

SETTING NETS ON TROUBLED WATERS: ENVIRONMENT, ECONOMICS, AND
AUTONOMY AMONG *NORI* CULTIVATING HOUSEHOLDS IN A JAPANESE FISHING
COOPERATIVE

by

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Submitted to the Graduate Faculty of
Arts and Sciences in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

University of Pittsburgh

2003

UNIVERSITY OF PITTSBURGH
FACULTY OF ARTS AND SCIENCES

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Fishing Cooperative Association (FCA) members in Tohoku, Japan cultivate *nori* seaweed for the personal autonomy and quality of life this maritime-based occupation provides. However, their fishing territories are severely degraded, their occupational income is unpredictable, and their production expenses remain high. Given such uncertainties, more than 85% of the peak FCA *nori* growers' population (1972) made the rational choice (in neoclassical economic terms) to quit *nori* cultivation. The remaining members made the rational choice (in substantivist terms), to continue this way of life in large part because it enables them to “not lower their heads” and “make decisions themselves.” This research, conducted in Shichigahama, Miyagi Prefecture over an 18-month period, employs ethnographic interviews, participant observation, archival research, and a demographic quantitative survey to examine *nori* growers and their lifestyle.

Research focused on FCA members' use of social ties to gain access to extra-community fishing territories. Since Japanese maritime resources are managed under a common property regime and are not open access, the degradation of fishing territories is problematic. Often, FCA members vote to sell their rights and quit fishing. In Shichigahama, remaining FCA members have instead opted to rent and barter for access to healthy fishing territories. This use of networks and social capital to make use of outsiders' fishing grounds shows a partiality for friendship and horizontal relationships over kinship and hierarchy in this segment of Japanese society. By “helping one another out” with exchanges of fishing ground areas, FCA members

are able to continue working on their own rather than resorting to wage labor and losing their autonomy.

Resource managers and common property theorists often cite Japan as a useful example for developing common property institutions elsewhere. Despite general success, however, Japan suffers from industrialization; this case study provides evidence of the negative impacts of pollution and eutrophication on FCA livelihoods. Yet, the Shichigahama experience also highlights the agency of locals in the management of natural resources. Showing flexibility as they use the informal means of social networking to cultivate *nori*, these FCA members epitomize the significance of personal autonomy in the lives of Japan's coastal communities.

ACKNOWLEDGMENTS

As the writing of the dissertation draws to a close and I find myself thinking of the numerous individuals – friends, family, academic associates, fishermen/women, fictive kin—whom I owe sincere gratitude and debt, I find the lessons of the dissertation come to the forefront yet again. Specifically, I think of the importance of one’s social networks and the ties that bind people together. I can honestly say that without the guidance, support, enthusiasm, and faith in me that these many individuals showed throughout my academic career and the dissertation fieldwork/writing period that this project would have never been completed. Heartfelt thanks to each of the following individuals, as well as a good deal of feelings of indebtedness and obligation towards all, especially the generous FCA members of Shichigahama, Japan. I will never be able to repay their kindness to me, though with the completion of this thesis, I have at least begun my journey on the road to trying. Any failings of course, in the face of such overwhelming support, are mine, and mine alone.

Given no idea how I should possibly begin to name these individuals, I will simply start chronologically with no emphasis placed on the order in which they are named. First, thanks extend all the way back to Macalester College, my undergraduate institution in Saint Paul, Minnesota. At Macalester, I found a friend in my advisor, Dr. James Laine and support for my senior project on Fishermen’s Wives in Japan through Drs. Phyllis Larson and David McCurdy. My early attempts at ethnography were woefully inadequate, but their tireless mentoring and suggestions led me to a Senior Honors Thesis and eventually, graduate school.

The initial fieldwork period (1991-1992) was aided by a number of individuals. Most especially, I must thank the Katori family, especially their daughter Eiko, who recommended I interview Tetsuji and Katsuko Sato, a seaweed cultivating couple, and provided the initial introduction. Shigeru and Shigeko Kuwahara also provided housing and emotional support during this time. Classmates who provided invaluable interpretation (from a dialect of Japanese

to ‘standard’ Japanese) assistance and friendship include Yuko Sengoku and Toyomi Mizuno. The positive experiences from this time helped strengthen my desire to continue research with coastal peoples and this topic in graduate school and thus the importance of their assistance should not be underestimated.

In graduate school, thanks go generally to all of the faculty of the University of Pittsburgh from whom I took classes with and with whom I enjoyed productive and informative discussions over the years. I must also thank the Asian Studies Program and the Japan Council for their financial support during my years at the University of Pittsburgh, including staff members Jonathan Wolffe and Dianne Dakis. Of the individual faculty members whom I owe sincere thanks, most especially: Dr. L. Keith Brown and Dr. John Singleton, for their unfailing support of my application and career in the Department of Anthropology and the Asian Studies Program. Dr. Brown, especially for his on-going support of my topic and for serving as my advisor throughout my years in the Department of Anthropology. *Taihen o-seiwa ni narimashita.* Dr. Steve Gaulin, for first suggesting I read Garrett Hardin’s (1968) article on the *Tragedy of the Commons*, thus beginning my research into common property and natural resource management issues. Dr. Rich Scaglione, for both his informal and formal advice over the years and especially for his ability to keep things in perspective. His practical view of academia and graduate school kept me on target and helped me to actually finish the dissertation. *Thank you, Rich!* To my dissertation and comprehensive examination committee members not already mentioned, including Dr. Gail Benjamin, Dr. Bill DeWalt, Dr. Jon Frechione, Dr. Dick Smethurst, *doumo arigatou gozaimashita.* The staff of the Department of Anthropology should not be overlooked: thanks, especially to Phyllis Deasy, Kathy Lancaster, and Felice Kappel for all of the logistical and practical help over the years. No graduate student could ever complete a degree without their help, so “hats off” to them.

Support, advice, and most especially friendship from my colleagues and cohort members should not be overlooked. We at the University of Pittsburgh (at least in the years I was in residence) have been blessed with a camaraderie and friendship, lacking the “cut-throat” behavior so often described in other graduate programs; I was fortunate in my choice of schools. I firmly believe the friendships made in my first years in the program paved the way for an enjoyable and successful time in graduate school. Those ahead of my cohort provided valuable insights and lessons on graduate school life; those in my cohort provided the social bonds human beings need as they make their way through life. Among the friends and fellow students whom I must thank, in no particular order, include, Mark Abbott, Elizabeth Blum, Dr. Florencio Delgado, Elissa Helms, Amy Kreithern, Jee Young Lee, Dr. Abby Margolis, Vernon Seguin, Cathy Serventi, Tammy Szatkowski, Mihnea Vasilescu, Ken Vickery, David White, and Dr. Patrick Wilson. Additional thanks to Andrea Cuellar for her kindness and expertise in map-making. Thanks, especially go to Dr. Joan Paluzzi, and (soon-to-be Dr.) Shawn Wells, for the shared experience of writing a dissertation. *The pasta and wine were almost as great as the suggestions!*

For aid during the writing phase of the dissertation, additional thanks must go to the University of Pittsburgh’s Provost’s Office for a writing fellowship which allowed me to concentrate on writing. Also, Dr. Susan Abbott-Jamieson and Dr. Patricia Clay of NOAA Fisheries must be acknowledged for their support, practical advice, and time to write as I served as a Dean John A. Knauss Sea Grant Fellow in NOAA Fisheries, Office of Science and Technology, during 2002-2003. The time I spent at NOAA Fisheries while writing the dissertation helped immensely as I sought to broaden the *nori* cultivator experience and put it into the context of fisher peoples throughout the world.

The thought of thanking everyone from the field remains a daunting one. There are literally hundreds of people who helped make this dissertation a reality through their kindness

and generosity, interest and advice, patience and perseverance while I conducted research in Japan. Thanks must, of course, go to the Fulbright Program and the Japan-United States Educational Commission for my fieldwork funding, especially to Jinko Brinkman for her help while I was in the Japan. Drs. Ichiro Numazaki and Mutsuhiro Shima of the Department of Cultural Anthropology at Tohoku University for sponsoring my year abroad. Dr. Shibuya was especially helpful to me in using the department's facilities and in checking my Japanese translation of my surveys.

Other researchers I must thank include, Dr. Fujizuka of the Ota Borough Ethnological Museum, Dr. Sho Kawamura of the Shichigahama Ethnological Museum, Director Abe and Nitta Shinichi of the Miyagi Fisheries Center, Ryuhei Sato of the Miyagi Federation of Fisheries Cooperative Associations, Dr. Teruo Igarashii of the Miyagi Fisheries Research Center in Ishinomaki, Miyagi, Japan, Mr. Akama of the National Nori Growers Federation, *nori* wholesalers Koukichi and Yasukichi Ishii provided invaluable information on the marketing of *nori*. Finally, I also owe a wholehearted thanks to Yokoyama-san, a machinery mechanic who provided numerous introductions and insights into the *noriyasan* way of life.

The Staff of the Town Hall of Shichigahama, including Katsuko Sato, Keiichi Kaida, Yasuhiko Sato, and David Heafitz were helpful in finding a place for my family to live during the fieldwork period as well as provided practical help and advice on life in Japan and my research.

FCA staff members to whom I owe a great deal include, Ms. Hachiya, Mr. Tomizaki, and Mr. Hiratsuka of the Yogai FCA, Ms. Suzuki and Ms. Sugawara of the Toguhama FCA, Mr. Ogata of the Miyado FCA, Masaharu Ito of the Shichigahama FCA and Shichigahama FCA president Etsuo Sato for his support of my project in his community.

Fishing Cooperative Association (FCA) and community members in Yogai and Toguhama, were most often at the receiving end of frequent visits and to them I offer profound

thanks for their patience as I very slowly improved my understanding of their dialect and the *nori* way of life. I spent the summers of 1996 and 1997 as well as 18 months in 1999-2001 continually in their presence; the debt owed from their kindness can never be repaid. All of the 13 *nori* cultivating families in Yogai were kind enough to teach me about their way of life. Without their support and help the research would never have been as productive and enjoyable as it proved to be in the end. Though I will forever feel gratitude towards these families, those who deserve special acknowledgement include: Yogai FCA president Etsuo Sato, and Yogai cultivators Tomoyasu and Masako Sato, Yoshiko and Isao Sato, Torau, Masami and Asayo Sato, Teiichi and Kumie Sato, Ryoji and Terumi Sato, Eiko and Keiichi Sato, The Kajita family, the Suzuki family, and Fuchiko and Koshiro Endo.

Toguhama FCA members who deserve special thanks include FCA president Wagatsuma and family, and the Hoshi, Sato, Seto, Watanabe, Wagatsuma, Namura, and Oishi families. Thank you for accepting me into your lives and your continual good humor upon my frequent visits.

Thanks, also to community and FCA members in Yogasakihama, Yoshidahama, Hanabuchihama, Shobutahama, and Matsugahama. Though not named individually the knowledge and wisdom imparted, as well good will shown to me by these individuals, will continue to reside within me. Indeed, to everyone who provided assistance to me in my research and writing and yet have gone unnamed; you are certainly not forgotten and most especially appreciated.

Finally, the greatest thanks and acknowledgement of debt has been saved for last. To Sato Tetsuji and his wife, Katsuko, *Taihen o-seiwa ni narimashita*. For literally years now, you have allowed me to intrude upon your lives, put up with my ceaseless questioning, picture-taking, and constant intrusions. Though I am sorry for any obligations you incurred by serving

as my introduction to others into the community, I am eternally grateful you felt my project was worth such a sacrifice.

To my family, Dr. Patricia Delaney, Dr. Colleen Delaney-Rivera, Dr. Paul Rivera, Maureen Delaney, and especially, my mother, Margaret Nourse, thanks for the help, support, advice, child-care, and bonding that enabled me to get his far in the dissertation, my career, and in life.

To Gregory Miller, my husband, thanks for the reading and re-reading of various texts and intellectual discussions, for the love and dedication you give to our boys, Hamilton and Aidan, and for putting up with me at times when I was pretty much hard to put up with. Spouses along during fieldwork often experience severe trials and tribulations. Our case was no exception. Greg and our *chibiko*, Hamilton, had to put up with such difficulties as having premium tuna (*maguro*) on demand from the Shiogama fish market, attending a wonderful community daycare with committed and generous teachers, commuting everywhere by bicycle, living in a scenic place of pine covered islands perched on the edge of the Pacific Shelf, putting up with, in Greg's words, some of the kindest people we've ever known ... such were the most memorable tribulations faced by our family while in the field ... thank you both for experiencing it with me. Though Aidan did not arrive in time to experience fieldwork, I must acknowledge that his impending arrival enabled me to see and experience Japanese customs and beliefs I would have not experienced otherwise (for example, I did not know pregnant women could not attend funerals). So thank you for providing me with the opportunity to broaden my understanding of Japanese culture.

This Dissertation is Dedicated to “The Boys” in my life:

Gregory, Hamilton, and Aidan

For reminding me what is most important in life

As well as to the

Memory of Sato Shoichi

Thank you for the laughs; you are greatly missed.

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Prologue

The reasons provided by Shichigahama Fishing Cooperative Association members for their fellow *nori* cultivators having quit cultivating seemed relatively straight-forward: high production costs coupled with low crop prices, difficult lifestyle, no occupational successors, lack of space for machinery, not enough personal connections, and retirement due to poor health and age. Since many of these reasons had been given to me in the field in 1991-1992, as well as in 1999-2001, and there was a consensus across the town, I was fairly confident of the validity of this reasoning. The most common reason given, high costs coupled with low prices seemed economically rational. But what of the 13.5% who remained? Were they being irrational (in neoclassical economic terms)? Why did these few (107 in 1999) choose to remain when so many others did not?

Some of the literature on maritime anthropology, commons, and economic anthropology seemed a promising place to start. But other studies, especially those which essentialized fishers (and peasants before them) as being irrational, independent, and tradition-bound, were troubling. I did not feel this depiction accurately represented the Shichigahama case. There had to be a reason at the local level, some value held by the individuals remaining in this occupation, explaining why they remained when so many others felt it was time to leave.

Outline of the Dissertation

Chapter One, examines the literature on Japanese culture, maritime anthropology and the commons before considering substantivist/formalist questions in economic anthropology. Studies reviewed will show that the belief of fishers as tradition-bound and simply conservative are not accurate depictions of fishers throughout the world. Such charges have often been made by formalists and neoclassical economists working in development who have not adequately considered the local cultural model and cultural values. Research Methodology will also be presented in this chapter. Chapter Two describes the Setting of Shichigahama and a brief history

of the area and Japanese Fishing Cooperative Associations. Chapter Three depicts the lives of FCA members through composite profiles, ensuring that the people are given a voice in this dissertation. Chapter Four considers a review of the environment, vital for understanding some of the background to the decision to retire or remain a cultivator. Given the fact that *nori* is a marine crop, the local environment is especially important to these individuals' lives. Chapter Five presents an overview of technology used to produce the crop. Chapter Six discusses an overview of the Japanese economy and places *nori* production/consumption in context. Chapter Seven explains the social networks so integral to cultivation today and highlights the values of "not lowering one's head" and "making one's own decisions." In Chapter Eight, I explain Japanese fishers' lives and discuss the concept of autonomy in Japan. Finally, in Chapter Nine I summarize my results, place them in a theoretical context of rationality, and consider possibilities for future studies.

Chapter One

Theory and Methods

Introduction

Fishing Cooperative Association (FCA) members in Tohoku, Japan cultivate *nori* seaweed for the personal autonomy and way of life this maritime-based occupation provides. Working the sea as FCA members, even as cultivators rather than fishers, enables these Shichigahama residents to make decisions themselves, “not lower their heads”¹ to others, and not take orders from others. Though personal autonomy is not the first value that comes to mind when discussing members of Japanese culture, this is an important value and cultural trait shared by the FCA members in the town of Shichigahama in Miyagi Prefecture.

In addition to autonomy, *nori* cultivation provides Shichigahama FCA members with the “way of life” and furnishes them with the “quality of life” that they desire. Cultivators in Shichigahama today do not take part in this occupation simply as a matter of convenience and societal expectations (such as they are the eldest son and therefore they will simply continue the family occupation), but actually actively choose to continue. They actively choose this way of life despite the availability of outside opportunities and the fact that it is a difficult occupation. The lifestyle remains challenging (long, cold hours now on open-ocean rather than protected, inner bay areas), the marine environment is under threat, household income is uncertain, technology is ever-changing, and social ties must be fostered in order gain more space in the fishing grounds, without which they could not continue large-scale cultivation in the Matsushima Bay region. Shichigahama FCA members are not alone in this choice to continue their way of life. Fishers throughout the industrialized world choose to continue a fishing and

¹ This quote was taken verbatim from numerous informant interviews. By “not lowering one’s head” they mean to not work under someone or for someone; generally being subservient. This is explained in greater detail in Chapter Seven.

maritime-based way of life for quality of life reasons (Pollnac, Poggie and Cabral 1998; Hall-Arber 2001; Gatewood and McCay 1990).

Of course, many FCA members have quit and retired from the Shichigahama FCA in recent decades. Down from a record number of *nori* cultivators in 1972 (804 members in the FCA), today only 107 members (and their respective families) continue *nori* cultivation in Shichigahama. The reasons for quitting are compelling and include resource competition, social competition, mechanization with its high expenses and need for space, falling crop prices, lack of successors, and pollution.

To begin, 804 households, almost 500 of which faced the Matsushima Bay, is a large number of families to enter a small fishing commons. Though “small” is a relative term, I say small given its size and the pressure place upon it, and the areas surrounding it. The area of the Matsushima Bay surrounding Shichigahama fishing grounds was, and is, utilized by other groups in the cities of Tagajo, Shiogama, the Town of Matsushima, and the island of Katsurashima. *Nori*, euphemistically known as ‘black diamonds’ and ‘black bills,’ was in the recent past a lucrative, if labor intensive, crop. Shopkeepers, farmers, and members of other occupational groups joined the FCA to reap the benefits of harvesting such a valuable product. Pressure on the resource was intense. Further, given the practice of ranking² FCA members which was common at the time, many of those families would not have had access to enough resources in order to survive on *nori* alone. Broad-spectrum subsistence was a common survival strategy then and is a common strategy by fishing peoples throughout the world.

Beginning in the mid-1960s, FCA members in Sendai, Yuriage, and Shichigahama’s Pacific Coast asked *nori* cultivators from the Matsushima Bay side of Shichigahama to serve as *shidojin* (guides, teachers) in their search for *nori* cultivating knowledge. These Sendai-area FCA

² Local FCAs set rules individually. Despite the fishing commons as being open to all members of the community FCA, all members were not necessarily equal. In Shichigahama, members were ranked according to seniority. Initially there were 10 rankings, then four, until today, there are none. In the 1960s there were still 10 ranks.

members wanted to begin harvesting *nori* given its nature as a financially lucrative crop. Soon after this, the teachers, realizing they could use extra cultivating space, began to borrow and rent fishing territory from their new students. These Matsushima Bay-coast Shichigahama FCA members were facing an increasing population (they had yet to reach the peak 804 families) with decreasing harvest areas as the Teizan Moat, Shiogama Bay, and the Yogai Bay were each gradually reclaimed or made unusable. At the same time, technology was changing with mechanization and bioengineering increasing. With the growing ability to process more *nori*, comes the need for increased space in which to harvest this larger crop.

Unlike many other areas of the world such as Europe and the United States, Japan's coastal waters are not open-access. Consequently, fishers are not free to simply search out additional areas. Finding someone with whom they could work and spending the time to foster the relationship is energy consuming. Secrecy was the norm and competition among FCA members for partners was fierce. Some FCA members lacked the skills needed for such networking. For others, it simply wasn't worth the effort.

Costs also began rising at this time with increased mechanization. The purchase and maintenance costs of semi-automated machinery were prohibitive. Tied in with this as more and more FCA member households became mechanized, prices fell, causing the two-pronged difficulty of high expenses with falling prices (from increased production). Also, a less-obvious but equally important reason at the household level, ground space is limited. Many households did not have enough room for large, automated machinery.

Coinciding with this, education levels were rising. As more and more children began receiving higher (high school, later college) education, outside opportunities increased. Children of Shichigahama, located near the largest city in the Tohoku region, found themselves with ample opportunities for outside employment. For the first time, beginning in the 1970s, wives joined their spouses on the boats, an occurrence unheard of a decade earlier. Connected with the

rise in education levels came a fall in successors (*atotsugi; kokeisha*). Continuing the FCA way of life did not look as bright of a future as it once did. Parents, though many were happy with their life, began to encourage their children to do something else.

Finally, coinciding with all of these other issues in the 1970s, there was a sudden and massive *nori* crop failure in the Matsushima Bay in late 1970s (and continued through the early 1980s and today). Termed the *datsuraku mondai* [problem of *nori* falling off (the nets)] since the algae would fall off the nets and stop growing, the problem precipitated the largest fall-out of cultivators in the history of Shichigahama. In a mere two year's time, 35 % of the FCA members quit *nori* cultivation. By the end of a decade, the population leveled off at 17% of 1972 households. From that point, cultivators have continued to quit or retire in small numbers each year. Today the population (107 households) stands at 13.5% of the peak.

Concurrent with the societal and demographic changes taking place in Japanese society at this time, the maritime environment was under threat from environmental pollution. Households and industry dumped wastes directly into the Matsushima Bay and rivers leading into the bay. Shoreline and marshy coasts, valuable as nurseries and protection for small sea life, disappeared as the coast was reclaimed for various government public-works projects. Shipping lanes were dredged to make room for larger oil tankers and container ships, taking seabed habitat away with the sand. In the Shiogama-Shichigahama region, cement factories, oil and gas refineries, a shipyard, a coal power plant, and Japan's largest *kamaboko* (fishcake) industry also released wastes into the waters housing the Shichigahama FCA members' resources. Pictures from the 1960s and 1970s show FCA members placing 'oil fences' around their fishing territories, keeping solid wastes away from their crop (Zenkoku 1969).

The Matsushima Bay was once an inky black color with little living in it other than the hardiest of species and an overabundance of jellyfish. Though the days of industry secretly (personal communication with the pipe supplier) discharging wastes into the bay are long gone,

and the Bay has rebounded somewhat, the *datsuraku mondai* continues to this day.

Shichigahama FCA members who hold fishing rights to the resources in the Matshushima (and interior Shiogama Bay) Bay can seed *nori* in their fishing territories, but they can no longer grow and harvest *nori* here in the Bay's waters. This pollution, combined with the difficulties outlined above, help to explain the decline in the *nori* cultivating sub-group of the Shichigahama FCA.

Japan enjoys a reputation among maritime and common property regime specialists as having a successful commons³ system that serves as a model for the rest of the world. The Japanese case is unique given the protection of livelihood given by the national government (livelihood rights) for a local, tradition-based management regime. Often, this protection does not come without a fight (McKean 1981; Huddle and Reich 1987). This case study provides lessons for fisheries managers and those interested in common property regimes, not as yet another Japanese case of successful management, but as a case of perseverance in the face of outside pollution and eutrophication (overloading of nutrients such as nitrogen and phosphorous) of coastal waters. The problem of eutrophication is increasing and can be seen throughout the world from the Gulf of Mexico, to the Baltic Sea, to the Yellow Sea. Understanding how fishing peoples react to this type of non-point source pollution, not just over-harvesting of fish, is needed given the increase of this type of pollution and limited focus on this problem in the literature.

The Economics and Economic Anthropology literature provide compelling reasons for declines in the number of small enterprise households such as seen here; the prohibitive consequences of the technology treadmill and industrial agriculture are significant (Barlett 1989). This study of Shichigahama FCA members, however, fills a gap in the Economics literature and addresses the issue of why the self-employed in an industrialized society would forego wage labor and remain in their occupation. Rather than assuming that those who remain are somehow

³ Commons system means the system of managing resources held in common; common-property. "Common property encompasses a wide variety of institutional arrangements that delimit access and impose restrictions on use, including tribal property, the communal lands of peasant communities ... grazing allotments on federal rangelands; and others" (McCay and Acheson 1987: 34).

unfit to take advantage of wage opportunities, as economists often presume, this research shows that FCA members continue *nori* cultivation out of a preference for this occupation and a preference for the autonomy this way of life provides.

Understanding the lure of this way of life increases the depth of understanding needed for correct economic analyses and economic impact assessments used when cities and regions are faced with fisheries closures—whether that be in a fishery or in a processing plant. Following the reasoning of old-school, neoclassical economics, fisheries managers and economists may expect fishers to quit and move on to a new occupation when, in fact, fishers often increase their effort level instead. In contrast, institutional and development economists would describe such agents as acting optimally (rationally⁴); any unexpected behavior is related to violations of assumptions other than people's behavior (such as the social structure of property rights). Case studies such the this one of Shichigahama FCA *nori* cultivators helps explain some why some fishers do not leave when profits are down and other such “not rational” behavior (Wilén, et al. 2002).

