innumerable creatures of the sea and coastal zone, they are the habitats for sea grasses, seaweeds, and trees. Reclamation not only disrupts the local ecosystem, but it also provides a means for human-generated inputs to find ways into the environment through the industrial complexes, homes, and agricultural fields that are placed upon the newly claimed land.

Physical Changes to the Coastline and Marine Environment

Changes to the coastline are the more dramatic and readily visible changes to the natural environment in Japan, including the Matsushima Bay and the Ariake Sea. The Japanese Ministry for the Environment estimates that less than half of the coastline of the four main islands remains untouched (Ministry of the Environment n.d.). In the Matsushima region (including the nearby Sendai and Shiogama Bays), the presence of a large fish market, the center of Japan's fishcake industry, oil and gas refineries, steel mills, and shipping container facilities all stand as testament to the changes humankind has wrought on the area -- all built upon reclaimed land. Less readily seen are the changes affected through dredging, water temperature changes, and inputs into the ocean water. In the Ariake Sea, though reclamation has taken place in small port areas and cities, a larger issue is the ¥249 billion project, spread across 7 km of dikes, that will reclaim 3,550 hectares of land by the time it is completed in 2006 (Newton n.d.)

Wigen (1989) catalogs damages to the environment which parallel what can be seen in the Matsushima Bay (see Table 1).

Table 1: Example Indicators of the Deterioration of the Japanese Marine Environment*

1.	Loss of tidelands and estuaries (to reclamation, shipping lanes, etc.)
2.	Alteration of Rivers
3.	Deterioration of the seabed
4.	Red tides
5.	Oil Contamination
6.	Accumulation of pollutants
7.	Mass kills
8.	Diseased and mutations of flora and fauna
9.	Floating solids

Adapted from Wigen (1989)

Some of the most obvious changes to the Matsushima Bay environment include the loss of estuaries and tidelands to land reclamation and the deepening of shipping channels and harbors. The deterioration of the seabed from dredging as well as the accumulation of sludge has affected all life from small *asari* shellfish to fish and seaweeds. Red tides have increased, suffocating sea life. Mass kills of seaweed and oysters have taken place such as when "oyster cultivation in Matsushima was totally wiped out one year when warm effluents rich in organic residues from nearby fish-processing plants caused both eutrophication and warmer than normal temperatures, inducing destructive overgrowth of the oysters" (Wigen 1989: 391).

FCA members in the Matsushima region point to visible changes as signs of pollution. In addition to the absence of key marine species, interviews elicited sightings of oils slicks and plastic bags as evidence of pollution. FCA members felt unseen pollution came from household wastes, the fish cake industry, the fish market, and farm pesticides, causing illness among *nori* plants and increasing red tides. The fish cake industry was generally viewed to be the main cause of the eutrophication problem in the Matsushima Bay, especially since problems intensified following the industry's relocation to a central point on reclaimed land.

Dredging of the inner Matsushima Bay, the Shiogama Bay, and Sendai port areas has taken place to enable larger ships to reach the ports in these areas. One consequence of dredging is the loss of bottom habitat for sea life. Some FCA members also argue that

the deeper channels affect the water flow in and out of the bay, altering the natural flow of life in the bay such as through salinity levels. In the case of the Ariake Sea, through draining and dredging a lack of natural tidal flow causes sludge and other muck to accumulate. Shrimp, shellfish and other bottom-feeders are then killed. Without these bottom-feeders, plankton proliferates, sucking up the nutrients from the sea and leaving little for seaweed to feed on (Earth Crash 2001).

Public works projects and land reclamation have taken their toll in other areas of Japan, as well (Huddle and Reich 1987; McKean 1981). Most recently, and most notably, more than 6000 fishermen protested a project in the Ariake Sea in southwest Japan following a massive crop failure of the *nori* seaweed crop in January of 2001. Since the *nori* industry is a $1 billion industry and the Ariake region produces approximately 40% of Japan's crop, this event made national and international news. The Minister of fisheries journeyed to the site along with six national Parliament (the Diet) members and numerous governors) to view the damage. FCA members cited the changing of water flows, combined with the release of contaminated water, has caused red tides and the lowering of nutrient levels needing for *nori* and other marine life (Japan Times 11/28/01). Other marine life such mudskippers and shellfish have suffered damage and extinction in the area (Japan Times 2001; Newton 2001).