Given the group-oriented nature (Nakane 1970) of Japanese society described in much of the social science literature on Japan, FCA members' desire for autonomy provides a reminder of the importance of values other than conforming to group norms, crucial for understanding Japanese culture. There is a need for heightened awareness of ideas of personal autonomy and independence for a comprehensive picture of Japanese culture. These FCA members find the benefits of “making decisions oneself,” “not lowering [their] heads,” and taking risks (these values are expanded upon in Chapter Seven) outweigh the economic stability resultant from a salaried position. These findings also strengthen and support studies of job satisfaction (Pollnac and Poggie 1979; 1988; Gatewood and McCay 1990) and quality of life in the maritime anthropological literature. In these studies (Jentoft and Davis 1993; Poggie and Pollnac 1978;

⁴ Rationality in this sense is simply defines as acting sensibly and as expected.

1988), quality of life and job satisfaction (Gatewood and McCay 1990) were tied to independence. Thus, for example, skippers (who made decisions) were found to have increased satisfaction with a fishing way of life compared to crew members (who took orders).

Literature Review

Contemporary scholars of Anthropology (including the Anthropology of Japan and Maritime Anthropology) and Japanese Studies are blessed with the availability of an extensive body of literature on the subject of the human condition. Given the sheer amount of literature, this review addresses only the texts felt to be most relevant to this analysis of Japanese coastal culture.

I consider three types of literature: Japanese society and culture; maritime studies, and common property literature. I then review studies of fishing and finally turn to substantivist/formalist approaches.

General ethnographies and survey texts on Japan (Beardsley, et al. 1959; Dore 1978; Embree 1939; Kalland 1980; Norbeck 1954; Singleton 1967; Smith 1978) were more common in the earlier years of anthropological inquiry of Japanese society and culture. This is to be expected in a field in its infancy and still growing. *The Chrysanthemum and the Sword: Patterns of Japanese Culture* (Benedict 1946) and Beardsley (1959), stand out as notable additions to the understanding of Japanese society during this period. These early texts provided information used to build upon – or refute – for later work. These texts provide information on Japanese social structure and organization. For example, understanding how work with, and disputes on, communal resources (e.g., irrigation water and canals in farming communities) helps to explain such practices Japan-wide (Kalland 1995; Kelly 1982; McKean 1992).

Early works serve to provide the field of anthropology with valuable background information on Japanese culture and society, without which current understanding would not be as robust. Work on Japanese kinship, (Beardsley 1959; Brown 1966; Nakane 1970) explains the

systems of kinship, household succession, as well as the *dozoku* (stem-branch household system). Fishing families could not be evaluated thoroughly without knowledge of these systems. For example, when informants say, “*kokeisha inai kara*” (“because there’s no successor”), one has to know the kinship system to thoroughly to evaluate what’s being said. Also, when an informant says he joined the FCA “when my brother died,” why is this death important? The literature on Japanese kinship and households (Fukutake 1967; Nakane 1967; Brown 1966) put these comments in perspective. For example, the practice of in-marrying husbands was found to be rather common in Shichigahama, even for multiple generations; the literature elsewhere in Tohoku supports such customs. Though *dōzoku* (stem-branch household system) were not thought to be particularly common in fishing households (Kalland 1995), Shichigahama residents quickly explained “so and so is the *bekka* (branch) of Hama-no-iru” without prompting. Thus the literature on kinship, especially in the same region of Tohoku, provided explanatory information that work on fishing villages elsewhere in Japan could not.

While in the field, I heard, and witnessed, quite a bit about *Hama O-bon* (beach festival of the dead), funerals, blessings of boats, the burning of New Year’s amulets, first visits of the New Year to shrines, and the blessing of the *nori*, among other religious practices. The literature on religion (Beardsley 1959; Nelson 1996; Norbeck 1970) places these practices in context. For example, knowing that pregnant women can not attend funerals helps explain which household members serve as the family representative. The importance of the blessing of the boat and the sending off of spirits (*hama o-bon*) are not simple traditions, but are practices internalized and often deeply felt. For example, the limiting of launching lantern boats (to send off the spirit) by the town in the name of preventing environmental pollution was said to give one woman “the creeps” (*kimochi warui*). Religious ideas and beliefs explain the persistence of some customs and practices, enabling a proper perspective on local situations.

Though agricultural activity is distinct from fishing, there are similarities in the underlying structure given Japanese culture is the common denominator. Consequently, the literature on Japanese agriculture (Embree 1939; Beardsley 1959; Marshall 1984; Moore 1990; Smethurst 1974; Smith 1974) and social organization (Ashkenazi 1991; De Vos and Wagatsuma 1972; Fukutake 1967; Nakane 1967; Rohlen 1974; Vogel 1963) were indispensable for understanding the Shichigahama situation. Out of necessity, many of these themes overlap with authors addressing more than one in their work. Ashkenazi (1991) and Embree's (1939) work, especially when combined with that of his wife (Smith and Wiswell 1982), explained the nature of small group organization and community living in rural Japan. This helped explain to the nature of the work (*nori*) and neighborhood *kumi* (group) seen in Shichigahama, among other practices.

Historical works also proved especially helpful in setting the background to enable understanding of the present. These include *Shinjo: Chronicle of a Japanese Village* (Brown 1979) which includes data on farming and village customs as well as historical information from Shiogama and Tagajo, cities bordering Shichigahama (though *Shinjo* is far more than a simple listing of historical practices). Other, more recent works (Hane 1982; Smethurst 1986; Marshall n.d.) from other disciplines provide the necessary historical information to inform researchers of contemporary society of the circumstances which frame current societal conditions. In Japanese agriculture and the Japanese fishing industry, Smethurst (1986) and Ando (1995) are two notable examples of studies having direct bearing on how the respective contemporary situations are understood. Smethurst's main point about the poorest groups not having the agency and ability to protest for change was especially relevant for work in this dissertation. The poorest groups are struggling simply to survive. It is poor, but not destitute groups, along with outsiders (such as political activists and caring government servants), who are actually able to work for change.

As the field of anthropology of Japan matured, manuscripts focusing on more specific aspects of life in Japan began to emerge. These included texts and edited volumes on Japanese social organization and structure (Ashkenazi 1991; Fukutake 1967; Lebra 1976, 1992; Hsu 1975), identity (Bernstein 1983; Kondo 1990), religion (Nelson 1996), aging (Kinoshita and Kiefer 1992; Traphagan 2000). This period also saw an increased attempt to relate the people to the reader (Bailey 1991; Plath and Hill 1997).

Ethnographic fieldsites moved from place-based community-level studies (Bernstein 1983; Embree 1939; Dore 1978), including the occasional fishing village (Norbeck 1954 and Kalland 1980), to schools (Singleton 1967; Rohlen 1983; Benjamin 1997), workplaces (Cole 1971; Kondo 1990; Noguchi 1990; Rohlen 1974), neighborhoods (Bestor 1989) religion and religious sites (Nelson 1996; Reader 1991; Smith 1974), and the home (Vogel 1963). Some studies, such as work by David Plath took unique approaches, focusing on lifecourse (1983) and leisure (1964). Many more studies, however, have focused on specific concepts while revisiting old anthropological rites-of-passage-themes such as weddings (Edwards 1989; Goldstein-Gidoni 1997), funerals (Suzuki 2001), and beginning school (Hendry 1986; Peak 1991).

Popular concepts for research have included: aging (Lock 1993; Traphagan 2000) identity (Kondo 1990; Ohnuki-Tierney 1993; Ryang 1997) self (Rosenberger 1992; 2000), and popular culture (Mathews 2000; Raz 1999) begin to play a larger role in anthropology. These studies, and other on occupations groups such as blue-collar workers (Roberson 1998) and day laborers (Stevens 1997) have taken great steps to explain Japanese society. An addition this study will make to those listed above is the focus of this study on the idea of personal autonomy.

This is not to say that the idea of autonomy has been completely overlooked in scholarship on Japanese culture; it has not. Some scholars (Lebra 1992) have even made a point to mention that personal autonomy is at the root of group behavior. Traphagan also points out that “autonomy and the ability of an individual to function as an autonomous entity are important

values in Japanese society. The communal benefit gained through the activity of individuals is largely a by-product of the autonomous action of those individuals” (Traphagan 2000: 5). There are few cases where autonomy, however, is discussed in anything more than a peripheral way. Kleinberg’s (1983) work with Japanese potters is a notable exception.

Related to the idea of autonomy is the concept of self. There continues to be an extensive body of literature on self in Japan, especially in relation to the group, which Plath feels has been oversimplified (1980). Smith (1983) provides evidence that Plath (1975) concedes that “Japanese values may indeed assign general priority to group over self” (Smith 1983: 73) while further “insist[ing] that individual values are also prized, so long as these do not lead to nihilistic self-centeredness or selfishness” (Smith 1983: 73 referring to Plath 1975). Smith further argues that proponents of the idea of group consensus nature of Japanese society fail to recognize the fact that Japanese do assign “high priority to the growth of human beings as social persons” (Smith 1983: 73). The growth of Life-long Learning in Japan is an anecdotal case in point of individuals and growth and maturation in Japanese society.

Though a general understanding of “self” is appropriate for a discussion of Japanese society (see also, Chapter 8) and a fascinating focus in Japan studies, this dissertation does not concentrate on such intellectual issues of a cognitive nature. Additionally, though Plath (1970; 1975) and Befu write extensively on the self in Japan, even Smith (1983) acknowledges that the Western view of Japan is one of a society that is oriented towards the group, where individual needs and wants are likely to be submerged in the group (Smith 1983). Thus, even with some scholars arguing to the contrary and for a well-rounded view, such general descriptions continue to be emphasized as true in among the general populace. This dissertation seeks to illuminate the more concrete issues of occupational preference while highlighting the issue of autonomy rather than an abstract idea such as self.

In focusing attention on autonomy, this thesis answers Hendry's call (1992) for a move away from the oversimplification of Japanese society as one as, for example, as collectivistic or as a 'consensus' society. Hendry argues that the notion of individualism is unnecessary in Japanese society and indeed, individualism connotes selfishness and immaturity while individuality is quite acceptable. Following Hendry's arguments (1992), one's choosing autonomy for an occupation and lifestyle, would be an expression of individuality rather than individualism.

This dissertation takes the idea of autonomy in Japan from an aside to the focus of attention. Autonomy of individuals plays a role in the survival of the industry and fishing cooperatives and in the character of the community. Though this dissertation will add to Japan Studies with an increased understanding of Japanese culture through its focus on autonomy; it also highlights an additional issue needing attention, that of regional Japan. In his article (1991), Kelly highlights two directions in regional society: attention on coastal (versus inland) societies and the affects of agrarian change and industrialization in regional development. This dissertation addresses both these themes. Regions, long tied to the country center, are also tied to global forces (Traphagan and Thompson, forthcoming). Recent work in regional Japan (Tohoku) has also shown a close connection between postwar agriculture and industrial development (Kelly 1991; Moore 1990). This literature explains how the beginning of mechanization "freed much of the farm population to migrate to metropolitan factories" (Kelly 1991). This same scenario can be seen with the fishing population of Shichigahama.

Despite Japan being an island nation, there is surprisingly, *comparatively speaking*, little work done on coastal communities. Some attempts have been made to "correct the agrarian bias of regional studies by turning to the coastal societies of maritime Japan" (Kelly 1991: 412). These works include research on the *ama* (abalone divers) (Linhart 1988; Martinez 1990; Plath 1988; 1989), outstanding work on sea tenure and coastal organization of fishing (Kalland 1981,

1995; Ruddle and Akimichi 1984), and Befu's (1980) article on the effects of technology and industrial development in the Seto Inland Sea. There have also been some work on the changing views of the sea in coastal communities (Anami 1998) and broad-ranging works involving coastal culture (Kyugakkai Rengo 1989). Along the lines of maritime resources, whaling has also received some attention with two notable texts: "Small-Type Coastal Whaling in Japan" a 1988 report and *Japanese Whaling: End of an Era?* (Kalland and Moeran 1992). Bestor's (2000; 2001a; 2001b) work on the social structure of retail and wholesale distribution channels in Japan provides some limited (for this study) context for understanding the distribution of marine resources in Japan. Bestor's explanation of the lottery system in fish markets certainly mirrors the system seen in not only the Shiogama Fish Market, but also in the equitable allocation of fishing grounds. Further, as *nori* itself is gradually becoming a globalized commodity (Delaney forthcoming), the parallels to Bestor's work should prove useful.

Despite the above-mentioned literature, studies in Japanese coastal communities, however, have been few relative to the bulk of research conducted in Japan. Furthermore, these have tended to focus on difference of the coastal group and their uniqueness (Martinez 1990; Plath is an exception). I am positioning instead Japanese fishers as central members to Japanese culture. Rather than a peripheral group, these are people who house ideas central to Japanese society and culture. Though some traits may be linked to their occupation, this is an occupation of entrepreneurs, also seen in artisans, shopkeepers, and other self-employed.

The literature on Japanese kinship and household is useful for background understanding of Japanese culture. In addition to the previous-mentioned works which address these themes, Bachnik (1983), Kitaoji (1971), Shimizu (1987), and Yanagisako (1979) elucidate in fine detail household succession. In enterprise households, which I count fisher households since work and family are essentially one, kinship and succession are especially important given their linked nature (Kleinberg 1983).

The final genre of work in Japan Studies to be discussed also bridges the next type of literature to be reviewed, Commons studies. Much of the work on common property takes as a point of departure, Garret Hardin's (1968) *Tragedy of the Commons* article. Though Hardin's article focused attention on overpopulation, the "dominant legacy of the paper has been its metaphor of common-property resource management" (Feeny, et al. 1990: 2). His basic idea was that all resources held in common, whether they be oceans, forests, rivers, or fields, would be subject to massive degradation. He uses the scenario of a metaphorical village commons. He asks the reader to imagine what would happen if each villager added a few more sheep to the common pasture. If the herders found it profitable, they would continue to add more even though numbers would be greater than the pasture could support, resulting in the loss of the resource for everyone. This is possible because herders would reap the benefits of an extra animal, but only bare a fraction of the cost of overgrazing. Hardin concluded that "freedom in the commons brings ruin to all" (Hardin 1968: 1244; also quoted in Feeny 1990).

This influential thesis has affected natural resource management (Wallace and Fletcher 2000) and has become a part of the conventional wisdom in environmental studies, economics, ecology, and political science (Feeny, et al. 1990; McEvoy 1988). It has also generated a wealth of studies which have taken exception to the inevitability of such as scenario (Bromley 1992; Berkes 1989; Cordell 1989; McCay and Acheson 1987; Pinkerton 1989; Ruddle and Akimichi 1984). Common property is not the same as open-access, an assumption predicated by Hardin's thesis. Consequently knowledge of the local property rights system must be examined to understand the applicability or inevitability of a tragedy of the commons (Feeny et al. 1990).

Much attention has been place on property systems and common property as an institution as a way to explain the reality of situations at the local level (Bromley 1992; McCay and Acheson 1987). Success and failure are linked to a variety of factors, not the least of which involved enforcement and the ability to results at the local level.

Japan is an excellent example of a country which has a communal property system having legal protection at the national level. In Japan, fishing communities, in the form of the FCA, hold legally guaranteed exclusive fishing rights in coastal areas (Ruddle 1987, 1989; Cordell 1989; Ruddle and Akimichi 1984). These rights are based on historical precedent (Kalland 1995; Weinstein 2000) and in the best of circumstances, limit overexploitation of the resources (Befu 1980), though in most circumstances these rights were implemented to control resources for a particular group, rather than to maintain stocks. Though examples are most often drawn from the fisheries sector (Barrett and Okudaira 1995; Cordell 1989; Ruddle and Akimichi 1984; Short 1989; Wigen 1989), McKean (1992, 1996; also quoted in Ostrom 1987) has provided historical accounts of grazing and forest common lands in central Japan.

Readings of these, and other, authors led to my initial investigation of the Shichigahama situation as a way to gain a background understanding of the fishing community. What I found, however, was a situation irreconcilable with many descriptions of sea tenure in Japan: the renting/borrowing of fishing territories by outside members. Intrigued by how such an apparent prohibited custom evolved, my research naturally turned to the causes and effects of just such a practice. The exchange of access to fishing territories is a gray area. On the one hand, such activity appears to be illegal; rights are inalienable, membership is not transferable, and informants described the practice as “*yatte ikenai koto*” (something that can’t/shouldn’t be done). On the other, compensation has been provided to the users of the resource, not just the owners. Thus, there has been a semi-official acknowledgement in Miyagi Prefecture of users having rights. One nearby FCA rents out its *nori* space completely to outsiders and maintains itself as an FCA of that community. If it did not do so, those rights (for *nori*) could be forfeited and awarded to another FCA that has a working *nori* cultivating population.

Following the trail of sea tenure and fisheries commons, leads naturally to maritime studies. Smith (1977) attempted to consolidate work in fishing and maritime communities into

the sub-field of maritime anthropology, by taking examples from studies from around the world. She suggested that fishing cultures constitute a specific type on par with, for example pastoralists or hunter-gatherers. Maritime studies have tended to fall into two broad categories, anthropology of fishing and maritime anthropology. Smith, as others like her, is interested in fishing cultures (Acheson 1981; McCay 1980) in the sense of Kroeber's (1948) whole culture patterns (Gatewood and McCay 1990). Gatewood and McCay posit the driving question of maritime anthropology as whether "communities based on fishing as a major subsistence activity develop a distinctive mode of living and in understanding the world" (Gatewood and McCay 1990: 15).

A significant portion of the literature also shows an interest in the anthropology of fishing (Orbach 1977; Gatewood 1984). This interest is in fishing as a particular activity, not with the whole culture. Much of this literature focuses on risk (Binkley 1991, 1995; McCay et al, 1989; Pollnac, Poggie, and Cabral 1998), job satisfaction (Gatewood and McCay 1990) and personal characteristics of fishers (Acheson 1981; Jentoft and Davis 1993; Poggie, Pollnac, and Fierro 1988).

This dissertation focuses a great deal on the *nori* cultivators' way of life. In the maritime and fishing literature, one's "way of life" has received a great deal of attention. Fishers, especially the *rugged individualist* -type (Jentoft and Davis 1993) are found to "express extremely high levels of attachment to and satisfaction with their work and social lives ... a [fishing] cooperative [sh]ould be understood as an extension of their way of life, embedded in a reflective of the intimacies and meaning of their labor process, families, and communities" (Jentoft and Davis 1993: 359).

Understanding a way of life can be critically important for the social implications involved in the loss of that way of life. Lee (1990) found, for example, that with the loss of jobs for the timber industry, depression, substance abuse, and physical abuse could result. The same

points have been raised by social scientists at NOAA fisheries in regards to fishing communities facing fishery closures in the United States.

In the literature, fishers have been said to prefer fishing to all other occupations. General characteristics maritime specialists have described many fishers as valuing include: independence, challenge, working outdoors, and lack of regimentation (Acheson 1981; Clay 1993; Poggie and Gursuny 1974). I would also add, given the cases of Shichigahama and Shingu (Kalland 1980), that many fishers in Japan also prefer to “make their own decisions” and “not lower their heads” to others. It is assumed these characteristics are what lead to fishers rejecting attempts to substantially change their lifestyle or move toward others occupations when times are difficult. Further, it should come as no surprise that fishers desire to continue in an occupation they enjoy. A number of people (such as university professors) find satisfaction in their chosen professions and prefer to remain (even at the expense of giving up a higher income, such as starting salaries for anthropologists: \$36,000 in academia; \$55,000 in civil service) for intangible benefits provided– such as autonomy, being able to work outdoors, and having long summers “off.” Clay (1993) suggests that in industry there are factors other than monetary income which are important in job satisfaction (Russell 1988); some research even shows job satisfaction high among farmers to the extent that those who have held other jobs tend to prefer farming (Coughenour and Swanson 1988).

Economic Anthropology

Studies of fishing populations have lagged behind those of farming populations when it comes to understanding and appreciating fishers’ rationality. There have been many claims about the irrationality of fishermen, irrationality often centering on investment, innovation, and cooperation (Clay 1993). Recent literature has challenged these assumptions in most parts of the world (an exception being Latin America where most of the studies through the early 1990s continued to emphasize the inability of fishermen to cooperate – see Clay 1993). In addition to

challenging assumptions of irrationality, much of the literature in North America focuses on well-being and quality-of-life issues; this is lacking in work in East Asia, especially Japan. Though some work has dealt with these issues peripherally [(e.g., ethnographies by Kalland (1980) and Norbeck (1978)], most of the literature in Japan focuses on sea tenure and resource management issues (e.g., Barret and Okudaira 19995; Ruddle and Akimichi 1984; Cordell 1989) or specialty groups such as the *ama* (abalone divers) and whalers (Kalland and Moeran (1992). This study adds to the general literature on economic rationality of fishers, and offers an addition to the prevailing trend of the Japanese case as one primarily of importance only in terms of resource management issues: the issue of “way of life” is also important.

Fishers in Shichigahama do invest in technology, innovate, and cooperate, as membership in Fishing Cooperative Associations (FCAs) shows, though their cooperation has limits. Most of the *nori* processing in the west of Japan takes place through mini-cooperatives; Shichigahama cultivators (96 of the 107) prefer to continue production at the household level instead. Though some formalists (see below) might argue that continued household production is irrational when small cooperatives could lower costs, maintaining household production sustains a quality of life that is important to the Shichigahama FCA members. This quality of life seen in the choice of continuing this occupation, as much as at the manner of taking part in the occupation, is at the heart of this discussion on FCA members’ way of life.

In the literature, there has been a tendency to treat fishers as being subject to special economic, social, and psychological conditions (Clay 1993). Fishers are commonly depicted as highly independent and unwilling (or unable) to cooperate in large groups, unwilling to invest in equipment to assure future profit⁵, and in love with the sea and its freedom to such an extent that they refuse to consider outside employment or lifestyle changes. These depictions of fishing life are so, according to the literature, because fishers work in small groups and in a dangerous and

uncertain environment, are subject to seasonal variations in the type, quantity, and quality, of crop available to harvest, and they often operate in a commons where the only guarantee to maintaining access to a good fishing area may be secrecy (Clay 1993).

In this thesis, I examine fishers in industrialized Japan. In the Tohoku region, in the town of Shichigahama, fishers have continued their occupation since pre-Tokugawa (1600-1868) times and most likely given the evidence from Shinto shrines, since the Heian Era (794-1192), albeit not always with the same technologies and materials. *Nori* (*Porphyra* species of algae—a seaweed) cultivation has taken place in Miyagi since 1854 with experiments in production beginning in the Matsushima Bay in the late 1800s. By the early 1930s, *nori* cultivation had begun by Shichigahama Fishing Cooperative members with membership increasing dramatically in the post-WWII period. By 1972, the *nori* cultivating sub-group of the Shichigahama FCA had reached their peak *nori* cultivating population (804 members/families). Numbers fell dramatically in the late 1970s and early 1980s (177 households quit in 1981-82 alone ; 50 more in 1986) and by the end of a decade, the population has leveled off close to the current level (107 members/families). The reasons for quitting include household issues such as successor, age, and lack of space related issues, but usually center on economics: high production costs coupled with low crop prices pushed most of the FCA members out of the *nori* business. Were those who quit *nori* cultivation being economically rational while those who remained being irrational?

Fishers as Economic Actors

In economic anthropology⁶, the debate over peasant⁷ rationality was for the most part settled in the 1960s and 1970s (although studies supporting and expanding ideas on rationality

⁵ The Shichigahama case is different given the level of investment in technology currently, although the Shichigahama cultivators have innovated at a slower pace than elsewhere.

⁶ I acknowledge assistance in economic anthropology from three main sources: coursework with Dr. Harry Sanabria, Stuart Plattner's *Economic Anthropology*, and most especially from conversations with Dr. Patricia M. Clay of Woods Hole Oceanographic Institute.

⁷ The choice of inclusion of peasant studies was purposive. These studies feature prominently in the debates of economic anthropology. Further, the lack of rational behavior initially ascribed to peasants (unwilling to innovate, etc.) has also been charged to fishing populations.

continue). The earlier view of peasants (and later, fishers) as tradition-bound, non- “economic men” was found to be wrong. If technologies and methods were not adopted, “these behaviors were found to be the result of carefully calculated assessments of risks and returns” (Clay 1993: 11). Many studies were conducted in diverse cultures to confirm these findings (literature analysis to follow below). Because, however, until the 1970s, comprehensive study had not been undertaken of fishing as a distinctive subsistence style⁸, few scholars had investigated the rationality of fishermen until the late 1980s and early 1990s.

The wealth of information on peasants as economic actors can also enlighten work with fishermen (Clay 1993). Japanese fishermen, though a part of a larger, industrialized Japan, are small-scale producers. As such, they have some similarities with fishermen and farmers elsewhere in the world, including those in developing nations. Fishermen are in many ways, closer to foragers than farmers. Seaweed cultivation, however, is in essence, farming the sea. The Shichigahama case then involves issues and uncertainties found with both—farming (the sea) and fishing.

Though some scholars labeled peasant as agriculturalists only (Wolf 1955; Plattner 1989), for others, fishermen were also included in this term. Firth (1966) was one of the first to broaden the definition of peasant to included fishermen. For Firth (1966), the distinguishing feature of a peasant economy was it possess “relatively simple, non-mechanical technology; small-scale production units; and a substantial production for subsistence as well as for the market” (Firth 1975:5). It must be noted, however, that for Firth, the extension of the term to fishermen was related to the fact that Kelantan fishermen also owned land and sometimes planted rice.

⁸ This is not to say no anthropological studies have been conducted on fishing peoples before this time. Malinowski (1922), Firth (1946), Hewes (1948), Norbeck (1954) and Fraser (1960) pioneered in this field, and in the late 1960s saw an increase with work by Barth (1966), Fraser (1966), Forman (1967), Brameld (1968) and Ward (1967). However, it is in the 1970s and 1980s that fishing gained recognition as a distinct subsistence strategy within anthropology (Acheson 1981; Smith 1977).

Other scholars have extended the term to include fishermen. Foster (1975) decided that fishing groups in Thailand were organized along similar lines as rice farmers. Ellis (1984) described the household organization of a small US fishing community as similar to Appalachian agriculturalists. Though I am not equating Japanese fishermen with peasants, I am attempting to show how fishing has fit within economic anthropology and the substantivist/formalist debate (below). The early years of this debate were well represented by peasant case studies, thus their inclusion here.

In considering the question of FCA members as economic actors, there are three key schools of anthropological thought: the substantivists, the marxists, and the formalists. Each approach draws on a separate body of economic literature. Formalists use formal, Western neoclassical economics as their base, and emphasize the desire of individuals to accumulate value as being universal (Clay 1993). Substantivists seek to establish local models for each culture in which they work, using descriptive ethnography to discern the economic system of any particular society. Marxists, like formalists, draw on a Western tradition. Their approach, however, is quite different from formalism, as they are grounded in the principles of Karl Marx and his emphasis on modes of production (rather than accumulation), and on the principle of exploitation. This introduction will focus on the formalist/substantivist debate rather than marxism.

The distinction between economic and cultural/social motivations is less important than it was previously (Barlett 1980:547). In fact, for some scholars, if the definition of wealth is expanded to include intangible items such as prestige and kin ties, then the distinctions between formal and substantivist approaches begin to blur (Clay 1993). Some economists describing industrialized societies now see leisure time as a legitimate tradeoff with increased income. Or there may a cultural preference for maintaining ties within one's group rather than turn to 'outsiders.' For example, Shichigahama FCA members may gain, economically-speaking, from

consolidating their fishing grounds, but many individuals exchange and rent territories with friends and relatives outside of the community. Thus, “the rationality of the decision-making process is complex” (Clay 1993: 19).

The Substantivists

Substantivists argue that researchers using Western economic models are being ethnocentric. Further, such models prevent the diversity of economic systems and, especially, motivations found cross-culturally from being seen (Clay 1993). These studies say that material gain is often not the goal of the system in peasant, tribal, and non-Western economies. Rather, “such economies are usually centered on community [and household] gains, on social relationships, on maintaining the integrity of the community by making sure all individuals receive a culturally defined minimum standard of living” (Clay 1993: 19). In these cultures, there is a moral aspect to the economy and the distribution of goods and services (Scott 1976). Polanyi believed that market economies were inherently different from pre-market economies. In pre-market economies, economic relations were grounded firmly within and based upon other social, political, and religious relations—as opposed to a separate sphere of action where people could be complete strangers, market economies (Polanyi, Arensberg, and Pearson 1957).

Substantivism attempts to understand each society’s economy in the context of its unique history and culture. “Market structures, for instance, known in the West may not exist in other societies. ‘Primitive’ economies use reciprocal labor exchange, centralized redistribution, and only to a limited extent market exchange” (Clay 1993: 20). Unlike a market economy where all goods can be exchanged for money, in peasant or tribal economies, goods may be exchangeable only certain domains. That is, some goods may be only exchanged for other strictly specified goods (Firth 1958). Ceremonial exchanges are often cited as examples of such closed spheres. Thus, a system must always be understood on its own terms, rather than described with imposed models from outside (Gudeman and Rivera 1990). For example, Gudeman and Rivera (1990)

describe a house-based economic system which uses monetary relationships with extra-house entities but non-monetary relationships within the house. This is a system which allowed for development along two separate lines—either reproduction of the existing house or transformation to a corporate model⁹. This model includes elements familiar to neoclassical economics, such as the corporation, but is not limited to them.

Peasant and artisanal fishing societies are alike in that their focus on subsistence frames a thoroughly different world view from that of completely market societies, thus decreasing the usefulness of classical Western economics (Clay 1993; Shanin 1973). For example, land and goods might be priced on the market, but labor may be outside the market (Chayanov 1966). Mechanisms act to keep social order by preventing any one individual from becoming significantly more wealthy than any other (as seen with the idea of Foster's limited good). Though Shichigahama is a part of the market economy, and wealth may be accumulated, it is unseemly to boast or display such wealth. Members always underreport their holdings (cultivated area) and leisure (because one would have to be wealthy to have leisure time) is avoided to a great extent. Thus, there are mechanisms in place for limiting shows of such wealth.

Consequently, one can conclude that the use of classical economics to predict results of development planning, planning which fails to take unique cultural and historical aspects of the situation into account, will fair poorly. An artisanal fishing cooperative, for example, could not be expected to run solely on the basis of maximizing utility (Clay 1993). Social, political, and/or religious relations may require transactions which are less than ideal or irrational (in neoclassical economic terms) (Clay 1993).

⁹ “The house is never fully engaged in or dependent on the market. Often, it is organized by kinship relations. It grows by increase in numbers and material means, but its expansion has limits having to do with its internal organization, control over information and technology, and the larger economy of which the house is a part. As it grows, it tends to fragment, to replicate and replace itself, or to be transformed into a corporation” (Gudeman and Rivera 1990:10).

People may be motivated to take advantage of opportunities other than those presented by outside developers (Johnson 1983) or governments. This can be seen in the valuing of kin or social ties with Shichigahama fishing ground exchanges (elaborated upon in Chapter Seven). In the Trobriand Islands, someone who works extra hours in his garden does so to gain prestige as a “good gardener” not to accumulate capital from the sale of his production; any surplus he grows will go to his relatives-in-law (Malinowski 1968). The behavior of members of these societies is judged not by neoclassical rationality, but by standards set by each society’s culture and history.

The Formalists

Formalist economic anthropologists take much of their theory and methodology from neoclassical economics. These anthropologists assume all actors are rational. This rationality consists of a desire to maximize one’s utility, defined as material wealth. As LeClair and Schneider (1968) point out, in neoclassical theory when people economize, they allocate scarce resources. Those resources may be material in nature, but they may also be social—such as prestige. “Neoclassical theory generally assumed that profit was maximized, but this represents an application of maximization theory, not maximization theory itself” (LeClair and Schneider 1968: 8). One can maximize anything that has value to an individual and this idea is assumed to be universal.

In international development, cultural constraints have often been cited as obstacles to development. These constraints are said to prevent people from utilizing rational economic maximizing (Attwood, Bruneau, and Galaty 1988; Hoben 1982). Since individuals in the developing world, often classified as the classic peasant (or artisanal fishermen), cared only for the security of subsistence, they were apparently non-economic (non-economic in terms of profit maximization in neoclassical economics). As investment opportunities increased, the question arose as to whether or not these groups would conform to neoclassical economic theory (Clay 1993). When groups chose not to innovate, the challenge was to discover the rationality which

theory indicated must exist behind the apparently non-economic behavior (Clay 1993). By the late 1970s views had changed. People who refused to adopt new technologies or more fully integrate themselves in to the market economy were no longer seen as being irrational. When it was possible and profitable to do so, individuals have accepted the change (Popkin 1980).

Those who chose not to innovate made rational choices in the face of inappropriate innovations (DeWalt 1985; Hoben 1982). Failure to adopt technical innovations such as biotechnology has been found to be a result of high opportunity costs (Firth 1969) and uncertain conditions which allowed for little risk taking (Wharton 1971; Shahabuddin and Mestelman 1986). Re-stated another way, the failure to adopt innovations required peasants to “maximize the subjective probability of the maximum loss” (Scott 1976)¹⁰. Households may refuse to incorporate labor saving, profitable machinery if its puts their children out of work and thus deprives their 'firm' of continuity and security in their old-age (Popkin 1980). This is in direct contrast to the Japanese FCA case whereby, the adoption of labor saving machinery has enabled other family members to seek employment outside the home.

Another reason behind failures to innovate involves coordination and cooperation within community. Poor leadership and mistrust could limit the amount of coordination (Popkin 1980). In the Shichigahama case, the process of seeding nets on-land is still in its infancy (compared to Western Japan). Seeding is a complicated, technical process which requires the labor of everyone involved. Possibly since production is done at the household level rather than a group level (as in Western Japan), coordination at the FCA community-level is made difficult. Overall, most decisions to reject change are highly rational, and based on an intimate knowledge of local ecological, economic, and social conditions. Further, such decisions are also made given the ability of each household to survive any negative results and/or the initial learning period (Clay 1993). Shichigahama members initially began on-land seeding methods (described in Chapter

Five) using only 10% of their nets; the early years did, indeed, see many failures. As they have increased their skill, however, seeding rates have risen to almost 30%. Thus, after an initial rejection of the technique, members decided to limit their seeding to an amount which they could stand to lose. After skills (and perhaps technology) improved, they increased use of this method. Their initial rejection in the early years was rational given their view that the losses would be too great to bear.

The range of variation within sectors was made clear (Barlett 1980) as formalist studies became more sophisticated (Clay 1993). Individual households are unique in many ways, including having different levels of available capital, access to information, and education, and being at different points in the lifecourse. What is rational for one household or individual is not necessarily rational for all members of a given community.

Discussion

Within the concept of rationality, there are common themes. Over and over, as with the peasants of twenty and thirty years ago, fishers are seen as irrational, bound by tradition, or in other words, “conservative.” Though Clay has argued strongly that “the Other’s behavior might [actually] make sense by our own standards” (1993: 41), I have not been convinced that formalism in economics provides the universal model needed for understanding rationality and economic behavior.

Humans vary enormously and these variations can mean the success or failure of government and NGO development projects. Education, level of income, work history, culturally valued goals ... these are all factors which vary across cultures and even members of the same community. The use of a standard model must be used and chosen with care. This study, while rejecting many of the assumptions of formalism, is also not strictly a substantivist

¹⁰ Scott, like many authors, defines peasants as farmers. However, he does extend the concept of risk aversion and maintaining a minimum subsistence level as common also to fishermen and petty traders who “living close to the margin also spread risks to help insure a steady income” (1976: 24).

study either—work and analysis was conducted at the individual and household levels with attempts to limit essentializations. Further, though it is fair to say that I believe the maximization of economic gains can not be used as the *only* criteria for explaining human behavior, this does not mean that I believe the maximization of economic behavior is an exception of typical human behavior. Extremist Substantivists argue that humans will maximize economically only when they are coerced into doing so (Greenwood 1976). Further, there is a tension between treating individuals as individuals, while also generalizing behavior at the community level. My hope with this thesis is to contribute to anthropology and maritime studies with a Japanese FCA case study while at the same time, adjusting my own model of economic anthropology. My view is one that rejects some aspects of *both* substantivist and formalist theory, while keeping the most important premise of substantivism at heart: variation of human kind and human cultures.

Greenwood (1976) offers a case study that succeeds in presenting an analysis in much of the manner towards which this dissertation originally aspired towards; he presents both Formalist and Substantivist (“Cultural” See Greenwood 1976:215, Note 13) analyses as a way to evaluate a Spanish Basque community. Significantly, Greenwood found that despite increasing profitability, the heirs of Basque farmers were refusing to succeed to the family occupation and moving to the city. As Greenwood commented at the end of the study,

“The most disquieting finding of all for me is that the market mechanism, which transmits the information to these people about supply and demand in the form of prices, did not determine their choice of activities. This is disturbing not because I think people should follow market incentives, but because, in most development planning, we rely on the assumption that the market mechanisms can be depended on” (1976: 211).

Consequently, the Basque case study provides an instance where a detailed, Formalist analysis is unable to explain the actions of the local people. The farmers maintained profitable farms, yet chose to leave the occupation. Greenwood devotes a significant portion of the book to quantitative data to support his contention that farmers are leaving when they are profitable, in

direct contrast to the common explanation that farmers throughout the world leave their occupations because they are unprofitable. Greenwood further argues that “the farmers are abandoning agriculture because it no longer satisfies their ideals of dignity in work” (Greenwood 1976: 18). He shows that the situation is a complex one with history, land valuation, and inheritance conflicts applying pressures on the farmers. The overarching lesson provided by Greenwood remains one which explains that “any model of the commercialization of peasant agriculture must be a reasoned blend of economic and cultural elements” (1976:18).

Greenwood’s study of Basque farmers and this study of Japanese FCA members have similar findings though they come from opposite directions: Greenwood documents why children of successful farmers choose to forego farming. In this dissertation, I explain why a select number of FCA members have not quit, even though so many of their neighbors have chosen alternative occupations. Given the economic nature of seaweed, shellfish, and fish harvesting, economic issues are presented in this dissertation, though not as extensive a formalist analysis as Greenwood presents. Rather, this study provides a framework of economic issues such as income, production, and consumption needed to understand the local situation and argues that if the universality of neoclassical economics and rationality is true, then all members of the FCA would have quit by now. Further given the broad spectrum of FCA members in the hierarchy, those who remain are not simply the ones who could not afford to get out earlier (lowest status), nor are they the ones most productive and successful (and therefore have no incentive to quit). The current cultivators cover the whole spectrum of profitable enterprises, just as the households cover the whole range of social status in the community (FCA members were formerly ranked in as many as 10 different levels).

Shichigahama *nori* cultivators continue as full-time members of the Fishing Cooperative Association because doing so enables them to live their ideal of life: keeping their heads high and making decisions themselves. Though the Basque case showed that “farmers are

abandoning agriculture because it no longer satisfies their ideals of dignity in work” (Greenwood 1976: 18), the Shichigahama case provides an example where working the sea still provides their ideal lifestyle and a quality of life they could not get from factory or even white-collar employment.

Methodology

I have a special fondness for Tohoku and the decision to conduct fieldwork in this region was a personal one. I spent two years in Tohoku in the cities of Shiogama and Sendai (Miyagi Prefecture) in high school and college. Being a person who enjoys the outdoors, I hoped to study in an area that was more pristine and cleaner than areas closer to Tokyo and along the Seto Inland Sea. I briefly considered Kyushu since it is the nation’s breadbasket in terms of *nori* production, but I feared the dialect would prove difficult. Additionally, I lacked contacts to usher me smoothly into a community. For these reasons, I chose to return to Miyagi Prefecture in the Tohoku (Northeastern) region of Japan (see Map 1: Japan).

The town of Shichigahama, Miyagi Prefecture (see Map 2: Miyagi Prefecture) was chosen as a dissertation field site for a number of practical reasons. First, I initially made contact with individuals in this community in 1991 while an undergraduate studying abroad at Miyagi University of Education. At this time, hoping to do a mini-ethnography on the lives of Japanese fishers’s wives, I used a fictive kin relationship to gain entrance into the community. The family that served as my main informants were primarily *nori* cultivators. Upon matriculation at the University of Pittsburgh, I chose to conduct two pilot projects in this community with the goal of gaining background information on the Japanese FCA and commons systems. I did not intend to conduct dissertation fieldwork here. My plan was to use contacts and information from these summers, 1996 and 1997, to select a new fieldsite. By the end of 1997, however, I discovered that if I planned to study the *nori* cultivators in Tohoku and Miyagi, Shichigahama would have to

be the place; Shichigahama is the heart of *nori* cultivation in Miyagi prefecture and contains the only sizable

population in a single, discrete community. Of additional importance was my familiarity with the local dialect, *zuzuben*. While not a great speaker of the dialect, I was nevertheless familiar with it given the time I had spent in Miyagi on previous occasions. I felt I would quickly pick it up given my history. Language ability was an important factor when choosing the fieldsite.

But how does Miyagi fit into the world of *nori* production? Personal preference is important for the fieldworker to be happy, but how does the fieldsite compare to other possible sites? Miyagi Prefecture is not the leader in *nori* production; neither is it on the periphery. The largest producer north of the Seto Inland Sea area, Miyagi is consistently ranked between third and sixth nationally in terms of overall production. Several important technological innovations have come from this area and they have a relatively lengthy history for this occupation (for areas outside of Tokyo). For the purposes of fieldwork, I didn't need the biggest and the best, but rather a strong example of what is typical. For these reasons outlined above, I felt fieldwork in Miyagi would provide a representative picture of the *nori* life in Japan.

Shichigahama

The town of Shichigahama is made up of seven communities which would have been known as villages historically. Each community has its own identity and fishing cooperative, though these co-ops consolidated into one, town-wide FCA just as I arrived into the field in October of 1999. My home was in corporate employee housing just up the hill from the community of Yogai. Yogai fronts the Matsushima Bay and happened by chance to be the area where my main informants lived and the time I spent my previous pilot projects. Through the auspices of the Shichigahama Town Hall, we entered an apartment here thinking we would move later when a house opened up on the Pacific side of the town. Later, however, my husband rented a ceramics studio in Shobutahama (Pacific Side) and this gave us a number of personal contacts with FCA members on the far side of the town. Given the fact we resided on the

Matsushima Bay side, my husband worked on the Pacific side, and our son was in public daycare, we quickly became known to most people in the community.

My previous pilot projects had been conducted almost exclusively in Yogai. Consequently, for the dissertation, I sought to expand my research to include all seven fishing communities in Shichigahama. For the most part, I was successful. I spoke with all FCA households who cultivated *nori* in the bayside communities and more than half of those in the remaining communities along the Pacific coast. Though I realize there are advantages to studying one, small community, I hoped to gain the perspective of *nori* cultivators in Shichigahama and to do this, I needed to speak with members of both coasts, especially since their environments are distinct enough to cause important differences between capture technologies utilized by members of the FCAs as well as differences in the effects of marine pollution. Had I only interviewed FCA members along the Matsushima Bay, this would have become a study of bayside cultivators, not Shichigahama cultivators.

Locations

I interviewed individuals and participated in activities in as many different locations as possible. For practical purposes, the majority of my time was spent in family-operated *nori* workshops and along the wharves since this is where cultivators spend the most of their time. I also met with cultivators in FCAs, at the judging and auctioning of *nori*, at the Shiogama Shrine, as well as several trips out on boats.

Methods

For my dissertation research, I wanted to understand why those FCA members who cultivate *nori* seaweed continue to do so. With greater than an 80% drop in membership in just over two decades, there seemed to be innumerable, compelling reasons for FCA members to quit. Yet 107 households cultivate *nori* in Shichigahama today. To understand their rationale, I

needed to gather data on the following themes: environment, economics, history, personality, technology, commons, and social networks.

The gathering of data primarily consisted of using the ethnographic method. Though I am not an FCA member and could never completely replicate their way of life, I attempted to put myself in their shoes as much as possible in order to gain an emic perspective on life as a *noriyasan* (one who produces/sells *nori*; can be either plural or singular). Though this may not always be possible, if nothing else, aiding them in their tasks did serve to increase my rapport with individuals. In the summertime this meant spending time washing, tying, and moving nets; in the Autumn I managed a few days on the boats seeding and dividing the fishing grounds; and the winters were spent in workshops wrapping *nori* and occasionally helping move boxes of *nori* around for the judging. Whenever possible, if I thought I could help, I volunteered. Through working with them, I gained a better appreciation for the difficult way of life they have chosen for themselves and a deeper understanding of what it means to be a *noriyasan*: far more than simple economics or history, *nori* cultivators work out of an actual preference for this way of life. This is an important fact I would have failed to fully comprehend had I not spent so much time with them in their daily activities.

Methods of Data Collection

During the fieldwork period, I gathered data primarily using participant observation, semi-structured interviews, and structured interviews. I also gathered written and visual documentation from libraries, museums, and television. Methods were often used in concert with one another, such as conducting an informal interview while being a participant observer.

Participant observation

Activities were observed in homes, workshops, in the FCA buildings, in the Shiogama Fisheries building, at the Shiogama Shrine, on boats, and on the wharves. As mentioned previously, I participated in as many activities as possible, though there were obvious limitations.

Without marrying a *noriyasan*, there was no way for me to become a complete member of the group. I tried to spend each morning of the week in a different community with the afternoons/evenings spent tracking down specific individuals with whom I needed to speak. I also made an effort to join them for special activities such as the judging of the *nori* and the judging/blessing of the *nori* from the Shiogama Shrine, an annual event at which the best is sent to a national competition with the best-of-the-best sent to the Japanese Emperor. Time on the boats was necessarily limited. Nevertheless, I managed to observe all of the activities which take place on boats, including seeding, harvesting, dividing the fishing grounds, and even fishing for lunch during group labor. I had my first experience of seasickness through actually participating with the seeding. Throughout each activity I attempted to carefully observe and record the activities around me and followed these up with interviews in an attempt to gain insight into their thoughts and feelings.

Interviewing

Semi-structured interviews took place with *noriyasan* from the seven coastal communities of Shichigahama as well as a number of individuals from elsewhere in Miyagi prefecture. First contact interviews often followed a grand question and continued naturally from that point. As the field season progressed, I compiled an interview schedule by which to guide the interviewing. I wanted an interview schedule to aid me in gaining more readily comparable data. From this data, I compiled a structured interview guide and passed it out in the form of a survey to every cultivating household in Shichigahama. Individuals were contacted using snowball sampling – with the introductions being secured by other cultivators. I also received a list of names and addresses of all the cultivators in the town, but direct contact was rarely productive; introductions were the best way to gain admittance into a new household.

Semi-structured interviews were conducted among the following groups of individuals:

- FCA members and wives
- Museum staff members

- FCA members, retired
- FCA employees
- Government scientists
- Fisheries Center employees

Though the majority of individuals interviewed worked and lived within the borders of Shichigahama, I did work with people from outside the town. FCA employees from further into the Matsushima Bay as well as some from Sendai were interviewed. Museum staff members from Shichigahama, Shiogama, and Tokyo also provided unique and insightful information.

Unstructured interviews were conducted among the above individuals as well as:

- Equipment mechanics
- Fuel delivery personnel
- Town residents

I sought out members of these groups as they had long-term dealings with the *nori* cultivators. I felt they would provide information that cultivators would possibly not provide directly.

It should be noted that since *nori* cultivation is the largest industry in Shichigahama, combined with my family being one of the only foreign *families* in the town (outside of the missionary village), everyday life usually presented itself with opportunity to gain more insight into *nori* cultivation. Shopping, waiting at a bus stop, going to the town gym, these are all activities that often enabled me to meet someone who had, or had some relative, produced *nori* in the town. Once, returning home from the train station, I had the good fortune to take a taxi driven by a *nori* cultivator; he had retired just three years previously. Especially following the publication of a brief description of my research project in the town newsletter, residents often started conversations with me on their own personal connection with the *nori* way of life.

Surveys

I sent surveys to all 107 households currently cultivating *nori* in Shichigahama. Compiled from data and questions gathered in the previous 15 months of fieldwork, the purpose of the survey was to reconfirm information gathered from individual interviews and to possibly

gain a larger sample size. My hope was to reconfirm the importance of themes uncovered in semi-structured interviews. I left the surveys with FCA employees in early February and asked they be returned within two weeks, hoping this would give cultivators time to complete the questionnaire, but not enough time to forget about filling them out. Additionally, by having the FCA (an official entity) deliver the surveys to each home along with other documents, I felt the response percentage would increase over my mailing them directly to each household. Given the busy lives *nori* lead, though I had hoped for a greater response, I nevertheless feel the return rate of 42% as respectable. I could not have feasibly conducted in-depth interviews with this many individuals at the end of the fieldwork period.

Important themes covered in the survey include:

The *Nori* Way of life

- Good points
- Bad points
- Enjoyable aspects
- Future

Fishing territories

- Rights
- Exchanges

Environment

- Matsushima Bay
- Sendai Bay

Survey results

Surveys results were analyzed using the statistical program StatView. Respondents were, on average, 58 years old, 2nd generation *nori* cultivator, had cultivated for 36 years, and lived in households of 4.75 people. Though I did not request a particular householder (male or female) to complete the survey, 43 of the 45 respondents were male.