Pictures from the late 1960s (Zenkoku 1969: 33) show Matsushima Bay FCA members replacing oil fences, bamboo and floating plastic fences placed around the fishing grounds, to keep out solid and floating wastes from the growing *nori*. The same article mentions worries of raised water temperatures from the Tohoku power plant built on reclaimed land facing the Matsushima Bay and damage from waves from passing tanker ships. "During the season, [Matsushima Bay cultivators] can't take their eyes away for a minute" (Zenkoku 1969: 31). Even from this time, sporadic crop failures were seen in various places in the Matsushima Bay.

Eutrophication is another on-going problem in the Matsushima Bay and the rest of Japan. Eutrophication is the "gradual fertilization of lakes and reservoirs into which nitrogen and phosphorous is supplied by sources in the surrounding area" (MAFF n.d.; see also Befu 1980). Given the increasing deterioration of marine water quality, the Japanese Ministry of the Environment established the Environmental Quality Standards

(EQS) and uniform national effluent standards for nitrogen and phosphorous in 1993. (MAFF n.d.) These standards are effective in 88 designated coastal sea waters including Matsushima and Kessennuma Bays, "Tokyo Bay, Ise Bay, Osaka Bay "where algal growth is dominant, particularly in the summer" (MAFF). Of course, some businesses and plants do not fall under these regulations, especially when their size is taken into account. Others should be regulated, but they work around the limits imposed by national standards (Huddle and Reich 1987, McKean 1981). Even in the Shiogama Bay (located in the innermost area of the Matsushima Bay, local business would discharge wastes through secret pipes (Original pipe supplier, personal communication) and at night when enforcers weren't around to take notice (FCA members' personal communication).

Fishers throughout Japan and the US worry about the environmental factors that affect their livelihood. In New England, "Some fishermen are concerned that there are anthropogenic sources of environmental impacts that are ignored because they are complicated or difficult to assess" (Hall-Arber 2001). The problems of Shiogama and Matsushima Bays could also be described as 'complicated or difficult to assess.' The continuing description of New England could as easily describe the Japanese case: "Chlorine and the plethora of other cleaning products, nutrient run-off, sewage outfall pipes, antibiotics, etc. are all possible contributors to the downturn in stocks" (Hall-Arber 2001: 404).

Miyagi Prefecture conducted research from 1979-1987 investigating the cause of the *nori* seaweed crop failure in the Matsushima Bay in the late 1970s (and continues today). In the published results, researchers were very careful to state that 'the [decreased] water quality had an affect" (Miyagi 1991: 86) on the *nori* problem, but never did state exactly what was the cause of the problems. One researcher stated that though he couldn't give *a single* reason, certainly "sewage, run-off from rivers, household wastes, and industry played some role" (Miyagi 1991: 86), just as it does in the rest of Japan. Scientists recommended that cultivators watch the salinity and water temperature levels carefully, removing nets and placing them in freezers as conditions warranted.

Between 1979 and 1987, water temperature, wind, air temperature, tides, and other relevant environmental conditions were tracked. Some growing grounds were

fenced off. Sewage waste was re-routed. Fluctuations (temperature, etc.) were compared with survey responses regarding when and where diseased *nori* was found; pH levels were compared; sludge from various points were examined for cadmium and other harmful substances (Miyagi 1991). The time and energy put in to these experiments notwithstanding, no definitive results were ever announced, to the frustration of local FCA members. The researchers did, however, give some parting advice and ideas.

First, the scientists mentioned that they did not believe the *nori* cultivation methods used were to blame and suggested that the *nori* be washed carefully (Miyagi 1991: 83). Additionally, they stated there is a biological basis to the *nori* quality as the *nori* begins to grow and then falls off (*datsuraku*). Finally, they state the Matsushima Bay water quality plays an important role. They believe this to be the case given their experiments conducted in Matsushima Bay, from the fact there are no problems in the Pacific Ocean areas, and from the results of the experimental nets which has been fenced off from other areas (Miyagi 1991).

The difficulties seen in the Matsushima Bay result from not only the alteration of the coastal ecosystem through loss of habitat and extinction of local species, but also from the chemical run-off from local industries built upon reclaimed land. And though the implications of land reclamation are on-going, the issues being faced began over three decades ago.