Table 1.1: Survey Results

Category	Mean	S.D.	High/Low	No. of Responses
Age	58.25	9.926	78/22	44
Household size	4.75	1.75	9/2	44
Generation	2.07	0.737	4/1	43
Years cultivating	36.40	9.357	53/3	44
Sex (43 male, 1 female)	n/a	n/a	n/a	44
<hr/>				
Good Points				
Work for oneself	1.52	.969	5/1 ¹	42
Work the sea	2.89	1.083	5/1	33
Work with wife	3.7	1.44	6/1	30
Work at own pace	4.0	1.34	6/1	33

Given the nature of the male as the legal househead and the FCA right holder in the majority of Japanese households, this result was not unexpected. Results reflect two atypical surveys: one respondent was unusually young (22); another completed only one page of the survey, to the exclusion of socioeconomic data.

Further means of data collection

To support the ethnographic data collection aspect of my project, I also gathered written and visual documentation on *nori* cultivation, FCAs, the marine environment, and the history of Shichigahama. Japan has one of the highest literacy rates in the world and their populace is extremely well-educated. Also, educational television shows are common. These two facts

meant there is a lot of information available in Japan on almost any subject; you simply have to have an interest to be able to find it.

Written documentation on *nori* cultivation

Written documentation on *nori* cultivation came from two main sources: museum publications and publications of the National *Nori* Growers Cooperative Association. *Nori* cultivation is a specialized occupation. The reader will be surprised to learn however, that there is a museum dedicated almost exclusively to this way of life: the Ota Borough Ethnological Museum (*Ota-ku Hakubutsukan*). Located in Oomori, Tokyo, the museum focuses on the history of *nori* cultivation in Tokyo Bay. Since cultivation throughout Japan spread from the people and technology developed in this community, historical documents here had direct bearing on the background research aspect of my fieldwork. The museum has also compiled detailed information on these outlying areas, such as Kessenuma, Miyagi, which proved vital to understanding the history of the people in my fieldsite. Three texts on the tools of *nori* production, *nori* in woodblock prints, and the history of *nori* production proved especially interesting and helpful. Staff at this museum also provided me with a number of useful articles on outlying communities.

The National *Nori* Growers Cooperative Association is an organization that serves *nori* growers throughout Japan. This organization publishes a newsletter, *Nori Times*, three times a month, every month of the year. Every cultivator I met subscribed to this newsletter and it is through this publication that I discovered the existence of the Ota Museum. A publication of this sort was invaluable to me for following issues of importance, news of other regions, as well as science and technology issues. Additionally, this organization has also published the text, *Nori Cultivation: Seen Through Pictures*. With previous editions in 1969 and 1979, its third edition was published in 1999 on the fiftieth anniversary of the organization. These three editions

allowed me discover site specific information, as well as enabled me to track and compare the different regions and prefectures over thirty years.

Visual information on *nori* cultivation came from two main sources, the Ota museum and television. The Ota Museum had extensive exhibits on *nori* cultivation; they have also published pictures and postcards of *nori* tools, people, as well as artwork depicting *nori*. Japanese television usually airs information on seasonal events and activities, such as seen with cherry blossoms. The first *nori* cutting and judging were deemed of significance for national public broadcast. The second season of the fieldwork period also witnessed an environmental disaster in Kyushu; consequently I have quite a bit of visual information from Japanese news broadcasts. Also from television, I was able to record a special educational show on *nori*: from cultivation to wild *nori* to information on health benefits and ways to prepare *nori*.

Textual documentation on the Japanese Fishing Cooperatives was primarily compiled and reviewed prior to the fieldwork period. These documents included articles and book chapters on the Japanese commons system and their way of managing their marine resources. While in the field, I reviewed documents on the FCA as they were covered in annual and monthly meetings along with written information provided to cultivators from the local FCA offices. I also conducted a search of the literature in Japan via the Internet at Tohoku University. From this search I gathered some very useful information on FCAs, economics, and the issue of FCA consolidation.

Gathering scientific data on the state of the marine environment was among the most difficult challenges of the entire fieldwork period. *Nori* cultivators stated repeatedly that *nori* “would not grow” in the Matsushima Bay despite twenty years of research. Understanding the *nori* crop failure is a politically-charged affair; under Japanese law, cultivators have the right to be compensated for the loss of resources (in this case, their ability to grow *nori* in their fishing grounds in the Matsushima Bay). When scientists state vaguely that “one *single* reason can not

be determined,” (italics my emphasis) this really means that the cultivators are unable to sue for compensation. As one might expect, direct application to scientific centers for information on the local environment met with about as much positive result as hitting a brick wall. Using one of the most important tools of anthropology (social networking), however, I was able to meet with one of these scientists eventually through his wife, the friend of a friend. From this scientist, I received a number of prefectural and center publications on the state of the environment and experiments conducted to determine the cause of the ‘*datsuraku mondai*’. I also received weekly bulletins from the prefectural fisheries center on the everyday conditions of the bay. Finally, newspapers were reviewed for articles on the Matsushima Bay, the Pacific Ocean, and land events that affected these areas.

Historical documents on the town of Shichigahama were gathered and purchased from the Shichigahama Town Hall and the Shichigahama Reference Museum. The most useful texts included *The History of Shichigahama, People, the Sea, and the Town*, and the 100th Anniversary text [of the incorporation of Shichigahama as an entity (village)].

Target population

Sex

For the research, I interviewed both men and women. Men are the right-holders and the official FCA members (except in the case of widows). For convenience sake, and following the Japanese frame of reference as the *noriyasan* as the rightholder, I often refer to men as the cultivators and the wife as “the wife.” I made great effort, however, to include wives and grown children in the interview sample. In some instances this was not possible and I interviewed whichever partner was available. I did not set about interviewing men and women out of a desire for gender equality or from an interest in gender issues. Rather, given technological and social facts of life today, cultivation is an occupation that requires two householders and for most families, this means husband and wife. The right-holder could not successfully cultivate today

without his wife. In some families sons replace the mother or serve as a third worker; in these families I did my best to interview the son, as well.

Age

The age of the sample population ranges from 22 to 92 with the majority being in their 50s. I interviewed cultivating individuals and retired individuals. Given the successor problem in Japan and the 'graying' population, the average age is older. Non-cultivating children (especially school age) were not interviewed (though in retrospect, I wish I had done so).

Length of fieldwork

Fieldwork was conducted in Shichigahama during three separate periods: May through August of 1996; May through July of 1997; and October 1999 through April 2001.

The first pilot study in Shichigahama lasted for three months in the summer of 1996. I undertook this study to understand the workings of the FCA system at the local level. During interviews I uncovered the separation of fishing grounds into seeding and cultivation grounds, along with the local practice of exchanging access to different territories among members of different FCA. I became intrigued by this practice and after a year of bibliographic research, I returned to the same fieldsite in May of 1997 to investigate their commons system. Research was directed at this time towards receiving information I felt would be useful for dissertation proposals; I believed my dissertation would focus upon how locals managed their access to fishing territories. During this fieldwork period I also searched for an alternative fieldsite.

In October of 1999 I returned with my family to Shichigahama where we would live for the next 18 months. The field season was intentionally planned to cover two growing seasons to see variation between seasons.

Summary

This study contributes to the realms of theory and data in a number of disciplinary areas. First, through focus on fishing territory exchange, common property theorists are forced to re-think common property regimes. A successful Commons not only relies on internal controls, such as seeing consequences of action at the local level (Ostrom 1987 in McCay and Acheson 1987), but is also at the mercy of outside forces [such as non-point source pollution and outsiders (see Marra 1986)]. Japanese fishers may be the successful managers of the fisheries they are generally described to be, but this does not mean that all who choose this profession will be able to continue this profession. Further, the territory exchanges described in this thesis are an informal first step towards consolidation. The literature on Common property theory has not often addressed the spontaneous formation of new commons (IASCP 2000 meetings panel had an exception); this study presents an example of a situation and the conditions which may lead to such a result.

The coastal setting provides a needed balance to the preponderance of studies on Japanese culture based in urban (especially the Tokyo and Kansai areas) and inland areas. It further adds a new dimension to maritime studies. Though Japan has often been set up as an example of successful management of fisheries, there is little in the way of in-depth research on coastal communities and pollution, especially in anthropology. Befu (1980) and Wigen (1989) are notable exceptions to this observation. However, this study goes even further to combine actions at the individual level with outside pressures.

As eutrophication of coastal waters increases throughout the globe, this study is an important example of the consequences of pollution in cultural and occupational terms. Lessons can be drawn from this Japanese case to lessen impacts among other peoples in different regions of the world.

Further, this study provides an additional case study for students of economics. This study illustrates the limitations of some formalist theory and shows, through concentration on individuals and the community, importance of particular socio-historical aspects of culture.

Though the methodological techniques used to conduct the research for this study do not offer anything particularly new to the field of anthropology, this study does illustrate the importance of long-term perspectives in our work. Field visits took place in 1991-1992, 1993, 1996, 1997 and 1999-2001. Without such an extended perspective on the community, research would probably not have progressed beyond the economic reasons for FCA members quitting and into the realm of personal autonomy and why these remaining individuals continue their way of life. This long-term perspective has enabled the study to be richer, have more depth, and be a better study than it would have been otherwise.

Chapter Two

Setting and History

"[Shichigahama] is a nice place, isn't it?"
"This town is 'the sticks' don't you think?"
"Shichigahama used to be much better. The water was clean, and numerous sea animals and plants lived here."

Three elderly informants, 2000.

Setting

Shichigahama, which literally means 'seven beaches' in Japanese, was the site of my fieldwork for eighteen months between 1999 and 2001. Small in size (smallest town in area in Miyagi Prefecture at 13.27km²) and population (21,134 in October, 2000), its residents have large hearts and a capacity for generosity. Though the town has become a bedroom community for neighboring Sendai (surpassed population of one million in May of 2000) in recent years, it has nevertheless retained its remote fishing community atmosphere in many ways. Completely surrounded by water, Matsushima Bay to the north and east, the Pacific Ocean to the east and south, and the Teizan Moat to the west, the community has long been isolated from the surrounding area and a common phrase, "as you cross the bridge, the language changes," does a fair job of summing up this isolation. In the not-very-distant past, the community could only be left via boat as ferries served the place of bridges; water taxis even took members of various hamlets to the closest city for movies and shopping.

Though Shichigahama (See Map 3: Shichigahama) is literally translated as seven beaches, beach in this sense really means community; thus there are seven coastal communities located within the town limits, incorporated in 1959. Within these communities, numerous inland hamlets contain dry fields, rice fields, tracts of forests, and shopping districts and housing, but for official purposes, they are a part of these coastal communities. Coastal communities include both sandy beaches and rocky shorelines. Overall, the town is quite hilly along the

perimeter with inner valleys filled with rice fields or new subdivisions. Going from one port to another necessitated a grueling bike ride up and out, with a ride along the spine of a hill, and an eventual downhill into the next community as a reward. At least, breezing downhill was a reward until it was time to go, in which case I had to climb up and out again. Given the terrain, most port areas had homes built very close together with narrow roads lined by stone walls. Kitchen gardens can be seen in every space available along hillsides and next to homes. The isolated atmosphere these communities have retained is due in a large part to these narrow roads, high stone walls surrounding close homes and kitchen gardens. As houses are rebuilt, however, the town has made it a requirement that the stone walls be moved in (1 meter) so that emergency vehicles (and SUVs) can get in, thereby slowly changing the character of the area.

The seven coastal communities under discussion can be roughly divided into two groups: those facing the Matsushima Bay and those on

the Pacific Ocean. Yogai, Toguhama, and Yogasakihama face the Matsushima Bay and each share similarities based upon their environment and the environment of their fishing grounds. In the recent past, the members of these three communities harvested shellfish (*asari* and oyster), fish, shrimp and seaweeds; today these grounds are almost exclusively used for the growing of *nori* seaweed. Limited netting of fish (subsistence), gathering of *asari*, and cultivation of *wakame* (commercial) seaweed does take place, but *nori* is by far the most important resource harvested from these grounds.

The Matsushima Bay is a very scenic bay filled with pine covered islands. Though the largest three islands are inhabited, the remaining 200 are small, sandstone rocks jutting out from the sea. The famous Japanese poet Basho (1644-1694) visited this area and described the Matsushima region in his “Narrow Road Through the North.” Traditionally described as one of the “three most scenic places in Japan,” the Matsushima Bay has been designated by the Japanese government as a quasi-national park. Found within the southwestern Matsushima Bay coastal area is the Shiogama Bay. The city of Shiogama is densely populated with some industrial development, negatively affecting the water quality (local environmental conditions are discussed in detail in Chapter 4).

The remaining four communities (Yoshidahama, Hanabuchihama, Shobutahama, and Matsugahama) face the Pacific Ocean and subsequently the fishermen follow a slightly different subsistence strategy. As with the bayside communities, *nori* has gained importance, but these fishers also dive for abalone and sea urchin, net and pole fish in the in-shore areas, as well as fish on large trawlers throughout the Pacific from Alaskan waters down to Argentina. Additionally, many have family members who run fish stalls in the nearby fish market of Shiogama. It has been explained that given the danger of deep sea and offshore fishing, it was common for family members to seek a safer occupation; fishmongering being an ideal occupation. The introduction of new *nori* growing technology, allowing *nori* to be harvested from these Pacific Coastal areas

in addition to traditional bayside areas, was also seen positively as a way to continue working with the sea, but in a slightly safer occupation. One community has a long, sandy beach and is a popular spot in the summer time, providing additional income for some families who run refreshment stalls. This community, and one neighboring it, also has numerous Japanese-style Inns that cater to tourists.

The port area in each community now consists of a concrete wharf and a local Fishing Cooperative Association Office. Though each wharf varies in size, some have more workspace than others do, each one is surrounded by a four to five feet high concrete wall. Doors are spaced here and there on wheels ready to be shut in times of emergency. The feared emergency in this case being tidal waves. Given the high tectonic and volcanic action found in Japan, and the nature of much of the coastline, especially in this area of Japan where houses are built close in to the water below steep cliffs, tidal waves are a legitimate fear. Indeed, a tidal wave in the 1880s killed thousands of people further north along the Iwate coast. The tidal wave of most recent memory to hit the town of Shichigahama resulted from the Chilean earthquake of 1960. Following a major earthquake in Chile, South America, the tidal wave crossed the Pacific Ocean, hitting Hawaii on the way, and ended up in Miyagi. Though the mortality rate was fortunately fairly low with only about 200 deaths (Fryer 2001), damage in some communities was extensive. Thus, as the government provided assistance to build wharves and work areas, surrounding walls were constructed at the same time.

Depending on the season, time of day, and local sea environment, ports are either a bustle of activity or deathly still. *Nori* (Latin name, *Phorphyra tenera*) harvesting was a full time activity for more than 100 households throughout the town and where I focused most of my attention. As some judge the season by flowers and other plants blooming around them, I learned to judge the season by the activities taking place on the docks.

Autumn

Early in September, if you were to arise before daylight and head down the hill to the docks, you would hear, though not see the hum and roar of outboard motors as the boats race away. Once at the dock, in the dim light, you may be able to make out boat after boat, with husbands and wives standing close together on an open boat, heading out to the (fishing/growing) grounds in the Matsushima Bay. Formerly fishing and *nori* cultivation grounds, this area is now used exclusively for the seeding of *nori*. Boats are followed by dinghies or small rowboats with an outboard motor attached and at this time of year, everyone who can work, does. Boats are piled high with nets, bamboo poles, and boxes of oyster shells containing the seeds of *nori*. Though men hold the boating licenses, wives are seen at this time of year piloting dinghies and the occasional larger boat. As will be shown throughout this thesis, much of their workload is divided along gender lines. Even so, everyone knows HOW to do another's task for the most part and do jump in when needed. Thus even though the husband holds the boating license and drives to and from the cultivation grounds, wives can and will drive when they must. At this time of year, they often must.

The majority of my time as a researcher was spent going around to various workshops, homes, and work areas on the docks to talk with informants and friends. Several were kind enough to allow me to join them going out to the fishing grounds and this was one time when I felt I could give back a little through my attempts to help at this busy time of year. Thus I found myself, early one morning rising before the sun and heading down to the docks closest to my home. After giving good morning greetings, and receiving a few good natured jokes about how they feared I wouldn't be up in time, we were off to the fishing grounds in the Matsushima Bay where I planned to help Mr. Suzuka for the day. Mr. Suzuka was driving their regular boat; I joined Mrs. Suzuka in the small dinghy. As we headed for the center of the Matsushima Bay,

hands were raised in acknowledgement of others and occasional greetings yelled out as we passed others heading for their nets.

The bay was relatively quiet in this Autumn dawn. Tankers, leisure fishers, and the tourist boats were nowhere to be seen. Save the *nori* cultivators' boats, the single ferry boat to the islands, bringing schoolchildren and workers to the mainland chugged by occasionally, and a few of the larger fishing boats, taking their catch to the fish market, were all that were seen in the dim light. We went straight to work, making our way along the length of the nets, dropping in oyster shells into plastic bags as we went. Though many have adopted a newer system with twine tied through holes in the shells, the Suzukas and most of the *noriyasan* (*nori* cultivator/producer; may be singular or plural) in their community, still use plastic bags attached with metal wire to seed the nets. As biologist Kathleen Drew discovered in 1949, enabling modern cultivation of *nori* to take place, part of the lifecycle of *Porphyra tenera* (commonly known as *nori*) includes the spores adhering to oyster shells before loosing themselves into the ocean, whereby they adhere to anything they can and begin growing. The seaweed cultivators' main goal consists of having the spores adhere as evenly and widely as possible, making as uniform use of the space as possible. Harvesting this type of seaweed is not a one-time affair such as with rice or wheat, but rather is similar to mowing the grass: it needs to be cut continuously throughout the growing season. Given time, the plant grows enough such that it needs to be cut again. Since these cultivators cut *nori* approximately four times, it is desirous to have the *nori* spread evenly since patchiness represents a loss of potential income.

After several hours of laboring away, Mrs. Suzuka heads the dinghy over to their main boat to get re-supplied with more shells. We take the opportunity to tie up alongside others taking a break and chat while eating a late breakfast. Most of the conversations run along the lines of me helping out with the most frequent question something along the lines of, "How do you feel? Not seasick?" I smile and say between yawns, "I'm fine." The women laugh. They

realize, though I lack the comprehension, that I'm already getting seasick. For those readers who have spent as little time on boats as I, yawning is the first sign of seasickness. Later I will develop a headache and feel so badly that I cringe at the sight of yet another dreaded tourist boat; with each passing hour dinghy rocks violently back and forth, turning my face a deeper shade of green. For the time being, however, our mid-morning snack of rice balls (*onigiri*) hits the spot and I am rejuvenated and ready to go again. After refilling the insulated boxes with more oyster shells, Mrs. Suzuka and I return to the nets.

As we travel down the narrow lanes, I notice two inch bamboo poles marked with every different type of marker as you can imagine, white, blue, green plastic bags, wooden tags, rice hulls tied around the pole, etc. Each cultivator has marked his rows in order to find his spot quickly. In addition, the nets being used are dyed different colors with the reds, purples, and greens making for a colorful scene. Mrs. Suzuka and her husband use nets dyed green and purple. I work diligently, head down and moving my fingers as quickly as possible. Mrs. Suzuka sits in front filling every other bag, I am behind filling in the others. The boat is parallel to the nets and we pull it along the length. After almost five hours on the water, with the sun now high in the sky, the port and bay is a bustle of activity-- leisure boaters and tankers now steam past in addition to the fishing boats and ferries-- my yawns have increased in number and my headache is bad enough that even I have to admit to myself that perhaps the rocking motion is beginning to affect me. When the grandfather from the next family over decides to head back home and offers to take me with him, I find I am more than ready to return. On the way back, I notice Mrs. Kumiko Saito alone on their big boat, her head buried in her arms. Seasickness, has taken its toll on her, as well, it appears. As the daughter-in-law in a family where the father and son still work together, her labor has not been needed on the boats. Now that her oldest is graduating from high school and her father-in-law is reaching retirement age, she has found herself for the first time in nearly 20 years of being a cultivator out on the boats. Unlike me,

however, she must stay and get accustomed to the rocking motion; her place is now on the water and on the water she must stay.

The seeding of the *nori* takes place over a week's time. Despite long hours on the water, most cultivators are cheerful. For them, this is the best part of the year; they have the anticipation of a good season to buoy their spirits. Following another ten to fourteen days when the *nori* has 'taken root' and grown a centimeter or so, each cultivator will decide when to pull his nets out of the water. Of these nets, some will immediately be put onto floating rafts in the cultivation grounds while the rest will be put into deep freeze for later in the season. The decision of exactly when to pull the nets, as was when to begin seeding, is a personal one; it is also a critical decision upon which the fate of the entire harvest may rest. Given the current condition of the marine environment, *nori* fails to grow beyond two or three centimeters. As numerous cultivators explained, "if left in too long, the *nori* will die. [We] wouldn't know now; not until we put the nets in [the rafts] would [we] find it's not growing." As a Yogai cultivator pointed out the first season of my fieldwork, "Toguhama had a tough year ... they left the nets in too long." Thus, even though nets of different communities can be found side-by-side to one another, the harvest can vary greatly. Indeed, I happened across several Toguhama men in serious conversation one summer morning and a wife explained, "we have enough to live, to eat, but ... meeting social obligations is a worry." Precisely when to pull the nets is just one of several decisions that are critical to a successful final product.

Following the seeding of the nets and they are pulled from the Matsushima Bay waters, nets are spread out on every available space on the wharf, in driveways, and even along roadsides. Families draft relatives and friends to help them spread out nets and once dry, place them into plastic bags and boxes to be frozen. Freezer space is rented in Shiogama and Sendai to flash-freeze the nets and store them at a temperature of -30°C. These nets will be taken out and placed in the ocean just prior to New Year's Day with some remaining for emergencies.

Freezing nets in this manner has been a boon for *nori* cultivators. First, it has enabled them to extend the growing season; in the past *nori* often went bad following the water inversion (mid December). Secondly, it has provided them with the ability to replace nets that are lost in accidents such as being run over by boats or being torn apart in storms. If run over by boats, the monetary value of the nets can often be replaced. Storms, however, are a different matter.

During the two growing seasons I resided in Shichigahama, there were, fortunately, no typhoons. Though even general storms cause damage, typhoons can be devastating. When I inquired if someone had ever thought of quitting this occupation, more than one cultivator responded, "After a typhoon." Further into the fieldwork I discovered most men who responded in this manner were probably thinking of one particular year: 1991. In the autumn of 1991 no less than three typhoons hit the Miyagi coast. As one described, "Repairing the rafts is such hard work. The nets were ruined ... we took more out of the freezers and just as that was going, another typhoon hit. Repair everything again. And then another typhoon came." The burden of three typhoons in one season was enough to make some wonder whether it was worth the trouble. A few actually decided it was not and quit *nori* cultivation; most, however, persevered.

In a more typical year when typhoons do not cause havoc, seeded nets are placed on the rafts and following approximately two weeks of growing time, are deemed ready for the first cutting. The scenery changes at this time of year with harvested *nori* being unloaded on the wharf. A thick mass of dark green, almost black, slimy seaweed fills crate after blue, plastic crate. Most are loaded onto small 'kei' trucks and driven home; some find their way onto rickshaws and walked to workshops. If the salty, 'fishy' smell in the air doesn't clue you in to the fact that the *nori* season has begun, then the hum of machinery in the evening when everything else is quiet lets you know for sure that the season's harvest has commenced. In most years this takes place around November first. The season officially runs through April 30 with the first *nori* auctioned around November 15. Being the first auction of the season in Japan, buyers from

throughout the nation attend this auction with NHK (the state-run television broadcasting company) and local television crews documenting the event.

After the televised opening of the season, cultivators fall into a routine with late autumn and early winter blurring together. Days follow much of the same routine; cultivators arise by five a.m at which time some are having a quick drink of green tea; others have already left for the cultivation grounds. My main informants and friends for over ten years, the Suzukas, are frequently visited by two neighbors Tosaburo and Shun Saito prior to their embarkation into the cold wind and frigid waters. Salutations are exchanged, warm tea is drunk, and then they are off to the boats.

Every third or fourth day rather than cut *nori*, they may wash the nets in an herbicide¹¹ solution to prevent *aonori* (green *nori*) from growing on the nets. Judging day is held once every two weeks. On this day, some cultivators will have to take a day off to unload the *nori*. Each community has its own system: some work in groups (*kumi*) whereby four couples will work the entire day unloading the entire community's *nori*; others work in groups in shifts but do just their own. For example, group A works from 8:30 to 11:00; group B from 1:00 to 3:30; group C from 3:30 to 5:00. Each system has its advantages such as if you work all day, you only take part in this activity twice the entire growing season, giving you more days to work the sea and potentially earn more income. Those who unload their own only lose a day's work every two weeks or almost ten days work for the season. Community members decide themselves, by consensus, which system they will use.