The Matsushima case, and thousands like it throughout Japan, could have served as an example for the Ariake Sea and the government planners in charge of the project. Indeed, many people have questioned whether the project is even needed. The idea to drain a bay within the Sea, Isahaya Bay, was first presented about 50 years ago, when the postwar, famine-struck land was looking at ways to increase rice output (Star 2001). Since that time, Japan produces a surplus of rice and many agricultural areas are even being turned into other uses, such as housing plots.

The project did have critics, of course. Critics see the project as a symbol of the government's love of wasteful public works projects that provide employment and income for construction firms but often do more harm than good.

In a summary of the issue, the Visible Earth homepage (n.d.) provides a brief summary:

> *"The project has been highly controversial because of concerns by environmental groups about the loss of wetland habitat. Hirofumi Yamashita was awarded the 1998 Goldman Environmental Prize for his scientific efforts documenting the ecological value of the bay and his grassroots activism trying to stop the closing of the sea wall. In 1992, he catalyzed other organizations to form the Japan Wetlands Action Network, composed of 70 grassroots and national conservation organizations, and became its spokesperson."*

Consequently, there were critics even outside of the FCAs to the land reclamation effort. They were primarily seen at the local level, however, much like the Matsushima Bay protestors before them. How the Ariake Sea case differs from the Matsushima case is the attention it drew from the national and international press. Protests by 6000 fishermen on more than 1000 boats made the national broadcast news in January of 2001; the coming of "*Nori* Day" soon after in February provided an opportunity for international news groups to comment on the plight of seaweed growers in the region.

The Reclamation Issue in the News

Analysis of the discourse presented by the media provides a useful tool for understanding issues and their importance at the local, regional, and national levels. Headlines and articles set the tone, tell the researcher what is important to the populace, and force one to focus on why particular issues are pressing. All-the-while it should be recalled that the media also affects public opinion and can present information in a way the media sees fit. This consequence should not be forgotten, especially in a country where the literacy rate of the populace is 99%. Informants will be guaranteed to have read about issue and one must focus on whose opinions are being expressed in interviews: the individual's or the press'.

Though the paper is still in draft form and stacks of newspapers remain to be reviewed, this presentation presents a glimpse of the very large issue of land reclamation and its consequences to fishers in Japan and provides a means to analyze the issue when fieldwork time is limited. A thorough discourse analysis of the literature sets the stage for rapid assessments and short-term fieldwork.

If one was to begin research with fishers in the Ariake Sea today, s/he would know the Isahaya Bay reclamation project was a very big issue. But when did it begin? Informants are often fuzzy on dates, just as we all are; review of the literature then puts it in perspective. Often, town newsletters and the local press are the first indication that an important issue is at hand. If one has access to industry newsletters such as the *Nori Times*, where small articles present issues for each region, then information will also be found in these outlets.

The Ariake Sea issue jumped from a local and regional affair and made the national news when the dikes were first closed in 1997. Of course, environmental groups knew of the issue even at the international level at this time (see, for example, "the Visible Earth" homepage) but the typical Japanese citizen would not have heard of the issue unless s/he has a particular interest in birds, tidelands, FCA news, or the Ariake coast.

The project was widely criticized when the gates first were closed in 1997 for threatening the ecosystem of the bay. "Environmentalists and opposition politicians dubbed the wall a "guillotine that killed nature" and say it led to pollution in the sea outside the gates, caused killer red tides and thus the huge drop in seaweed production" (Earth Crash 2001).

Table 2: Some News Outlets Reporting on the Ariake Sea (Isahaya Bay) Issue

BBC	**Asahi Shimbun**
The Guardian	**The Japan Times**
BusinessWeek	**Kahoku Shimpo**
Reuters	**AsiaWeek**
MSNBC	**Yomiuri Shimbun**

And numerous environmental groups such as WWF Japan

For the average citizen, however, not plugged into environmental issues in a corner of Japan, or connected to the FCA and seaweed networks through national newsletters, the Ariake Sea issue went largely unnoticed. It wasn't until the seaweed

harvest failed and monetary effects of the environmental problems became apparent that news agencies brought the information into every home in Japan. Once the economic losses were apparent, then the media was quick to seize upon the issue. This included not only the Japanese media giants such as the *Yomiuri Shimbun* and *NHK* broadcasting, but also the international press such as *BusinessWeek*, the BBC, and *The Guardian*.