Winter

In mid-December the view of the docks begins to change: here and there you can see nets beginning to be piled neatly on the docks. Autumn nets are pulled and replaced with winter nets

¹¹ Most claim they do not use pesticides which would harm the environment. Rather this seems to be an herbicide of which citric acid is the main ingredient.

from the freezers. These piles will grow until, by the end of the growing season, piles may be ten feet high. Nets are pulled for a variety of reasons: *nori* fails to thrive; *nori* has turned yellow; *nori* has been overrun with *aonori*, the *nori*'s been cut too many times and has become thin and tough.

Daily life continues in the pattern set in late Autumn: cutting and processing *nori*, washing nets, and judging day. Cutting involves pulling nets across the boats and over a long, narrow cutting machine. As the machine cuts the *nori* pulled over it, the cutting fall underneath where crates have been placed to catch the falling *nori*. These machines have been nicknamed *shamisen* for their similarity to the stringed Japanese instrument by the same name. The New Year's holiday arrives quickly and involves extra preparation for rituals: special food preparation, bamboo and pine decorations at the entrance to homes and also on each boat. A visit to a Shinto shrine takes place on January 1st, or as soon as possible, by all the members of the family. For many members of Japanese society, several days may be taken off for work to enjoy with family, go shopping, etc., but for *noriyasan*, they are back on the boats the second of January. The consequence of working in an occupation which is affected by the weather: if you take off today for a holiday, you may be forced to stay home tomorrow due to inclement weather. Basically, they don't know when they will be forced to stay home so they work every day they possibly can. As they explain, "a year's living must be made in five months so ...", so few take days off, even for injury or illness. On more than one workshop visit I was offered *tamagozake* (raw egg and *sake*), a concoction to heal your body from colds. At these times, the husband of the house was often taking a nap; catching what little rest he could at the end of a long season.

The streets on winter evenings are dark and quiet save for the running of processing equipment late into the night, the smell of *nori* wafting through the air. The quiet of the streets belie well lighted workshops, humming with activity. Depending on your timing, you can often catch *noriyasan* visiting one another in their workshops, coffee, tea, or sometimes *sake* (alcohol)

passed around. Topics of conversation range from the crop, politics, and the homelife of the field worker. The first season of fieldwork coincided with presidential primaries and I was constantly called upon to explain the US political system.

Windy, wintry nights bring the volunteer fire brigade to each neighborhood with their flashing red lights and "ding ding ... ding ding" of the bell. As the truck inches through the streets, the loudspeaker informs you they are "such and such fire brigade" and implore you to "please be careful and keep watch" for fires. Many *noriyasan* husbands are members of the volunteer fire department well into their 50s and 60s. Taking turns on nightwatch, with an occasional training session, thankfully their services are rarely needed. The fire season ends with a drinking party where food and alcohol, occasionally too much, are enjoyed well into the night.

Spring

In March, the yellow forsythia can be seen throughout the town hinting of warmer weather to come. Plum blossoms bloom here and there, giving light shades of white and pink through the trees. The winds also increase, blowing from a new direction, keeping more *noriyasan* home each day. Most cultivators, especially those without the most up-to-date machinery, work until two in the morning, night after night, with the morning wake up call still coming by five a.m. These longer hours are the consequence of catching up on nets missed due to inclement weather as well as simply cutting as much *nori* as possible in the time remaining to them. The last auction of the year is usually held around April 15 with all nets and gear needing to be pulled from the water by April 30.

As nets are pulled from the water and piled on wharves, the temperature rises and the last of any snow melts. Flies buzz around the nets; the pungent smell of decomposing *nori* wafts through the air everywhere one goes. When the *noriyasan* aren't in their workshops processing the *nori*, they can be seen on the docks, hosing down and piling up nets. Towards the end of the season, they also bring rafts back from the cultivation grounds. Bit by bit, piles increase from

only nets to water-logged bamboo poles, rusty anchors, coils of rope, and black and orange buoys, paint scratched off from months of water and wave action.

As one would expect, energy levels and patience run low at this time of year. Occasional outbursts can be heard as equipment is being unloaded between husbands and wives, fathers and sons. Even with the best of routines and years of experience working together, opinions vary and directions can be misunderstood. After weeks of minimal sleep and months of around-the-clock work, fuses are short. Once all nets and equipment have been brought ashore, husbands head out alone to bring the bamboo poles back from the seeding grounds, a task which usually takes three to five days. Though each cultivator works his own allotment, if someone finishes early, he will lend a hand to a friend or group member. As the last of the cherry blossoms flutter to the ground, another *nori* season comes to an end.

May is a month for rest and organization. Equipment must be sorted and put away. Items are inventoried so each family knows what damaged materials need to be replaced. Processing machinery in the workshops are cleaned and slowly dismantled for an overhaul and tune-up. Sometime in this month, most husbands and wives take a few days to visit a hot spring in what will be their only vacation for the year. The practice depends on the stage of their lifecourse, however, and the size of the family. Those with elderly still healthy can leave without any reservations. If someone is ill, however, or simply unable to get around on their own due to age, then a hot spring trip is out of the question. Several families which visit *onsen* (hotspring) year after year gave up the practice while I was in the field due to grandmothers going *boke* (senile) or the death of a grandma who previously took care of the invalid grandfather. In most instances several friends, group members, or exchange partners will visit a hot spring together.

Opportunity for rest, however, is minimal. *Nori* cultivation, though its season lasts a mere five months, is a year-round occupation. The preparation needed literally takes from the

end of one growing season to the beginning of the next. The first task is the washing and repairing of the nets. Once cleaned, nets are tied together and left to dry draped over walls, temporary scaffolds, and bamboo poles. Yet again the scenery has changed on the docks: pinks, greens, reds, and purples cover the walls and brighten life on the otherwise barren concrete. With well over a thousand nets needing to be cleaned and repairs begun before the rainy season begins, workers do not dawdle but work steadily and purposefully.

Summer

Once summer arrives, the air is dense with humidity and the sun beats down upon the treeless, concrete wharves. Trees are at last leafed out and the town has become a sea of green. As I head out on my bicycle each morning, I fill my water bottle up with ice water; within thirty minutes it's lukewarm. As with winter, work begins early in the morning, this time to beat the heat. Working steadily, the *noriyasan* nevertheless are able to take their time and visit in this time of year. Stopping by someone's workshop is often an excuse for a break, especially if you time it around nine or ten in the morning. Exclamations of "it's hot today!" punctuate greetings. Breaks are frequent and most *noriyasan* take a siesta from noon to two o'clock, staying out of the sun in the hottest part of the day.

Families often do without one adult worker at this time of year when they opt for seasonal work to bring additional income into the household.. When possible, husbands work out of the home in the local gas refineries, steel mills, and as (*nori*) equipment repairmen; wives may work in food and beer factories. Recent years, however, as the recession continues in Japan, locals have not been called to work in the summer months.

As the summer continues, pressure increases to finish the tasks at hand. Nets are tied together in sets of five and ten nets, rafts are built of bamboo and rope, boats are painted and engines tuned up. This is also the festival season with each community holding its own neighborhood affair. Most consist of food and music and dance; *noriyasan* are among the

leaders whether it be taking donations, playing the shakuhachi, or teaching the fieldworker the local folk dance.

The end of the festival season signals one of the two most important religious occasions of the year: *O-bon* (Festival of the Dead). Once again, houses are cleaned, special dishes prepared, and grave sites are visited with flowers and incense. As a fishing community, residents of coastal hamlets also observe a local custom of '*hama O-bon*' (beach *O-bon*). This *O-bon* is specifically for the souls of those who have died by drowning. A monk holds the special ceremony in the neighborhood FCA or community hall where prayers are chanted and food, flowers, and incense are offered. Following this ceremony, lanterns are lit and set out on the ocean. Representatives, almost all of whom are women, of families with ancestors being commemorated then board several boats and take the incense, food, and flowers to the middle of the bay where they will be tossed upon the waves. Ancestors in this situation include fishers who have died at sea, grandmas and children drowned in the local bay, and unknown souls washed up upon their beach. Though residents have recently been forbidden by the Town Hall from setting individual lanterns afloat for each soul because it "pollutes" the bay, they nevertheless feel they must continue the custom even if only a few lanterns must represent the many who have died. The lanterns send the souls away, after all, and as one woman stated, "it would not feel right, it would give me the creeps" to not set the lanterns afloat.

Hama o-bon signals the end of the summer; tasks are nearly complete. The division of the fishing grounds and the seeding of the nets are all that remain. As everyone gears up for autumn and the tempo increases, spirits are high. "We are busy, yes, but I am looking forward to it." Everyone is optimistic that they will be visited by another bumper crop and exceptional year.

Community and FCA history

Local history

The town of Shichigahama, previously known as Shichigahama Village (1889), was incorporated in 1959. As many places in Japan, the area has a long history which town officials and citizens are proud to point out to visitors. Shichigahama is home to Japan's largest Jomon (early to mid-Jomon, 10,000 BC to 300 BC) site of inhabitation, Daigi Shell Mound. Made up of 40 small inhabitation sites and covering an area of over 19,000 square hectares, Daigi Shell Mound was designated as a National cultural treasure in 1968 (Shichigahama 1999).

Additionally, an area of the town, Shichigahama's Minatohama, was mentioned as Takenominato in the *Nihonjiki*. Slightly more recent, Hanabuchi Shrine, has a history of over 2400 years. The shrine, originally accessed by the sea, sits atop a high cliff with steps leading up from the water. When the portable shrine and boats circle the Matsushima Bay during Shiogama's Minato Festival, shrine officials always make a detour and visit the deity of Hanabuchi's shrine. Among Shiogama's deities include Takemikazukichi-no-Kami, Futsunushi-no-Kami, and Shiotsuchi-no-Kami. The deity felt to be the guardian of fishers and seafarers is reputed to have been interred in the Shiogama Shrine from the Hanabuchi Shrine.

The site of various settlements throughout different eras, Shichigahama has been somewhat remote with access most easily made via boat. Following several battles, defeated samurai are known to have escaped to Shichigahama where they then settled and their descendants still live (such as the Kanda family). Beginning in the early 1600s, Date Masamune (1567-1636) began building the Teizan Moat, effectively rendering Shichigahama inaccessible except by boat.

Given its varied environment and large size, some residents of the Village of Shichigahama could have been described as "*hanno hangyo*", half-fishing, half-farming though

some remote hamlets had members who practiced only one type of subsistence. Yogasakihama, Yoshidahama, and Hanabuchihama especially, specialized in fishing.

The fishing hamlets practiced a wide variety of capture technologies: fishing with lines and nets and gathering shellfish and seaweeds. Given their different locales, Yogasakihama residents practiced net fishing in the Matsushima Bay while Yoshidahama and Hanabuchihama residents worked the inshore areas. Later, these fishers would be the first to brave the North Pacific in search of salmon and *masu* (1920s-1930s). Yogasakihama fishers also began oyster cultivation and most specialized in this by the beginning of the Showa era (late 1920s). Though seventy percent of the town's fishing grounds would be dedicated to growing *nori* by the late 1990s, at this point in its history, *nori* was simply gathered from the rocky shore areas.

Nori cultivation first began in Miyagi Prefecture in the 1850s in a northern area near the city of Kesenuma (Miyagi Prefecture 1993). Initial attempts to cultivate *nori* failed and a *nori* cultivator was brought up from Tokyo surreptitiously to teach his craft. At this time, *nori* was considered a high-grade product and its cultivation was a 'trade secret'. The practice of cultivating *nori* spread south slowly through the prefecture until it began in the area of study in the late 1920s. Prior to this *nori* was gathered, but efforts had not been made to cultivate it. Regulations for Fishing Cooperative Associations were passed in a law in 1882 (Miyagi Prefecture 1993) and beginning in 1902, individuals needed to own regional (*kukaku gyogyo kenri*) fishing rights to harvest *nori*. Prior to this date, any individuals could gather *nori* as they wished without being a member of an FCA. Through the World War Two era, most members of fishing cooperatives (pre-cursors to the current FCAs) practiced a wide array of subsistence fishing and gathering: shrimp, shellfish, seaweeds, and fishing in addition to other occupations. Commercial fishing was also practiced.

Shichigahama fishers pioneered traveling to the North Pacific as early as the end of the Taisho era (mid-1920s). By 1932, in 20 ton boats, dangerously small for the seas being sailed,

Shichigahama fishers fished for salmon and masu in the waters of the North Pacific and Kamchatka. With fishing taking place on the high seas in what are extremely small boats by today's standards, it was no accident that boats were primarily manned with second and third sons (Shichigahama 1999). Kei Suzuki, an FCA member in Matsugahama, dives for abalone and sea urchin in addition to fishing and cultivating *nori*. Late in joining the crowd of *nori* cultivators, Suzuki's wife explained, "my husband used to work in the big ships at sea, but it was quite dangerous. Once we were married, my family suggested *nori* cultivation as something safer." Safety was the top reason cited by family members such as Mrs. Suzuki for FCA members to give up working the big ships in favor of in-shore work such as *nori*. Most made the transition after they were married and had children to depend on them. Most who joined late and practice a broad spectrum of subsistence techniques don't own *nori* processing equipment but have chosen to borrow them from others. Several did not even begin to cultivate until they sold their rice paddy land for the construction of the Sendai port in the 1970s.

Mr. Nakashima (85) said his family "joined the fishing cooperative just so [we] could eat." in the early Showa Period. He and his father were boat builders "until the recession" (the Great Depression). Since they could not make enough boats to help support the family, he decided to experiment with *nori* with three other men in his community in 1932. He had some experience processing *nori* from helping maternal relatives in a neighboring district. As a trial, he placed 300 Camellia branches into the bay for *nori* to adhere to naturally. The first year was so successful he tripled his number of stakes the following year. He cultivated *nori* for only four years and then he was called up for military duty in Manchuria. When he returned, he split his time between boat building and cultivating *nori*. In this area, as well as the rest of Japan, the number of cultivators increased dramatically in the early post-War years (*Nori Times* 1999). Since little capital was required, most of the gross could be counted as profit. *Nori* was harvested by hand in rowboats, cut and processed by hand, and set out to dry in the sun. The

mats used to shape and dry the *nori* were also made by hand from rice straw. Often, men held another job during the day and harvested the *nori* at night. Additionally, given that most households lived in an extended family, there were many hands available to help. And even if there weren't enough, farm girls came from the mountains to live during the harvest season with only room and board and a new kimono at the New Year as compensation for their work (Takahashi, direct communication). *Nori* cultivation became so popular that one FCA imposed limitations on membership at 200 families. By 1972, over 800 families cultivated *nori* in Shichigahama.

Table 2.1: Brief timeline of *nori* history in Miyagi/Shichigahama

<u>Brief timeline of Nori history in Miyagi/Shichigahama</u>	
1854	Nori cultivation begins in Miyagi Prefecture (Kessennuma City region)
1900s	Miyagi cultivation experiments begin in Matsushima Bay area by government scientists
1930s	Cultivation begins in Shichigahama (Toguhama and Yogasakihama communities)
1948	Fishing Cooperative Associations are restructured
1960s	Floating Raft technology develops
1960s	Pacific-side Cultivation begins
1972	<i>Nori</i> Cultivating populations reaches peak at 804 households
1981	177 households quit nori cultivation (50 in Yogasaki alone) – almost 29% in one year
-82	
1986	Another 80 households quit in the last massive retirement wave
2001	107 households remain (including two on “temporary” medical leave)

History¹² of Fishing Cooperative Associations

Today, to fish and gather in coastal water, commercial or otherwise, all fishers in Japan must maintain membership in a Japanese Fishing Cooperative Association (FCA). The FCA system of resource management and membership is based upon the 1901 Fisheries Law which, in turn, is based upon traditional practices. The "principal purpose of the 1901 Fisheries Law was to ensure order and peace within the inshore" (Weinstein 2000: 402). In the 1870s, the Japanese government sent young people abroad to "learn the most modern governance, economic, educational, military and technological methods" (Weinstein 2000: 401). At this same time, Japanese studied Western resource management practices. As the rest of Asia fell into colonial or dependency status to the Western powers, their approach was strategic: they too could be modern and enlightened and 'equal.'" Overall, the government's strategy of incorporating Western models of law, education, etc. proved extremely successful. One failure, however, came in fisheries management (Weinstein 2000).

Historically, fishers in Japan have tended to be poor. In many locales such as Kyushu in the Tokugawa Era (1603-1868) residents of fishing villages could not farm land (Kalland 1995).

These villagers were dependent upon farmers to provide them with rice, barley or millet which served as the main staples in the Japanese diet. Foodstuffs were traded directly or bought on the open market. The fishers's catch went to a middleman or a merchant -- usually one with whom they had a long-term association-- and one to whom they were often indebted. Lacking the capital for technology such as fishing boats and new nets, fishers often went into debt with these merchants. Once indebted, it was difficult to pay off the loans and debts could run from father to son (Kalland 1995; Weinstein 2000). Many more fishers served as crew members for someone else and did not even own their own boat.

In the 1870s the Japanese government sought to modernize the way its marine resources were managed, as it did with other methods of governance such as learning the most modern methods of economics, public education, and the military (Weinstein 2000). The Japanese government's desire for modern technology and methods was strategic: as their neighbors were colonized and became increasingly dependent upon the Western powers, they sought to remain independent. As Weinstein notes, "this strategy of incorporating Western models proved highly successful. One notable failure, however, was in fisheries management" (Weinstein 2000: 401). The government chose to make fisheries an open-access resource along Western lines rather than the historical practice of limiting access to in-shore areas to the adjacent fishing communities (Weinstein 2000). As an open-access resource, fisheries became open to outsiders who could gain entrance through payment of a small fee.

Prior to this point in time Fishery Guilds had been responsible for management of the fishing territories. Guild membership was limited to those born in a fishing village (Weinstein 2000) and social sanctions were used to enforce rules on the types of gear allowed, season for harvesting as well as where one could fish. In 1881 fishing cooperatives were established to control coastal resource use. As modern versions of the guilds, they also required membership to

¹² For an extensive review of FCAs, resource management issues, and resource management in Japan, the

be based upon residency and added the requirement of an apprenticeship period. In 1901, Fisheries Legislation was passed that granted exclusive rights to the inshore waters to local Fishery societies. Over time, however, flaws were seen in the system; specifically the transferability of rights meant that fishers would remain poor as they transferred their rights to moneylenders to get the capital to purchase new technology (Weinstein 2000).

In the 1930s the government, through the efforts of individuals such as Takatoshi Ando, a public servant in Hokkaido, worked to break the fishers free from the hold merchants and middlemen had in controlling the capital and marketing of the harvests. In this period, credit federations were established and fishers began to market their own catch (Ando 1995). During the Occupation in the immediate post-World War II period, legislation was finally passed that prevented fishing rights from being transferable, thereby preventing the rights from being turned over to money lenders (Ruddle and Akimichi 1984; Weinstein 2000).

Today, all Japanese fishers in the inshore areas are members of Japanese Fishing Cooperative Associations (FCAs), organized under the 1948 Fishing Cooperative Association Law. As the Occupation Forces set about land reform to end the farmers' eternal indebtedness to landlords, the FCA system sought to break the fishers's reliance on merchants and middlemen to buy their catch and sell them the necessary tools of their trade such as fishing nets (Kalland 1995; Norbeck 1954; Marra 1986; Weinstein 2000). FCAs are not simply local offices, but are regionally and nationally linked organizations which market products, supply gear, and work as credit unions.

FCA membership entitles fishers to usufruct rights to resources found within the territory of their local FCA; the FCA hold the right to the resource. Rights for different resources and technologies must be applied for separately by the FCA to the prefectural government and may include small-scale net and trap fisheries, aquaculture, and large-scale set-net fisheries (Ruddle

following texts are useful: Berkes (1989), Cordell (1989), Kalland (1995), Pinkerton and Weinstein (1995),

and Akimichi 1984). Permits for the in-shore rights such as aquaculture must be re-applied for every five years. The system is very much "use it or lose it" and some FCAs in the region run the risk of losing their rights as membership dwindles: in a hypothetical case, an FCA with no members cultivating *nori* could be forced to forfeit their right to that resource if another FCA applied for the permit. The fishers, as committee members of their local FCA, are the primary managers of each local resource, though they do work in concert with government fisheries regulatory commissions and scientific staff at the prefectural and national levels (Short 1992; Weinstein 2000).

The Japanese FCA system came into being following the passage of the legislation, Fishing Cooperative Association Law of 1948. Though generally based on previous fisheries laws and traditional practices, the 1948 law corrected a trend of poor fishers remaining poor with heavy debts to money lenders and merchants in order to purchase new technology. The indebtedness of the fishers in effect caused the transfer of fishing rights to absentee owners (Sato 1992 in Yamamoto & Short 1992).

Resource management is one of the most important functions of Japanese FCAs. Access to fishing commons is limited to part or full-time members in an FCA and further restricted to residents of the community where the FCA is located. FCAs own the fishing commons; FCA members hold rights to the resources. Legally, the rights can not be rented or sold to individuals and must be forfeited if not used by the family. Management of fishing territories ultimately rests at the local level (Short 1989) and though there may be general guidelines set at the prefectural level, FCA members decide for themselves how to best manage their resources.

Local History

Nori cultivation first began in Miyagi Prefecture in the Kessenuma region in 1854 (See Map 4: Spread of *Nori*). Eight cultivators were brought from Oomori, Tokyo to teach their craft.

Ruddle and Akimichi (1984), Ruddle and Johannes (1985), and Weinstein (2000).

The *nori* produced here was sold in Tokyo under the brand name of Sendai *Nori* (Miyagi Prefecture 1991). An experimental area was set up in the Matsushima Bay in 1900 using a variety of cultivation techniques and by 1928, *nori* cultivation had spread throughout the prefecture (Miyagi Prefecture 1991: 4).

In the immediate post-World War II period, *nori* cultivation attracted large numbers of individuals in the Matsushima Bay region. Even many who did not fish, such as shopkeepers, started cultivating as a subsistence strategy that involved little outlay with substantial rewards. The origins of these households can be seen in *yago* (house names) such as *komeya* (rice shop), *sakeya* (sake shop), and *tabakoya* (tobacco shop). Initially, a small wooden boat, baskets for the harvest, knives for cutting, a wooden mold, and rice straw (*wara*) for setting the *nori* out to dry was about all the outlay that cultivators needed. Branches cut from trees from the local hillsides and staked into the seabed were used for *nori* growth initially—*nori* spores would naturally adhere from floating in the water; later, nets spread along the surface of the water were used. What foreigners termed 'black paper,' local Japanese called 'black diamonds'¹³. As more and more individuals jumped into the *nori* cultivation business, growing grounds risked being overcrowded and local FCAs closed their doors to new members. Yogasaki FCA alone had 199 families.

The gold rush atmosphere of *nori* production was aided by two main improvements in growing: first nets began to be used instead of branches; next the life cycle of *nori* was discovered by Dr. Kathleen M. Drew, an English biologist in 1949. Once the cycle was understood, *nori* could begin to be artificially seeded, improving harvests over the previous method, that of placing branches in the water for *nori* to adhere naturally. By the late 1960s, *nori* cultivators had reached their peak population in Miyagi Prefecture. Family members in the large households pitched in where needed (only men went out on the boats) and many families even employed farm girls from the mountains in Yamagata prefecture who came to work in exchange for room and board and a new kimono on the New Year Holiday¹⁴.

¹³ *Nori* was one of three items that were worth a small fortune in local eyes. Two of the three were *azuki* beans (red diamonds) and *nori* (black diamonds). *Nori* was also known as 'black bills,' in the sense of yen bills of money. Locals liked to tell of a time when *nori* cultivators could purchase a house and the land it was on with one season's returns.

¹⁴ Direct communication with A. Takahashi. Prior to his death on December 25, 2000, he spoke with great fondness of the girls and the numerous holidays poor weather provided.

Japan underwent rapid industrialization in the 1950s and '60s, with the coastal areas receiving the brunt of development and consequences. Consequences were both positive, such as through employment possibilities, and negative, as in polluted air and water. The negative effects of which finally caught up to them by the 1970s and '80s. As the populace suffered through ill health (McKean 1981), the environment suffered doubly (Befu 1980; Huddle and Reich 1987; McKean 1981). One irony of industrialization includes the fact that as some areas of historical usage declined in productivity, other areas further offshore actually became usable. Befu (1980) notes this occurrence with seaweed cultivation in the Inland Sea: many fishers quit fishing and turned to seaweed cultivation in areas that fishers were only recently able to begin using thanks to eutrophication of the waters.

The national government designated the Sendai region a secondary industrial zone and though development took place at a slower rate than the Tokyo and Inland Sea regions, the effects of industrialization have been felt. By 1969, even as the *nori* population was reaching its peak, 'oil fences' were placed around the growing grounds to protect the *nori* from solid and liquid trash that was floating in the waters (Zenkoku 1969). There were intermittent good and bad years through the 1970s until, by the early 1980s, *nori* stopped growing altogether in the Matsushima Bay. Termed *datsuraku mondai* (problem of lack of growth), the *nori* crop appears to grow fine until it reaches a certain length at which point it turns yellow and breaks off (Zenkoku 1998). Matsushima Bay, areas of which have been home to cultivation for just over 100 years is now used solely as 'seeding grounds'¹⁵. Cultivators have had to look elsewhere in order to actually cultivate *nori* in Shichigahama.

Coinciding with the declining environment came a rise in production costs. Cultivators throughout the nation were increasingly using semi-automated and by 1981, fully automated equipment which allowed them to produce greater amounts of *nori* as it was cut, spread, and

dried indoors by the machines. Once, they would have had to take a day off when weather was poor, such as rain, now they could still get a day's work in. With machinery, you can produce as much in an hour as cultivators formerly produced in a day. Machinery is expensive, however, and involves additional expenses for oil and electricity. With production increasing nationwide, prices fell and remain low. The cultivators in Shichigahama informed me on numerous occasions that "the price of eggs and *nori* haven't changed" in over 25 years. It's true. In the 1970s *nori* averaged ¥9 per sheet (Zenkoku 1998); in the 1990s in Miyagi, *nori* still averaged ¥9 per sheet. If you were to adjust for inflation, however, you would find that the real price of *nori* has changed; it's gone down.

To summarize, Shichigahama FCA members who cultivate *nori* specialize in a year-round occupation. Family members work together, usually in husband-wife or father-son pairs. Initially, economic rewards were such that families flocked to the occupation. Technological advances, coinciding with environmental problems, however, caused a rapid decline in their numbers.

Today, Shichigahama *nori* cultivators find themselves in this situation: the environment has been compromised and they must ask other FCA members to allow them access their fishing/growing grounds; they can produce a large amount (about 36,000 sheets a day) of *nori* which gives them a large gross income (averaging ¥15,000,000¹⁶ but their expenses are high (minimum of ¥10, 000, 000). Insecurity lies in the fluctuations of prices, the weather, and even access to growing grounds. Prices rise and fall with the quality and amounts of production elsewhere in the country; a disaster in the south is a boon in the north. A good crop, however, can be cancelled out by a better crop elsewhere in Japan. Life relying on someone else to use their growing grounds, dependent upon their good graces and good humor is precarious and

¹⁵ FCA members use the terms *taneba* (literally seed-place) for seeding grounds and *gyouba* (fishing grounds) or *youshokuba* (cultivation grounds) for cultivating grounds.

¹⁶ I use the rate of 120¥ = \$1 as it hovered around this rate during the fieldwork period. Using this rate, gross income averages \$125,000.

insecure, never knowing when the other person will say you can no longer use his space¹⁷. With these difficulties, combined with the typical complaints of this being a cold (*nori* is a winter crop), hard, and dirty (one woman laughs that her grandchild says “Grandma, you stink!” when he comes to visit) occupation, it is no wonder that so many individuals quit and successors are currently scarce. Yet, some 100 individuals chose to stick with the FCA and continue to cultivate *nori* (among other FCA-related activities for 56 of them) today.

¹⁷ One could view this as an instance where individuals would perhaps be forced “to lower their heads” though I will argue later that this is not the case. Today cultivators try to put a positive face and say they work “*o-tagai ni*” or, help one another out.

Chapter Three

Composite Profiles

This chapter introduces the reader to Shichigahama *nori* cultivators. More than anything else, this dissertation is about the men and women of Shichigahama who cultivate *nori* for their livelihood. External factors (environment, economics and technology, Chapters Four, Five, and Six), though important for analyzing the lives and decisions of Shichigahama *nori* cultivators, should not overshadow the people.

Most of these profiles provided of cultivators from throughout Shichigahama are composite profiles, descriptions cobbled together from pieces of different lives to form a whole. In some cases, holes in the data necessitate combining details from several FCA members into one ‘individual’; in others, the composites were drawn to protect identities. Six profiles will be provided: historical *nori* cultivator, white-collar worker turned cultivator, deep-sea fisherman turned cultivator, farmer/cultivator, native daughter cultivator, and in-marrying cultivating bride. These profiles will show both the similarities and the differences found among *nori* cultivating households in Shichigahama today.

Historical *nori* cultivator

Yoshi Takahashi, 71, Matsushima Bay-side

Yoshi has been a member of the FCA for 46 years. His household, *Mahanashi*, has been in the Yogasakihama district of Shichigahama for 13 generations. Prior to World War Two, his household, like most others where members were interviewed, fished and cultivated oysters off the coast of nearby islands. His family was one of the first to experiment with *nori* cultivation. As an eldest son, Yoshi never had any interest in doing anything else. “[I] enjoy it.”

Yoshi described the *nori* work in the past as cold and difficult. “Father would leave in the middle of the night to harvest the *nori* [as it was dependent on the tides] ... cutting the *nori*

with a knife ... in a rowboat ...with hands so cold [one] could hardly move them.” Processing could take the entire day, cut and shaped by hand as it was. Further they relied on the sun to dry the *nori*. Rainy or even cloudy weather could prevent the *nori* from drying. Still, inclement weather was an opportunity for a day of rest. Yoshi enjoyed the time off visiting with the young farm girls employed to aid with *nori* cultivation during these early years. “Oooh, those days were fun [happy, reminiscent smile]. Any days we couldn’t work, I would visit the girls. There used to be lots of holidays.”

Yoshi’s father was one of the first to change over from oyster cultivation to *nori* cultivation. Oyster cultivation required a lengthy wait (5 years) before maturity and the construction of rafts which involved substantial investment. *Nori*, by contrast, could be harvested the same season it was planted. In early years, though some harvesting took place from *nori* grown naturally along the rocky shore, other areas were set aside to begin cultivation with brushwood (*hibi*). In order to begin, the *Mahanashi* representative and two other FCA members, petitioned the FCA for the experiment. After a successful first season, the household invested more into the project.

Today, Yoshi and his son practice gillnetting and shellfish harvesting (*asari*) in addition to *nori* cultivation. He does not work in an outside (non-FCA) occupation and *nori* provides enough income to support his 5 person household. Yoshi’s wife and son both work with him. Having a son participate is a great help as two men are stronger than a husband and wife pair. His wife, spared from the need to accompany her husband on the boat, processes the *nori* with the aid and company of her sister (who lives down the street). Yoshi’s household is, by all accounts, the most successful *nori* cultivating household in Shichigahama. Though he and his son are fairly reserved, they are both *nesshin* (crazy) about *nori* and talk freely about *nori* even when other discussions are strained.

Yoshi, because he lives in Yoagasakihama, still has access to both cultivation and seeding grounds. He works with three partners outside Yogasakihama, two are friends and one is an acquaintance. With the two friends, though he pays for some space, at ¥2500 per net, the rate is quite reasonable (in contrast, the going rate for Yuriage space is ¥8000). The acquaintance situation is different. He provides some labor and rent in exchange for cultivation grounds. He must also pay the insurance on the rafts in the fishing territory under the other person's name. "I don't want to pay it, but he insists, "If I don't do it, he won't exchange with me."

White collar worker turned *nori* cultivator

Taro Suzuka, 66, Matsushima Bay-side

Taro is an intelligent and thoughtful man. Self-reflexive, he would often think about questions I would ask him in one meeting, and have a detailed answer in the next. More significantly, he would often ask me why I would ask a certain question and then think further along the lines of what I must be interested in, then taking the interview off on a productive line of inquiry. Like so many of the other *noriyasan*, his father was an FCA member, yet unlike many, didn't live long enough to pass on his knowledge to his son.

Taro's grandmother was the only child, a daughter, of the family and she was married to a man who took the family name (*mukoyoushi*). She ran a *sake* shop and used to walk all the way to Kokubuncho, Sendai's *sake* district, about 20 km away. She would take seaweeds and sea products on the walk in, and fill the barrel with sake on the walk back. One could make the walk in a day; if she was late, she would have to wait at the ferry boat dock overnight as the ferry only ran in the daytime. The closest ferry was across the Teizan moat. Childless for many years, this woman finally had a daughter in her 44th year, after her husband practiced numerous oblations at the Kusaiwa Jinja (Kusaiwa Shrine)¹⁸. Desperate for a child, at the age of 44 he

¹⁸ Though a "shrine," this is the spot where a Buddhist monk died and maintained by a monk even today.

went in the cold of winter and poured cold water repeatedly on himself. His prayers were answered and a daughter was born, Masako (1916). Masako-san, the only daughter of an only daughter, also married a *mukoyoushi* (adopted son-in-law), though her married life was short-lived. Soon after the birth of her second son, her husband was sent to the Burma where he subsequently died.

Masako, Taro's mother, brought up her two sons as a widow. Her parents, Taro's grandparents, lived in the same household, and the grandmother lived to be quite old. Bringing *mukouyoshi* into households was quite common in Yogai and Shichigahama. Masako was fortunate to be living in her natal household when she became a widow; she was able to stay with her sons and stay in her house. As a widow, Masako-san continued running the family store and *sake* shop, this time going to Kokubuncho in place of her mother. She did so throughout the war until Sendai was flattened and burned in an air raid in the waning days of the war (July 30 or 31, 1945). The immediate post-war period was a difficult time. Yogai's population grew as refugees from Sendai returned to natal households. According to Fuchiko, a neighbor, beggars and thieves were everywhere.

As Taro grew he found he enjoyed his school studies and he did quite well for himself. Rather than quit school after the end of junior high as most boys his age, he went on to the Prefectural Technical High School. It was a long trip in those days and he jerry-rigged a bicycle with a motor to take him all the way to the Geba station (5 km away). Taro enjoyed school life. He laughed, in fact, at the memory of the Chile Earthquake of 1960. When the alarm sounded for an incoming tsunami, Taro made sure he took his precious pencils and pencil case. He laughs now to think he did not first consider the safety of others, such as his grandmother, whom he had to go back for and carry to safety.

After Taro graduated from high school (the only one from his age cohort in Shichigahama) he became a white-collar worker. The question of what to do with the family's

right in the FCA was not an issue since though he was the eldest, his younger brother (Shinji) would succeed the family. By this time, it was the 1960s. *Nori* was becoming a lucrative business. Seeding techniques had been discovered; raft technology was being developed. The FCA had held the right for the widow because she had two young sons, but now it was time for someone to take over. Shinji completed junior high and began *nori* work full time while his brother worked in an office.

It was a busy time. Taro married a local girl, Kumiko, daughter of a carpenter. She grew up helping *noriyasan* counting sheets of *nori*. Kumiko thought she would be the wife of a salaryman. They bought a lot to build a house. They had a son. And then Taro decided he didn't like office work. The hours were too constricting. He had to answer to someone else. Besides, he enjoyed using his hands. So he started a machinery business, catering to the *noriyasan* and fishermen. Taro met FCA members from all the districts in town. His brother used his contacts to begin leasing raft space in the Pacific Ocean at the time when this practice of exchanges was just beginning. His brother needed more space. As a new FCA member, he was at the lowest level of the FCA hierarchy which meant he received the least amount of space.

In the late 1960s, tragedy struck Taro's household. Shinji cut himself while working on the beach, contracted tetanus, and died. Thus, during a *nori* boom, Taro found himself in a quandary: continue working his business, or quit and begin life anew as a *noriyasan*. He did not know how to cultivate *nori*. Though he gathered some seaweeds and sea life from the Yogai Bay (inlet) before it was reclaimed, he was not a professional. Yet the FCA could not wait, they had held the right for 20 years, they would not continue to hold it-- not when there was now an adult male in the house. So Taro quit his little machinery business and began cultivating *nori*. "It was very difficult at first. The lowest (ranking) did not receive enough [space] to support a family. ... Takahashi san helped me a lot. He, along with these books, taught me all I know about *nori* cultivating."

It was probably apropos that Taro, one of the few with a high school degree would turn to books to speed his progress along. His knowledge grew, as did his family. Today Kenji, the eldest, lives at home, unmarried, and works as an office worker. He usually fires up the engine on his Landcruiser around six in the morning, the same time his parents leave on their boat.

Change, however, is not only for the young. In the 1980s, Masako (Taro's mother), finally freed from her duties as family matriarch, followed a lifetime calling and became a *kitoshi* (spirit medium). She thinks it was perhaps related to the details of her late and miraculous birth (since both parents were 44 at the time of her birth). Throughout her life, she has been able to see ghosts—seen in this area of Japan as floating balls of blue light. She has also helped people cure their troubles. One neighboring household suffered from sickness and tragedy, until Masako dreamt that one of the stones in their compound wall was actually a tombstone. Once it was removed, their lives improved. Another family tried to find their missing daughter. Taking a pair of the girls' school socks, she chanted to “stop the daughter's feet” and have her return home. Masako san ran the small store, worked a kitchen garden, helped with some *nori* tasks (such as lifting the 65kg crates), and worked as a *kitoshi* until senility starting reaching her in 1999.

Taro's household is a blend of old and new, traditional, and “out-of-the-box” thinking. He did not initially become a *noriyasan*, he became a salaryman. And yet, like *noriyasan*, he did not like the hours, did not like working beneath someone. So he struck out on his own, he worked to have his own autonomy. And then, the tragedy of his brother dying at 27. Yet the man who was the highest educated, chose the traditional route of taking over the household. His empty house lot will probably go to his eldest son. He thinks about his mother's calling in very rational terms. He often asks what I think of certain Japanese customs. He breaks with some Japanese customs (such as putting his foot over a *nori* box to ease the closure process), but not others (drinks *tamagozake* when sick in the winter).

Taro's exchange partners stem from business acquaintances, one of whom has been working with the family since the days before his brother's death. This partner, especially, is a good friend. Once when interviewing his wife, Kumiko, I witnessed the entrance of this partner's son, Yanagi. It was clear that the families were on good terms. They visit each other's workshops and Taro still makes machinery parts for himself, and this friend. His relations involved simply exchanging labor and seeding space for cultivation space. He does not (now) pay for any outside space, other than for a small amount in Yuriage's fishing territory (everyone renting there pays as the transactions are handled through the cooperative and not individuals).

Having first met in 1991, Taro is the *noriyasan* I've known the longest. He was a good first introduction. He epitomizes the fact that *noriyasan* are rational, thinking human beings. Humans do not follow traditions blindly. Every change, every step was thought through. There was pressure to succeed the family occupation after his brother's death, certainly, but he did not choose to take up *nori* cultivation simply because it needed to be done. He did so because it needed to be done, but also because such a trajectory fit with his own ideals-- being an entrepreneur and working his own hours.

Taro says things have changed a lot, even since he has begun (1968).

“When I was a child, *noriyasan* could build a house on a single year's earnings. The children's allowances were pretty big; the parents were working so hard they just gave them money ... There was a time when you would get *nori* for *O-seibo* (end of year gift giving) and you were really thankful to have gotten such a gift. Now people just turn their heads away and say, ‘oh, thanks.’ It really used to have a [nice] aroma. Plus, of course, people used to cultivate it nearby – before the pollution.”

Then Taro asked, “When did you first come here?” Reply: “Eight years ago.”

“The sea was probably still black then. They've been dredging the bottom for years, and still are. It will be a few more years before the project's completed, but it is getting cleaner. The consequence of going out to Sendai [because of the pollution] is one deterrent to this way of life. ... Plus Sendai and Tagajo are close [thus there was other work available].

Even with pollution, increased expenses resulting from renting outside space (and needing to travel to that space), the high costs of mechanization, and low *nori* prices, Taro feels life is better now than it used to be for *noriyasan*.

Deep-sea Fisher turned *Nori* Cultivator

Osamu Suzuki, 56; Pacific Ocean-side

Osamu Suzuki is the second child of a family with many children. For years after graduating from junior high school, he worked on the off-shore trawlers while remaining in his natal household. Married at 24 years of age to a woman from the Town of Matsushima, his in-laws first suggested *nori* as a viable alternative to working trawlers away from home.

The Suzuki household is not a wealthy household. Though they cultivate *nori*, they have not purchased the equipment needed to process the *nori*. Instead, they borrow equipment from the Matsushima Bay-side cultivators who form their exchange network. In exchange for providing the cultivation grounds to his partners, Osamu in return receives seeding space, and access to equipment. Osamu does not pay for the equipment. They go to Tsuneo Kanda's workshop and spend the day in the workshop. As a consequence of such an exchange, Tsuneo Kanda's family loses a day's worth of income, though they also save possible outlay in the form of renting the cultivation space.

Osamu's family numbers five; himself and his wife, two sons, a daughter-in-law and one grandchild. He and the sons dive for abalone and sea urchin in addition to fishing, though the sons are still in the apprenticing stage of diving. Until recently, both sons worked outside the home when they lost their jobs from restructuring. As Osamu is a quiet man, his wife did most of the talking during interviews. She is a straight-forward woman who manages to make traditional foods from scratch which one rarely sees anymore.

Farmer-Cultivator

Masaaki Ito, Yoshidahama, Pacific Ocean-side

Part-time farming is the norm for rice cultivation in 21st Century Japan. Though it involves little day-to-day work, it does have periods of intense activity, periods which, unfortunately, coincide with *nori* cultivation's busiest times. Even so, a number of families do

farm as well as cultivate *nori*. Many more families also have extensive kitchen gardens. Mrs. Ito, especially, loves her garden and spends all of her free, and not-so-free, time in it.

The Ito family of Yoshidahama is one such farming family. As the *nori* season is winding down, they must gear up to prepare the beds and transplant rice. Following a peaceful summer (where the greatest amount of work involves putting nets over the fields to prevent sparrows from eating their profits), they must harvest the rice just as the *nori* seeding process begins. With a small family (3), the Itos are unable to rely on others to take care of the rice crop. They simply juggle their schedule to fit everything in. They are also not above paying for the occasional help from retired neighborhood cultivators. This willingness to pay for help was not seen to such an extent in one of the neighboring communities.

Though they do market their rice through JA, the agricultural cooperative, the Itos share their rice harvest freely. Much of what they harvest is distributed to relatives and most notably, their (fishing ground) exchange partners. Their *nori* harvest, as I found with most other Shichigahama families, is also given away as *O-Seibo* gifts to friends and relatives; some is sold to these same people for give away to *their* friends and relatives. These practices, whereby a portion of the harvest is sold and another is given away, add to the difficulty in judging household incomes. The Itos, however, have a new Japanese-Western-style home with a new, large television set and car. They give the appearance of being a financially well-off middle class family. The husband is proud of his awards from the Annual competition at the Shiogama Shrine and plays with his grandchildren often.

Native Daughter

Keiko Wagatsuma, late 50s, Matsushima Bay-side

Though many of the women who cultivate *nori* come from outside of their current communities of residence, some do not. Keiko is one such woman. Her father was a carpenter, though *nori* cultivators lived all around her growing up. She said she used to help one neighbor

after school. She got so she could tell the feel of the *nori* and know if it was too heavy or had too few sheets just by touch.

Keiko volunteered one day that she wanted to marry her husband and pushed her family to enable such an outcome. She has strong feelings about behaving properly and not burdening others. She has a good relationship with her husband and in-laws, especially important given their large family. Their home is a large, 2 story traditional style home. Additions have made room for a large kitchen and extra living (bedrooms) space; their workshop is just across the driveway.

When I first met Keiko she lived with her husband, parents-in-law, and one daughter. In the Autumn of 2000, tragedy struck their family with the sudden death of a son-in-law. The widowed daughter then returned home with her three sons; the family then grew to a family of nine. Despite the large family, neither the grown daughters, nor the grandparents (90s) work to support the family. Keiko appeared happy to have their grandchildren in their home with them, even if it was slightly exhausting and more lively (*nigiyaka*) than they were used to. Fortunately, the (great) grandparents were still in good health.

As natives of Yogasakihama, both Keiko and her husband appreciated the history and the health of the environment of Yagasakihama. A picture of the harbor prior to the building of the Tohoku power plant was displayed prominently in their *chanoma*. They also spoke often about the oystering reports as a good guide for *nori* as the environmental conditions needed were similar for both.

Keiko also voiced an enjoyment also heard often from others, she “enjoyed watching the *nori* grow” and “received pleasure from taking care of it, growing it. ... It’s like raising a child, there are difficult days, but ... the final result provides such pleasure. Most, though not all of the in-marrying brides seemed to have come to this conclusion. Yoshiko’s situation (following below), unfortunately, was different.

In-Marrying Bride

Yoshiko Saito, late 40s, in Matsushima Bay-side

Yoshiko's situation as an in-marrying bride seems fairly typical upon first glance. She had been a farmer's daughter in a large farming community known for its famous Shinto shrine (approximately 20 km away). Relatives served as her go-between in her marriage to Susumu on the Matsushima Bay-side of Shichigahama in the early 1970s. When told of her future life, "They [go-betweens] just said, 'oh, she'll do a little bit of this, a little of that. She'll be in the kitchen most of the time.'" The reality of the changing times, however (mid-late 1970s), included her entrance into the boating aspect of *nori* work. The *nori* life was much harder than the go-betweens had described and she had expected. Her hard work on flower arranging lessons would be wasted.

Yoshiko's father-in-law had been ill and weak for many years before his death in May of 1997. Her mother-in-law was also weak and was not very mobile; she could not, for example, carry the laundry out to dry though she did try to do some limited gardening. Adding to the burden, neither she nor her husband, Susumu, had driver's licenses, limiting their mobility and the outside work they could do.

Yoshiko worked in the local beer factory with several of the other neighborhood wives during summers. I never, in two summers of fieldwork, saw her help her husband on the docks with any of the activities related to the beginning of the *nori* season, though she would have been needed for working on the rafts. Yoshiko's only child, a daughter, went away to school in Tokyo in the late 1990s, leaving Yoshiko alone with her mother-in-law. It was a difficult situation.

Yoshiko's husband, Susumu, committed suicide on March 1, 1999. Following an end-of-season banquet with the other members of the volunteer fire brigade, Susumu went to his workshop and hung himself. The grandmother, thinking his missing boots (from the *genkan*) meant he had left on the boat, found his body when she entered the workshop in the morning.

After Susumu's death, Yoshiko tried to work as a waitress in a nearby restaurant, but lost her job when the owners closed it for remodeling. Finally, sometime in 2000, Yoshiko left simply left the community. She and her mother-in-law had already shown open dislike of one another. Each woman kept secrets which they felt compelled to tell the outsider. The grandmother had cashed in a secret life insurance policy (on her son) that Yoshiko did not know about; Yoshiko went to Tokyo to see her daughter get married, without telling the grandmother that a marriage had taken place. The household was not the energetic, lively household seen so often elsewhere in the community.

I first met Yoshiko's husband, Susumu, on the wharf in the summer of 1996. I remember him wearing funny, round reflective sunglasses and a floppy straw hat. He joked constantly. I distinctly recall being struck at the time by the fact that he was always working alone. Most families had a wife, or a grandparent helping out; Susumu did not.

Susumu died six months before my long-term fieldwork began. His death came as a shock for which I was unprepared. Later, *Sakeya* would say, "[I] had no words to tell you." The wife in the *Sakeya* household was so upset by Susumu's death that she couldn't bathe for weeks and she brought flowers to his alter for months (she grew up with him and had known him all her life).

No one knows why Susumu committed suicide. I do know he always worked alone and that must have been difficult, not having his wife or a parent to work with him in a physically demanding occupation. Many cultivators stated that you can not continue [*nori* cultivation] without the wife's agreement. Having anything less than Yoshiko's full support and help would

have made life difficult. Outside opportunities, though they appear ample, were not as readily available in Susumu's case—a man with a junior high education and no driver's license (needed if one was to pursue common occupations such as taxi and truck driver, as well as commute to other positions in the nearby factories).

This life was also hard for Yoshiko, abandoned by Susumu in death, left to live alone with her mother-in-law, someone with whom she didn't get along. Neighbors told me they had seen flowers at Susumu's tombstone and it was cleaned off, presumably by his wife, as the mother was homebound, so Yoshiko obviously felt some attachment, some obligation. From dinners we shared after his death, it was clear that Yoshiko had felt tricked into marrying a *nori* cultivator; she felt the go-betweens had not been above-board with her and her family.

Susumu's death is a startling example of the difficulty of this way of life. Though I write about *noriyasans* choosing this way of life and not wanting to lower their heads to others, not wanting to be salaried workers... that does not mean life is easy. Dedication, hard work, and acceptance is required of all the household workers. Anything less could impede the success of the household.

These profiles show there is a great amount of diversity in history and demographics among *nori* cultivators: large households, small households, broad-spectrum subsistence and specialized occupations. What each household shares is a commitment to the way of life, something without which life would be even more difficult given the outside challenges facing them.

The next chapter, Chapter Four, addresses the first of these outside conditions: the environment.