Headlines (see Table 3) provide a glimpse of the opinions of the media and the public. Though support for the project was overwhelmingly lacking, such as seen in the editorial from The Japan Times (2/5/01), the scanning of additional headlines show that this was far from unanimous. Some prefectures continued to support the project while others bordering the sea decried its continuation (for example, Japan Times 3/8/01).

Between January 1999 and January 2001, there were 4 articles on the Ariake Sea (Isahaya Bay) and the related environmental issue. Between January 2001 and November 2002, there were more than 50 articles. In 2003, the issue has quieted again and few articles can be seen at the national level, and certainly not at the international one. Though the issue is far from resolved, it is looking as if the project will continue, though possibly on a smaller scale. If so, the Ariake Sea will become yet another case in Japan where the fishers lost out to plans made by local, regional, and national governments. In this case, however, the environmentalists and fishers were on the same side. Despite joint efforts and help from a university biologist, the issue appears a lost cause.

Table 3: Example Headlines Surrounding the Reclamation Issue in Ariake Sea

"**Save Ariake Sea Before it Dies**" Japan Times Editorial 2/5/01
"**Draining of Japan's Largest Tidal Wetland Turning Ariake Sea - Source of Famous Ariake Nori (Seaweed) - Into a 'Dead Sea**" Earth Crash, 2/5/01
"**Big Spenders and the Great Seaweed Slaughter: It could be that a wasteful Japanese Public works project is backfiring and damaging this year's crop. If so, it's one more reason to end the boondoggles**" *BusinessWeek Online* 2/6/01
"**Burying the Seaweed**" Star Publications 2/13/01
"**Governments Disagree on Dam Project**" Japan Times 3/8/01
"**Agricultural Minister Vows to Open Isahaya Floodgates: Worsening Water quality prompts calls for action**" Japan Times 3/28/01
"**Quota for South Korea Nori to Rise**" Japan Times 4/11/01
"**Floodgates release Mistrust**" Japan Times 5/1/01
"**Dearth of Bottom-dwellers linked to Isahaya Bay project**" 9/19/01
"**Ariake Nori Discoloration Spreading; Plankton surge starving seaweed crops of needed nutrients, co-ops say**" Japan Times 11/28/01
"**Fishermen's Protest Blocks [Re-]Start of Isahaya Bay Reclamation Project**" Japan Times 1/9/02
"**Isahaya Water Quality Questioned**" 11/1/02

The Matsushima case also ended a lost cause. Though reparations were made by the government to fishers for selling their fishing rights to the reclaimed areas of the coast, none have ever been made for subsequent damage to the *nori* crop. Instead the fishers worked out informal arrangements to gain access to usable fishing/cultivating territories.

Due to time and monetary constraints, fieldwork was only conducted only in the Matsushima Bay region while events peaked in the Ariake Sea region. As a researcher, I longed to visit southwestern Japan and interview locals on the issue. A discourse analysis shows however that some of the work, especially background research, can be done from afar.

Conclusion

Though far from complete, a beginning has been made in the search to explain how land reclamation affects fishers. One FCA member in Matsushima felt the entire situation is absurd. In his view, the government destroyed the *nori* crop and the livelihood of the *nori* growers. With supply limited (down 40%), *nori* packagers were facing difficult times with their inability to raise their product prices significantly to pass on the rising costs (as much as 60% more) to the consumer. Consequently, the government was allowing an increase in the importation of Korean *nori*. Thus in this FCA member's view, the government destroyed the *nori* crop and then turned around and said, "Oh, the *nori* crop is bad, we better import *nori*." That action he said "is like shooting your own father." And at the heart of the issue, is Japan's insistence to reclaim land to for projects, many of which have dubious utility and benefits.

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The Ariake Sea as seen from the Space Shuttle, 1998. (http://visibleearth.nasa.gov/cgi-bin/viewrecord?7656)
The white arrow in the center of the picture points to the area where the dikes have been closed and the land is being reclaimed

Seaweed Cultivators in the Ariake Sea

Protesting the Reclamation Project

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