Chapter Four

The Environment

Matsushima Bay, 1689:

“Much praise has already been lavished on the wonders of the islands of Matsushima. Yet if further praise is possible, I would like to say that here is the most beautiful spot in the whole country of Japan.”

Poet Matsuo Basho (1689)

Matsushima Bay, 2001:

“I don’t think [the Bay] will ever return to the way it was. It is too big of a job for humans.”

Taro Suzuka.

This chapter focuses on the Shichigahama *nori* cultivators’ local environment. I dedicate an entire chapter to the environment for three important reasons. First, the proximity of the Matsushima Bay and Pacific Ocean has a direct impact on weather, livelihood, and occupational possibilities for the area residents. Second, the aquatic environment (water temperature, tides, currents, salinity levels, outside inputs to the water) is crucial for enabling the *nori* way of life. Third, environmental problems and the *nori* crop failure (*kankyō mondai* and *datsuraku mondai*) in the Matsushima Bay were emphasized repeatedly by *nori* cultivators themselves during interviews. Consequently, most of the discussion in this chapter will center on the physical environment as a result of Shichigahama cultivators’ stress on environmental problems in the Matsushima Bay region.

The concept of environment in Japanese culture includes notions of nature as well as the physical, biotic, and climatic factors that act upon individuals and organisms. To aid in the quest of understanding why *noriyasan* continue this way of life, the tools and concepts of environmental anthropology will be discussed. Following this, common property theory will be presented. Commons systems are important as they address the ways in which the environment is parceled out. The chapter concludes with a discussion of the physical environment and the effects of anthropogenic inputs to the environment.

Nature and the environment

In this thesis, environment is conceptualized as including what would often be in the West, two exclusive ideas: nature and environment. As the Matsuo Basho quote (above) suggests, the local environment is often perceived of as nature, with the subsequent cultural trappings. Nature as a concept remains nebulous. The idea varies between cultures, and even within. “In Japan, the complex and multifaceted idea bound up in the characters *shizen* and *tennen* captures, depending on situation, the opposite of artificiality, the opposite of humanity, some inner fundamental property, common sense (*tao*), objects in the environment ... , and creative processes not under human control ...” (Ellen and Fukui 1996: 11). Though ideas such as these may seem to form a dichotomy, in Japan it is also “accepted that there are strong spiritual connections between say, mountain (*yama*) and village (*sato*) which cut across any inherent dichotomizing tendency which these ideas might seem to be suggesting” (Ellen and Fukui 1996: 11). Asquith and Kalland (1997), Shaner (1989), and Tellenbach and Kimura (1989) also give examples of similar dichotomies.

It is quite common in Western societies to set up just such a dichotomy between ‘natural environment’ and environments constructed through human activity. “This distinction between natural and artificial environments is an outgrowth of Western tendencies toward viewing things in the world as tightly bounded, discrete objects that may interact but are ultimately distinct from each other” (Trapahagan 1998: 39). This dichotomy can also be seen in the anthropological literature on culture and the environment. The physical environment, for example, has been subdivided into both natural and constructed environments. The natural environment is made up of such geographical features as the weather, flora and fauna—things which are wild or ‘natural.’ In contrast, the built environment results from humans altering and structuring the environment (Altman and Chambers 1980: 4-5; Trapahagan 1989: 39). Thus when National Parks in the United States are formed, to the extent possible, property owners are evicted from their (former)

land and provided with monetary compensation. Humans are not supposed to be resident in a park dedicated to preserving nature. In Japan, to the contrary, quasi-national parks are often formed, leaving people and communities in place. The mountain, the village, the ocean ... all are linked and thus there is not contradiction in leaving human communities in the area.

Though environment and nature may appear to consist of mutually exclusive categories, conceptually distinct, both play a role in how the Shichigahama FCA members, as Japanese, work and view the world. Sellers of wild fish stock at the Shiogama Fish Market were quite indignant when asked if their fish was cultivated (*youshoku*); “No. *tennen* (natural/wild)!” was the usual response. Natural, wild fish were seen as tasting better. As for the environment, though wild fish were preferred, and the community was often espoused as a retreat from city life, numerous cultivators also bemoaned the fact that “*shizen ga nai*” (“there is no nature” left) in Shichigahama. Little remained of a wild, natural environment, even while locals relied on wild stock for support and sustenance. The islands found in the bay supplied an idealized form of nature for some (though not all informants), just as they did for Basho in 1689; the water formed the environment with its subsequent environmental problems.

Environmental Anthropology

Shichigahama and the Matsushima Bay are, of course, located in Japan. Japan, as an industrialized nation is not often a site of inquiry among environmental anthropologists. Industrialized nations are, by the very nature of industrialization, often quite urbanized. Japan is no exception to this observation with 72 % of the populace living in urban areas (Liaw 1992) by the 1970s. Environmental inquiry in Japan tends to focus on ideas and images of nature (see Asquith and Kalland 1997; Traphagan 1998) and environmental degradation (Befu 1980; Huddle and Reich 1987; McKean 1981).

Some urban environmental anthropologists concentrate on “environmental ‘bads,’ such as sources of air or water pollution or seriously contaminated soils” and the environmental justice

issues found in these areas (Ingerson 2001: 224). Yet, taken broadly, environment includes the “physical/biotic, built, and cognitive environments” (Crumley 2001:viii). This includes urban environments. As Ingerson notes (2001), part of the problem may revolve around categories such as with her work, urban land is seen as more “*urban* than *land*” [italics original] (2001: 224).

The holism which is the hallmark of anthropology serves to justify environmental inquiry into industrialized places such as Japan. Environment does not consist solely of nature with limited human contact and inputs, though certainly some environmental areas do provide for an initial logical connection. If Japan does not jump out as an ideal locale, than certainly its maritime communities should. “The anthropology of fishing, or ‘maritime anthropology,’ is *environmental* anthropology in so far as the technical features of marine and coastal environments and the effects of human activities on those environments are included in that record” (McCay 2001: 254).

Environmental anthropology as a subfield remains broad with fuzzy borders. Environmental Anthropology is related to, yet also distinct from, Ecological Anthropology. Ecological Anthropology has been described as “the study of the relations among population dynamics, social organization and culture of human populations and the environments in which they live” (Orlove 1980: 235). While, in general, environmental anthropology “concerns both causes and consequences of patterns and changes in natural environments, and those causes and consequences can be found at many levels and in many kinds of phenomena” (McCay 2001: 267). In marine environments, the causes of change can include “the so-called ‘driving forces’ of large scale environmental change, such as population growth and migration, economic forces of industrial capitalism, and the evolution and diffusion of a hungry consumer culture— as well as regional and global climatic change, itself affected by some of the same anthropogenic drivers” (McCay 2001: 267).

Environmental Anthropology is concerned with human-environmental interactions in more ways than simply change, however. The human-natural environment interaction affects the manner in which local residents live their lives, just as the way they live their lives affects the environment. Though aspects of the human condition have often been studied and described apart from the environment, the niche humans find themselves in has direct bearing upon their subsistence activities (Netting 1993). This is true no matter where one lives, though it is easier to see when faced with an extreme environment such as high elevations or a maritime-based existence. Consequently, understanding the local environment provides a window for understanding the important aspects of culture being discussed in this dissertation such as social organization, technology, and processes of change.

The relationship between humans and the environment is dialectical-- as people shape the environment, they re-shape themselves. The inclusion of the environment offers one valuable perspective from which to investigate the human condition. The idea of environment and especially, the related concept of an ecosystem, lends itself to the study of groups through studying whole systems. Though important for the field of anthropology and useful in some ways, this ecosystem approach (e.g., Rappaport 1968; Vayda and McCay 1975), has some drawbacks, especially in its emphasis on the ecosystems at the expense of individual choice, and the reduction of aspects of culture to simple, functional adaptations to the environment. Nevertheless, these studies are important for bringing the biological and ecological sciences together with the study of human groups. Later studies go a step beyond and show how environmental factors intersect with social and cultural ones. Throughout all of this, however, individual agency and processes of time must also be included to fully understand the importance and relevance of an environmental view of people and culture.

This dissertation uses a processual approach to the study of people and the environment. Through a people-centered approach whereby I am investigating the choices made by individuals

(choices which have consequences for the greater community) as they live and work as a part of their environment (Orlove 1980). As seen in McCay and Vayda's work (1975), the people-centered approach allows study of individual and population-wide responses to environmental problems. Through the decision-making of individuals we can see how these individuals' choices can affect the wider community.

While acknowledging the existence of heterogeneous aspects of fishing populations around the globe, especially in terms of gender roles (Nadel-Klein and Davis 1988), "fishing," nevertheless, "poses similar problems the world over" (Acheson 1981: 275). As a type of subsistence strategy, fishing "has received relatively little attention compared to other human adaptations" (Nadel-Klein and Davis 1988: 5). Perhaps as a result of the dearth of information, maritime researchers tended to focus on the commonalities found among fishing societies in the 1970s and early 1980s. Andersen and Wadel (1972), Smith (1977), and Acheson (1981) all point out that fishing is a distinctive way of life. Possibly as a result of the environment fishers find themselves within, whereby, prey is often elusive and invisible, there is a certain amount of risk and uncertainty found in the fishing enterprise. Additionally, as Nadel-Klein and Davis (1988) note,

"... people in fishing communities have special sets of technological and social problems ... capture techniques must often be highly specialized, requiring special skills and equipment, as well as considerable social cooperation. At the same time, many fishing peoples depend on a wide variety of species, so that fishers must be flexible and innovative in their approach to subsistence..." (Nadel-Klein 1988: 5).

Subsistence upon a marine environment, though practiced by heterogeneous groups throughout the world, is predicated upon the idea of adaptation to the environment. These adaptive strategies include distinctive technologies (gear such as nets, hooks, types of boats), consumption patterns (fish, seaweed, shellfish, jellyfish—some cultures consume all, some only a few), and social arrangements (common property regimes versus open access).

Even in similar environments, consumption patterns vary among groups. Documentation exists which shows that residents of some areas of Japan opted to use *Porphyra tenera* for their subsistence over a thousand years ago (Ueda 1970). Yet prior to the time (1854) when the secrets of *nori* cultivation were brought to the Kessenuma region of Miyagi Prefecture, Miyagi coastal residents were not believed to have subsisted on this algae (Miyagi 1990).

Different species of seaweeds have been harvested in different regions of the world at various times throughout history. Sze teu wrote in China in 600 BC, “ ‘Some algae are a delicacy fit for the most honored guests, even for the King himself’ ” (Guiry 2002a). As stated in Chapter Two, *nori* was used in Japan as a special payment of taxes, used in place of rice (Ueda 1970). *Nori* was used as tribute in China, as well. “In the Sung Dynasty (AD 960-1279), *Porphyra*, called "zicai" in China, was the symbolic item chosen to present to the emperor each year from the Haitan Island of the Fujian Province” (Guiry 2002b). Other species are cultivated and consumed, as well, in Japan, China and South Korea.

The most important seaweed species in Japan are *nori* (*Porphyra* species), *kombu* (*Laminaria* species), and *wakame* (*Undaria pinnatifida*). *Nori*, *kombu*, and *wakame* are also produced in China, though *wakame* production is very small (Tseng 1982; Guiry 2002a). Similar environments with the availability of similar species thus do not guarantee the same resources will be utilized, though one would expect some resources to be used. In Europe, seaweeds also have a long history of human consumption and there are some surviving materials documenting this fact. “Regulations for the gathering of ... a red seaweed are mentioned in the Icelandic sagas of the 10th Century” (Guiry 2002a). Various red algae have also been used since pre-Christian times (Guiry 2002a; Stein and Borden 1984). Wales, well known for its laver-bread, produced as much as 200 wet tons of *nori* (also known as laver) until very recently when “fears of industrial pollution, particularly from nuclear reactors, caused a sharp decline in the harvest” (Guiry 2002a).

As one would expect, time is an important factor in a local populace's adaptation to the local environment and use of available resources. In the case of common property systems, "these systems were not created by a single sweeping administrative reform that set up local councils in all communities ... Trial-and-error methods could be used as villagers became aware of the consequences of the current rules" (Ostrom 1987: 263). Ostrom also notes in Japan, in reference to avoiding the tragedy of the commons, "Without denying the importance of cultural values, it is apparent that Japanese villagers have not been willing to rely entirely on socialization as a means of ensuring behavior that avoids tragedy of the commons" (1987: 263). Rules and sanctions exist. Just as 10th Century Icelandic sagas mention regulations for the gathering of red seaweed (Guiry 2002a) (more detail below).

Nevertheless, despite differences, it is safe to say that the local environment does have an effect on subsistence, even when the exact effect cannot be foreseen. The environment surrounding Shichigahama has had a profound effect.

Shichigahama's Local Environment

Shichigahama is surrounded by water. Ocean water; bay water; and since the early 17th Century, brackish canal water. In the recent past, close to 90% of the male populace (Shichigahama 1999) fished or gained their livelihood from the sea¹⁹ in some way or another (up to WWII). Many ran ferries, water-taxis, or shipped goods in boats while fishing on a subsistence level. Junichi Nakashima spoke with reminiscence how he and his father were carpenters, building boats for the fishers. His family joined the Fishing Association (pre-FCA) during "the recession" (Great Depression) so that family members could harvest resources for the family's survival.

¹⁹ The small peninsula where Shichigahama is located has no freshwater streams, though some springs and freshwater marshes are found in the area. The lack of freshwater may have had a significant effect on limiting land available for rice cultivation in the past.

The fact that individuals take advantage of the marine resource in the Matsushima Bay area should come as no surprise. Evidence exists that humans have been residing almost continually in the area since at least the mid-Jomon period (Shichigahama Town Book). The Toguhama area was productive and hospitable to the Jomon era residents; tools, pottery, and the ubiquitous shells can be found throughout the Daigi Shell Mounds site. Daigi Shell Mounds is one of the largest Jomon sites in Japan. Just as residents turned to the sea and tidal shallows for bodily sustenance, so did they for spiritual protection. By the Heian era, shrines had been established housing deities whom protected fishers and travelers on the sea (Watanabe 1968). Throughout history, residents have subsisted off of the sea and the bay areas.

Humankind wrought some changes upon the natural environment during this time. Shell mounds and heaps of trash formed hills in some areas from the Jomon period onward. In the early Tokugawa (ca. 1614) the Sendai Lord, Date Masamune, began building a canal to speed the transport of goods and protect them from the dangers of the sea. Formerly a marshy area and the outlet of the (Nanakitagawa) rivers, the Teizan moat separated the (villages which form the current) Town of Shichigahama from the mainland. Masako Suzuka would often tell me of her grandmother's trips to Sendai to get *sake* during the middle part of the Meiji Period (1868-1912), she would walk the entire way to Kokubuncho with seaweeds on her back, returning with *sake* in the barrel for the return trip. Sometimes, if she was too slow, she would have to spend the night at the Teizan ferry dock if she didn't make it by nightfall.

Other coastal areas have changed under man's hand, as well. In marshy areas such as Matsugahama and Toguhama, residents gradually reclaimed land for housing and fields. Most of the residents of the Sanmichi hamlet in Yogai reclaimed their land by hand in the Meiji (1868-1912), Taisho (1912-1926) and early Showa (1926-1988) periods. The scale of reclamation increased significantly, however, in the post-World War II period during the Japanese government's push for industrialization. By the middle of the Showa Period (1926-1988), most

of the Yogai inlet has been reclaimed for a small industrial park (1968) -- much of which remains underutilized today. The dock areas of the seven villages have also been reclaimed and concreted (completed in 1991).

Though reclamation has helped the local economy and helped businesses in some ways, it has also hurt the local population. Several deaths took place as a direct result of filling in the Yogai inlet; others have died by drowning, including old women and young children, after individuals fell off the wharf into the bay. Though the concrete wharves help fishers, the sheer vertical cliff that results makes it difficult to get out were one to accidentally fall in. Of course, drownings took place even when the coastline remained a sandy beach as Mr. Nakashima. informed me as *Hama O-bon* (Beach Festival of the Dead) drew near. Now in his 50s, when he was a child, his [then] 2½ year-old sister drowned in front of their home in Toguhama.

One consequence of living in such a hazardous environment has been the establishment of unique cultural and religious rituals and customs. The *Hama O-bon* or ‘beach day of the dead,’ is one such special ritual held only for the souls who died by drowning in the Bay or Ocean. Additionally, an example of a custom resulting from the local’s placement within the local environment would be the custom of managing Japan’s coastal areas as a common property resource. The next section will discuss the Japanese Commons system in more detail.

Japan’s Commons System

Japan has had an extensive system of commons (land and sea) for centuries (McKean 1984; Ostrom 1987). As commons regulated at the local village-level, these had the formal conditions required for “successful and enduring collective management” (Ostrom 1987: 23). Among these conditions are “the visibility of common resources and behavior toward them; feedback on the effects of regulations; widespread understanding and acceptance of the rules and their rationales ... and the backing of values by socialization, standards, and strict enforcement. ... Sentiments and “community” were not enough (Ostrom 1987: 23-24). McKean (1984)

estimates that during the Tokugawa Period (1600-1867), as much as 12 million hectares of forests and uncultivated mountain plains were held and managed as commons by villages throughout Japan; approximately 3 million hectares were still managed communally in the 1980s (McKean 1984). As Ostrom (1987: 259) summarizes,

“Rules [of entrance into the commons] were tailored to the specific needs of each village and the ecological condition of a particular commons. Villagers were also required to work to enhance and maintain the yield of the commons in collective work such as annual burning or specific cutting of timber or thatch. Each household had an obligation to contribute a share to each to such efforts (McKean 1984: 39). The establishment of rules, monitoring of behavior and of conditions of the commons, and the assignment of punishment were all conducted primarily in the villages. McKean concludes that the long-term success of these locally designed rules systems indicates “that it is not necessary for regulation of the commons to be imposed coercively from the outside” (McKean 1984: 56).”

Commons does not mean equal access. Rights, held in shares much like in a corporation, were not held equally by all households. The household was the smallest unit of account in Japanese villages. The rules regulating the use of the commons were established by each village’s assembly. Use rights (usufruct) could be bought and there was often a sliding fee depending upon the manner in which harvest was undertaken (such as the use of a horse rather than human labor). “Negotiations and payment took place at the village level, between villages” (McKean 1996: 10).

Japan’s system of managing coastal resources has been heralded throughout the world as a model of successful management. This management regime, though it has changed in some ways over the years, is based upon traditional practices of commons (*iriai*) whereby by local resource users control and manage resources themselves at the local level. This is in stark contrast to the way resources have been managed in North America during the twentieth century. In North America, the standard form of management consists of controlling users from over-harvesting resources at the national level – a top-down approach. As Weinstein (2000) explains succinctly and clearly,

“[a top-down approach] relies on the authority of the government to enforce harvesting plans. The harvesting plans, in turn, rely on the analysis of technical experts. The technical experts conduct studies to determine the surplus that can be cropped without reducing the productivity of the given resource be it trees in a forest tenure area, a salmon stock, or a moose population. Once these plans are implemented, government employees have the task of monitoring and enforcing compliance with the harvesting plan” (2000: 376).

An important assumption made by the decision-makers using a top-down approach is that resource users are unable to self-regulate (Weinstein 2000). The idea that users of common property resources cannot self regulate was the conclusion drawn in “one of the most influential resource management articles ever written” (Weinstein 2000: 377), Garrett Hardin’s, *The Tragedy of the Commons*. “Simply stated, Hardin showed mathematically that users who cheated by taking more than an equitable share of a common property resource came out ahead of people who acted cooperatively. Competition among users to take as much of the resource as possible before it is gone leads to the decimation of the resource” (Weinstein 2000: 377). Hardin suggests in his paper that the only solutions to this problem involve intervention of an external power (the State), or the transformation of the commons into private property. Hardin’s thesis is so powerful that a Mississippi Sea Grant publication (Wallace and Fletcher 2000) used his analogy of England’s common grazing lands and the subsequent overgrazing, described as “the tragedy of the commons,” to explain fishing management in the United States. Indeed, fisheries management in the United States (if not management of all public resources) appears to be predicated on this very thesis. Though the “Tragedy of the Commons” was published in 1968 and much has been written in the intervening years to debate the universality and inevitability of the commons dilemma [by common-property theorists, economists, biologists, and anthropologists, among others], Hardin’s thesis continues to hold considerable sway in bureaucratic institutions in the United States even today.

Japanese conceptions of communal land holdings/tenure (*iriai*) and sea holdings/tenure (*iriai*) are not distinct as in the West (Ruddle 1989). Indeed, fishers enjoy ownership of the aquatic resources found within the water and fisheries rights have legal status

(Ruddle 1989; Ruddle and Akimichi 1984; Short 1989). Local, village level customs evolved over time and these formed the basis of control. Even during the Tokugawa period (1603-1868), “there was a notable lack of nationwide uniformity in the importance, definition, and regulatory procedures governing coastal fisheries” (Ruddle 1989: 169). The complex system of varied, customary village tenure and fishery rights to in-shore coastal waters, rather than being abolished with the passing of important fisheries legislation (1901, 1949) were incorporated into the ‘modern’ system. This system is organized around “community territoriality and livelihood rights” (Ruddle and Akimichi 1984: 333) not biological criteria.

Three general categories of fisheries are found in Japan²⁰:

- 1 Distant water fisheries, beyond the Japanese and other nations’ Exclusive Economic Zone (EEZ)
- 2 Off-shore fisheries, boats > 10 tons, operating between coasts and EEZ
- 3 Coastal-fisheries; inshore areas, often less than 10 tons

All coastal waters of Japan (except ports and reclaimed industrial areas) are divided among FCAs. There are three main categories of fishery rights: joint rights, demarcated rights, and set net rights. All can, and often do, exist within the same sea space; it is up to the local FCA to set a plan for the use of its territory (see map below). For my research, the demarcated fishery right was most important. Demarcated rights are given out for small-scale aquaculture. As the Shichigahama coast saw much use, ‘special’ rights were given out to equitably manage and coordinate different types of aquaculture (such as *nori*, *wakame*, and oyster) (Wigen 1989; Short 1989).

²⁰ Adapted from Wigen and Short (1989) , Ruddle 1989.

Pollution and the Physical Environment

“Under the Matsushima Refresh Program [the Matsushima] Bay has gotten cleaner. But you still don’t see the tiny sea creatures, the small animals and seaweeds that you did when I was young. There was a long, thin, green seaweed that used to grow off the seabed. And there were tiny shrimp that people used to catch with screens in the rowboats ... you don’t see those anymore. Maybe a few here and there, but not in the numbers that you used to; otoosan-tachi[men] used to harvest them for their income when they were in season. So the bay is cleaner, but it hasn’t become the environment it used to be.” Taro Suzuka.

Shichigahama occupies most of a small peninsula bordering the southern end of the Matsushima Bay. Matsushima, a large bay designated a Quasi-National Park, currently receives some minimal protection (for example new housing and cutting of trees was regulated in Shichigahama facing the bay, though this is not the case for most of the City of Shiogama). The bay is filled with over 200 limestone islands covered with pine trees. It was these islands which captured the attention of the poet Matsuo Basho in 1689.

Changes in the coastline are the more dramatic and readily visible changes to the natural, physical environment in the Matsushima Bay and Sendai Bays. The reclamation that took place in the Yogai Bay can be seen on a grander scale in the Shiogama Bay and in the Sendai port: a large fish market, oil and gas refineries, steel mills, and shipping container facilities all stand as testament to the changes man has wrought on the area. Less readily seen are the changes affected through dredging, water temperature changes, and inputs into the ocean water.

Deterioration of the fisheries and coastal environment in Shichigahama mirrors that of the rest of Japan. Wigen’s (1989: 390) catalog of damage to the environment mirrors what I found in the Matsushima Bay.

Table 4.1: Deterioration of Fishing and Coastal Areas of Japan

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

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).

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.

Inputs into the marine water in the form of chemical run-off has had a profound effect on the Bay and the livelihood of the individuals who depend on the bay. The region is in the midst of a “Matsushima Refresh” program with a twenty-year outlook for improving the quality of Matsushima Bay environment. This includes dredging the bay and depositing contaminated sludge elsewhere and improving water quality.

The threat to the environment in Japan is extreme. Kalland’s words, though published in 1981, remain accurate today:

“Hardly a country in the world is facing the same threats to the environment as Japan. Being densely populated and with her economy aimed at reckless industrialization, the ecological destruction has been immense, and nobody has been affected like the fishermen. Many fishing villages have been forced to give up fishing altogether due to the pollution and land reclamation. Oil spills and other wastes from industry and private households, in addition to large quantities of chemicals used in agriculture, have caused serious cases of pollution and frequent occurrence of red tides. Several bays are declared dead and the Inland Sea is in danger” (1981: 14-15).

The communities of Yogai, Toguhama, and Yogasakihama face inner portion of the Matsushima Bay. Consequently, the coastal areas bordering these communities have been greatly affected by activities in Shiogama and Tagajo (pop. 61,456). Shiogama, a city of 61,550, is located at the innermost part of the Matsushima Bay around an inlet called the Shiogama Bay. In its recent history, Shiogama had a thriving ship-building industry, fishing port, and fish cake industry (largest in Japan) and large gas and oil *kombinato* (industrial parks). Shiogama’s coastline has been all but entirely reclaimed and concreted and its port dredged to service tanker ships. Though several hillsides in the town remained green and forested in 1992, by 1999, new residential subdivisions were seen throughout the remaining hills.

Shichigahama FCA members suffer from residential and industrial activities in Shiogama, the result of nonpoint pollution. “Nonpoint pollution, as the name implies, includes widely scattered and cumulative sources such as runoff from urban streets and parking areas, agriculture, forest harvesting activities, marinas and recreational boating activities, and impacts from the construction and maintenance of dams, channels, and other alterations of natural systems” (NOAA 1998). Non-point source pollution is a significant problem in Japan, the United States, and the world. The National Oceanic and Atmospheric Administration [US] stated in 1998 that

“Toxic and nutrient pollutants, sedimentation, and disease-causing organisms are degrading ocean and coastal water quality and threatening public health, the environment, and the economic well-being of communities that depend on fishing, tourism, and marine commerce. While point sources of pollution, such as discharge pipes, continue to be a problem, the leading cause of water pollution today is nonpoint source pollution, which includes runoff from farmland, suburban lawns, and city streets, as well as pollution that is deposited from the air. Increasingly, excess nutrients in polluted runoff are contributing to harmful algal blooms and robbing coastal and marine ecosystems of life-sustaining oxygen, creating dead zones that cover huge areas, such as the 7,700-square-mile dead zone in the Gulf of Mexico. Pollution can also alter the chemistry of the coastal ocean, which scientists fear is happening in the Bering Sea and other areas” (NOAA 1998).

Pictures from the late 1960s (Zenkoku 1969: 33) show 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 in Yugasakihama 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.; 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 n.d.). Of course, some businesses and plants have 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 1980, McKean 1981). Even in the Shiogama Bay, local business would discharge wastes through secret pipes (Mr. Sugawara,

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).

Research was conducted by Miyagi Prefecture from 1979-1987 investigating the cause of the *nori* crop failure. 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 state *a* 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 and Mansenura, 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).

Given the lack of definitive results on the causes of the water pollution, *nori* cultivators had no choice but to follow the advice provided by the scientists. They continue following this advice today. During the two months surrounding the seeding season, the water temperature and salinity levels are taken daily and posted outside of each FCA office. The pulling of nets from the Matsushima Bay (after the *nori* is approximately 2 mm long) is an individual decision tied to one's opinion on the water conditions.

With the continued lack of improvement of water quality, the Shichigahama FCA members are faced with only one option: find somewhere else to cultivate. A second option, sue for compensation exists in theory, but is not practical in this situation (discussed further below). This option, however, is not as easy as it sounds. If *nori* cultivation was taking place in the United States and pollution was a problem, the cultivators would probably move to another area of the coast. In Japan, however, where FCAs own the resources and rights are given out FCA members, this is a difficult solution. How, after all, does one gain access to commons which are owned by others when the selling of individual rights is prohibited? This prohibition (1948 Fisheries Law) against the selling of individual fishing rights was a good one and is a consequence of protecting fishers from "absentee" landlords (such as middlemen and fish

merchants). Early in the 20th Century fishers were poor and heavily indebted. The law against selling rights was needed to protect fishers. Such a law, however is awkward in current conditions, however. So what is the solution? If you can't buy, borrow (or rent, as the case may be). Borrowing access to other fishing grounds is precisely the serendipitous solution to the problem of marine pollution that the Shichigahama cultivators came upon.

The practice of exchanging fishing grounds (see Map 5: *Nori* Seeding and Growing Grounds) with FCA members of different communities and different ecological niches – quiet bay areas and coastal Pacific areas—began among a few individuals in Shichigahama in the 1960s, was NOT initially begun as a result of pollution. The practice began prior to this point in time. Coincidentally, the choices and precedents made at this time have played a large role in enabling cultivation to continue today in Shichigahama despite the degradation of the Matsushima Bay, the traditional growing area of *nori* seaweed. Though the practice of exchanging access to one another's fishing territories did not begin as a result of the pollution problems in the

Matsushima Bay, these exchanges have to a large degree enabled the continuation of *nori* cultivation today.

Compensation Lawsuits

The common property of villages has gradually come to be regarded as private property (as opposed to public or state property) in Japanese Law. In other words, Japanese law holds that common property rights are shared private rights with the same protections as individual private property rights (McKean 1996). Given this, the Japanese Constitution (1947) offers protection to the commons. Further, in the case of the sea, though the Japanese government claimed ownership of the water to serve their interests in development and industrialization (1930s), the resources found *in* the water were held to belong to the fishing cooperatives and by extension, the right holders to whom the said cooperatives extended these rights. Rights to sea resources are viewed as property rights just as we see with land-based commons. Given the fact that FCA members own the resources (they hold property rights to them, after all), they are entitled to compensation for the loss of these resources, just as anyone is entitled to compensation for the loss of property. McKean's book (1981), *Environmental Protest and Citizen Politics in Japan*, is full of examples of FCAs either suing for the loss of resources or fighting to prevent the loss of the resources. Even with legal rights, however, receiving compensation for the loss of resources is not a foregone conclusion as the Shichigahama cultivators could attest.

The Shichigahama cultivators have had limited success in lawsuits. In fact, most compensation has been awarded only as a result of land reclamation and construction (Sendai port; new shipping channels) and not as a result of pollution in the Matsushima Bay. When compensation was awarded for the construction (Yogasakihama 1958-1961) of the Tohoku Power plant and subsequent loss of resources, only members of Yogasakihama and Toguhama FCAs were compensated. Furthermore, they were only compensated for the immediate effects

and not for future problems or disposal. “We were the only community in Japan to not be compensated for the disposal of the waste [from the power plant]. We were a poor village ... we learned a lot from that experience” (Shichigahama FCA official). Yogai FCA members, though right holders, were not using their rights at the time and consequently weren’t compensated. In a surprising twist, when the Sendai port was built, compensation was awarded only to the Matsugahama, Hanabuchihama, and Shobutahama FCA members since they were the right holders. When the actual *users* of the area (Yogai, Toguhama, and Yogasakihama FCA members) complained to the Prefecture, they were eventually awarded compensation and “someone got in a lot of trouble for not researching who was actually using the territories” (Shichigahama FCA official).

The use of social ties to gain access to Pacific Coast fishing grounds enables FCA members to continue working while waiting for pollution to abate or to receive compensation for their lost resources in the Matsushima Bay. Following difficult negotiations, Bayside cultivators actually voted to sell some of their rights in the Matsushima Bay for a ‘Matsushima Refresh’ project. The way it was described, as a part of the Bay clean-up, the bottom is being dredged and dumped in waters further off-shore. Rather than dumping the sludge, the local, prefectural and national governments proposed a plan where the sludge is combined with concrete and an artificial island would be built. This island would serve as a new headquarters for the local office of the Maritime Safety Agency, which currently has ships spread out around the Shiogama Bay. Today’s cultivators, especially in Yogai and Toguhama, would like the project to take place. The areas being sold are to areas no longer in use (though at the time of the proposal, these areas were being used) and with few successors, many think “why not?” Doing so would provide them with a chunk of money they could use towards their retirement. These cultivators don’t call this ‘artificial island’, however, but ‘dream island.’ As Saito Sanae related one day “a

dream because that's all it is. After the bubble burst, Miyagi Prefecture no longer had the money to throw in to the project." So for many, a dream is all that remains.

Some clarification is needed in regards to the selling of fishing rights. In this dissertation I am writing about FCA members remaining in their occupation despite opportunities elsewhere. The selling-off of one's rights to the resources would seem antithetical to my contention that the remaining FCA members are sticking with this because this is what they want to do. As I describe below, their use of social ties is one example of the lengths they go to in order to continue *nori* cultivating in this area of Japan. Some insights are offered into the reasons for selling fishing rights by Befu (1980) and McKean (1981). In the Seto Inland Sea of Japan they each describe instances whereby FCA members fight hard for their rights if they gain *raison d'être* (or *ikigai*) from fishing or if they have an outside income (such as with fishing on tuna boats) and are able to hold out. In many of these instances, the FCA members were fighting against the construction of industrial centers and for compensation for loss of resources resultant from pollution.

One respondent to the survey administered at the end of the fieldwork period gives an example of the way FCA members feel about this issue. He stated, it's not a matter of wanting to sell his right, but "in order to receive compensation [for the loss of resources, I] must part with it." The FCA members on Shichigahama's bay-side find themselves unable to harvest resources from areas where they own rights and they don't see this situation changing in the near future. That is why some individuals voted to finally sell their rights.

The town of Shichigahama's location as a community surrounded by two types of marine environments (ocean and bay) worked to the advantage of its residents. Marine resources were abundant, providing for their livelihood and sustenance. The condition of the environment today, however is drastically different from the conditions found when humankind first settled the area. Eutrophication of the coastal waters from household, farming, and seafood processing

has negatively affected the health of marine flora and fauna. Other forms of pollution, from industrial discharge to oil spills to alteration of the water temperatures, also affects the marine environment.

Though the “Law for the Resolution of Pollution Disputes” (Barrett and Okudaira 1995) has provided for the loss of livelihoods, it has not protected fisheries and fishing territories from the industrial, residential, and agricultural wastes. Concerned over the lack of improvement made in recent years in regards to the pollution problems, the Japanese Government established the Ministry of the Environment in 2001. Time will tell whether Japan will be able to improve water quality and protect natural areas for its citizens’ future.

The environment is just one crucial aspect of the *noriyasan* existence which *noriyasan* take into account when deciding to continue this way of life. Another important aspect includes the issue of technological innovation. The following chapter, Chapter Five, traces technological innovations in the *nori* industry and explains how such innovations can be a help, but also a burden, to people in this way of life.

Chapter Five

Technology

Why Technology?

Technology remains vitally important to society. Affecting every part of daily lives including health, hygiene, communication, and subsistence, technology provides an important arena from which to view cultural activity. This observation is especially true of agricultural groups and groups harvesting natural resources. The ability of *nori* cultivators to produce larger crops with less labor hinges fully on the technology accessed and developed.

Understanding the role technology plays in the lives of Japanese *nori* cultivators remains key to understanding the cultivating way of life. “Technology [however] is not only a material instrument or even an intellectual device but also a social process. We should think of *technological processes* as including various instruments, knowledge and people (human energy) articulated in space and time in sequences which are under the control of particular individuals or groups at different points in the total process” (Narotzky 1997: 18). In order to understand the tenacity of the remaining *nori* cultivators, the role and specific types of technology (whether it be machinery or seeding techniques) used must be understood. Importantly, the *noriyasan* choice of cultivating technology will also be described. Smith (1977) suggests when studying fishing and technology, that “the organization and goals of the work force” [are] as much ‘tools’ of the of production and technological system as material elements” (1977: 15).

Shichigahama FCA members also have commonalities with the rest of the fishing world, “partially as a result of what Goldenweiser once called ‘the range of limited possibilities’ given a specific subsistence focus there are only certain techniques available for the efficient performance of the tasks involved” (Smith 1977: 9) in this lifestyle. The study of techniques (and economics such as through technoeconomics), then, is as mandatory for understanding this way of life as including their complex relationship with the environment.

Lemonneir (1992) lays out elements for an anthropology of technology and though this dissertation does not answer his call, I do nevertheless take steps in the directions he asks anthropologists to travel. Specifically, he states, “anthropologists rarely ask questions such as: what is the social context of a technological ‘choice’? ... [we] “must deal with the relationship between technological systems and other social phenomena” (Lemonneir 1992: 2). Conklin (1982:16) tells us that technologies are the material expression of cultural activity.” As I strive to document Japanese society and culture through the lens of the *nori* way of life, technology provides important pieces to the puzzle.

Technology in Japanese Fishing

Japanese fishers are among the most technologically advanced and sophisticated as any you will find in the world. Shichigahama FCA members are no exception to this observation and the *nori* cultivating sub-group provides a good example of the use of technology to enable coastal residents to continue an occupation in the face of an ever-changing world. New, complex technology has transformed *nori* cultivation from a labor-intensive, limited growing season crop to one that can occupy the cultivating group full-time. With seven months of growing, five of those harvesting, and five months of clean-up and preparation, *nori* cultivation can be a year-round occupation for those who choose it to be so; indeed, forty-one percent (44 of 107) of the *nori* cultivators in Shichigahama produce seaweed as their only FCA-related occupation with the remainder fishing and diving (and some farming) in addition to cultivating.

As you find with any sub-group focused upon for their subsistence strategy, the technology utilized by Japanese *nori* cultivators remains vitally important for their way of life. I will argue in this chapter that technology plays an integral role in the *nori* cultivating occupation: new methods and machinery are embraced by some *noriyasan*; yet pushes others away from this lifestyle. The prohibitive expense involved with the purchase of new machinery was named by everyone, literally, as a reason for *noriyasan* to quit. In 1991, my main informant stated that

cultivators are quitting due to the high costs associated with *nori* cultivation, combined with low returns for their crop. Cultivators stated the same reasons in 2001. The nature of industrial agriculture is such that one is pressured to purchase the newest technology; it is in one's best interest to do so. In this instance one could argue that cultivators are at the mercy of greater forces outside of their control. Yet, these individuals do have agency; they do, to a limited degree, have some discretion in choosing which technologies work best for their own household, even within the confines of an industrial society.

Industrial Agriculture

Japan is an industrialized nation and as such, its food production system would be best described as industrial agriculture. Seaweed cultivation, though mariculture by virtue of it being a marine plant and not agriculture per se, is as industrialized a form of food production as any in the world. According to Barlett (1989: 255), "Industrial agriculture is capital intensive, substituting machinery and purchased inputs ... for human labor." As is found with industrial agriculture throughout the globe, Japanese *nori* cultivation is characterized by the "use of machines, chemicals, and complex production techniques, many of which are new since World War Two" (Barlett 1989: 255).

As noted briefly in the section of the history of *nori* cultivation in Japan, there was relatively little change in the manner of *nori* production from the early 1700s through the early 1900s. With the exception of the innovation of using nets beginning in 1929, most of the technological change has taken place since World War II. *Nori* was grown on tree branches or bamboo placed in the brackish waters of river and canals and in coastal shallows. Though *nori* cultivators in Hiroshima developed their own production methods around the same time as Tokyo's Oomori Ward, the methods used in Oomori ended up spreading throughout the nation in the end of the Tokugawa Period (ended 1868) (See Map 4). Once *nori* was gathered by hand, it was brought ashore in baskets. On land the *nori* would be chopped, shaped in a mold, and set

out to dry on sheets of bamboo mats. After sorting into stacks of ten, the *nori* would be placed into boxes for judging and sale to merchants who came to each cultivator directly. As seen with fishers (Kalland 1995), seaweed cultivators were also often clients of one specific patron from whom they purchased materials (Ito, personal communication). With little variation, *nori* was gathered and produced much the same way in 1930 as it was in 1730. Since World War II, however, *nori* production has undergone a number of technological changes (Ota 1993). Though Japan was an industrializing nation in the Inter-war Years, it was not until the post-World War II reconstruction period that agriculture in Japan truly became industrialized.

Barlett (1989) has outlined six general characteristics of industrial agriculture which serve as a useful starting point for discussion of *nori* cultivators, their use of technology, and the place of this technology in the world.

Table 5.1: Characteristics of Industrial Agriculture

<p>Table 5.1: Characteristics of Industrial Agriculture*</p> <ul style="list-style-type: none">• Increased use of complex technology and the technology treadmill• Increased substitution of capital for labor• increased influence from State• a tendency towards competition, specialization, and overproduction• increased interdependence between farm units and agribusiness that control inputs, machinery, product sales, processing
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This framework serves as a reminder that *nori* cultivators live within the greater sphere of an industrialized society and as such, in choosing technology, they are often at the receiving end of outside actors. Though I will make the case that they do have agency, through the invention of technology and the adoption or rejection of other technology, they are also at the receiving end of technologies introduced by government and private corporations hoping to make a profit. I will next discuss four of Barlett's six characteristics which are most applicable to the *nori* cultivating case.

A. Increased use of complex technology and the technology treadmill

Midway through the fieldwork period, I was surprised to discover an ethnologist researching historical *nori* cultivation in the Shiogama Bay. This gentleman was a graduate student on staff at the Shiogama Ethnological Museum on the grounds of the Shiogama Shrine. Enthused to find someone interested in much the same subject matter as myself, as well as excited to find someone to aid in me in the background, bibliographic aspect of my project, I quickly made his acquaintance. I found him quite helpful and very nice. Unexpectedly, however, I discovered one afternoon following a lengthy interview, that he did not consider the *noriyasan* (*nori* cultivators/producers) I worked with to be '*noriyasan*.' By virtue of their choice to use contemporary, automated machinery and forgoing the methods used historically,

noriyasan had ceased to exist in Japan in this ethnologist's mind²¹. He spent his time cataloging tools and materials and interviewing what aged *noriyasan* (most in their 80s and 90s) he could find on their methods and way of life.

Though I understand the view held by this young ethnologist, I can not completely agree with him; the *noriyasan* today are citizens of an industrialized Japan. As peasants, the "economic and ecological adaptations" (Barlett 1989: 255) produced by the *noriyasan* remained relatively stable for hundreds of years (Tokugawa, Meiji, and Taisho Periods: 1603-1926). Yet, the technology utilized was "state-of-the-art" for their time period. Though today's industrialized agriculture, has brought 'constant innovations' (Barlett 1989), these innovations do not make today's *noriyasan* somehow less valid. I believe, when one takes their history, culture, and personality into account, individuals make rational choices; this includes choices to use new technologies. Even prior to the explosion of new technology in the post-World War II period, *noriyasan* were already experimenting with new technology: for the growing of *nori*, nets had already replaced tree branches; prior to this, tree branches replaced bamboo.

Today, mechanization has taken a firm hold of *nori* cultivation in Japan. The introduction of new technology led to the rapid introduction of other technologies. As will be detailed below, the introduction of nets to harvest *nori* led to the introduction of new harvesting machinery. The ability to harvest greater amounts led, in turn, to the introduction of machinery to process greater amounts of *nori*. The processing machine, however runs in excess of \$150,000, an amount which has some cultivators retiring from this way of life. Barlett describes cotton production in the southeast United States as responding to technological innovation in a similar vein: Prior to World War II, cotton was plowed with horses and mules and usually hand-picked. Following the introduction of a mechanical picker, unskilled labor was no longer

²¹ This comment provides important insight on what it means to be *dentouteki*, or traditional, in Japan. Though I argue that *nori* cultivators today are like fishermen throughout Japanese history in the sense that they are simply taking advantage of a particular resource when it suits their purposes (such as being lucrative) --

needed. This picker in the late 1980s cost as much as \$80,000, an investment all but the largest farmers could purchase. This investment is significant enough to discourage some farmers from continuing cotton production (Barlett 1989). The development of the cotton picker, according to Barlett, set off other technological changes:

oyster cultivation was previously popular in Shichigahama prior to *nori* becoming popular as a cultivation item-- and there is no traditional or not traditional about it, Japanese notions of tradition remain otherwise.

“Further research led to improved varieties of cotton more amenable to machine harvest. Planting methods changed, and the chemical defoliation of plants before harvest became necessary. Mechanical pickers mix more stems, leaves, and dirt with the cotton, with forced cotton gins to experiment with new cleaning machines and methods. Thus, a change in one aspect of the cotton production process interacts with changes in processing techniques, planting methods, biological innovation, crop choice, land tenure, and rural population” (Barlett 1989: 256).

The same can be said for *nori* cultivation: specific strains of *nori* have been chosen to increase production as well as hardiness (Ueda 1970); production brought about different types of harvesting machinery: first knives, then vacuums, now the *shamisen*²², as the harvesting machine is colloquially called; the change in the harvest has brought about mechanical change of production. Along with this change have come changes in the cultivating population -- from entire households to households pairs. Japanese *nori* cultivation, then, is firmly within the world of industrial agriculture.

Industrial agriculture is also characterized by the “technology treadmill” (Cochrane 1979). In a technology treadmill, innovations (often mechanical) adopted increase production and lower costs, giving a competitive advantage and a period of higher profits to those who adopt these innovations early. As the technology becomes widely adopted, however, benefits become reduced by increased production and lowered prices. Farmers (or cultivators) who resist the initial change then suffer from lower prices and may be forced to adopt this new technology just to survive (Cochrane 1979). The technology treadmill operates in various aspects of capital intensification and mechanization. It can be seen in Wisconsin dairy farms (Barlett 1989) when dairies no longer accepted ten gallon cans or when new sanitation laws required them to buy bulk tanks: small herds didn’t justify the expense. In Shichigahama, new, automated processing equipment was felt by many to be too expensive. Along the same vein, a new machine which alerts the cultivator of ‘dirt’ on the *nori* is required to be in use by health officials beginning in October of 2003. Cultivators say there will be even more retirements following the end of the

2002-2003 season. They say the additional expense and health regulations will be too much for some households to adopt use of additional machines.

B. Increased Use of Capital in Substitution for Labor

Industrial agriculture is also characterized by the substitution of capital for labor. *Nori* cultivation in the past was an occupation that required help from all available members of the household and sometimes from personnel from outside the household: in a typical family men would harvest the crop and sometimes process it with other family members; women and girls would dry the *nori* and count sheets for sale after helping with the processing. Elderly cultivators in Shichigahama often reminisced about the Yamagata farm girls brought into their households in the winter season (the off-season for farming in Japan) to help them, the need for labor was so great. In Japan, as elsewhere in the industrialized world, capitalization has replaced labor. Capitalization can be seen in the forms of machinery and purchased seeds (over self-grown). Machinery allows fewer individuals to work to produce a greater amount of *nori*; purchasing seeds means time and energy can be spent elsewhere since the householders no longer work to incubate the *nori*.

Despite the tendency to increase the use of capital in substitution of labor, following the industrial agriculture model, householders remain individuals with their own agency. In Shichigahama, some *noriyasan* invest more quickly than others in labor saving technologies. Yogai, especially, is a community where the *noriyasan* tend to be the last to adopt new technology, preferring instead to use labor over capital. Some Shichigahama FCA members feel that “Yogai [people] are cheap” since most of these families tend to adopt new technology only as (extreme) need arises and never pay for help during the busy seeding period. An example of late adoption of technology is the taping (wrapping) machine. Current taping machines wrap ten stacks of ten sheets of *nori* into one bundle (*hitohaku*) and slides the stack over to the side until

²² The *shamisen* is the name of a three stringed instrument. Cultivators call their harvester by this term due to its resemblance with this traditional instrument.

someone places the bundles in a box. Without the machine, the wives must sit awake to take the stack of 100 sheets out, wrap it, and then place it in a box. Failure to be there, and be conscious (sometimes they fall asleep), results in *nori* falling all over the floor. Mrs. K.S. related this story to me one morning when we were talking about their long days:

“Oh, once I made a big mistake. I thought I’d just close my eyes for a bit. Just a bit. I was tired... when I opened my eyes the *nori* was everywhere, sheets were all over. I had to pick them up one by one, sheet by sheet, myself. *Otoosan* (her husband) became mad at me. ... all myself. So I started thinking what could I do to keep that from happening again? Soon I had the string with five cat’s bells tied on, loud enough to wake me up.” (Keiko Shimada, Yogai)

Taping machines enable wives to be away from the shop for between ten and thirty minutes. A luxury compared to earlier times. As Mrs. Shimada told me, “another time, before that, we had a different machine then that just stacked them sheet by sheet, and I left for a bit ... they got stuck somewhere ... I came back and it was a mess [with sheets all over the floor].” With aging grandparents no longer able to care for themselves, these precious minutes are valuable time needed to check on grandparents and get meals together. Taping machines have been in use for a number of years throughout the town, yet when I visited during the summer of 1996, no Yogai families used them. The following summer, I found two families had adopted this technology. By the 1999-2001 fieldwork season, more households had adopted this technology, though still not a majority. As I made my rounds of the community upon my return, I would comment, ‘oh you have a taping machine now?’ to those with the new machines. The majority of the responses fell along the lines of, “grandma/pa’s going senile so I need to check on her/him” though one did say “[my] wife insisted.”

Though useful for the family, capital intensive methods serve to increase the costs of cultivation. A new baking machine cost ¥6,000,000 in 1991 and by 2001 the cost of a new machine ran ¥15,000,000²³. The down-side of investment in this machinery is being locked into

²³ I did see a deluxe model in a machinery catalogue run ¥2,300,000, though no single household in Shichigahama would purchase one of these. Even the *nori* co-op had lower models.

nori cultivation. With the investment of the baking machine, cultivators feel they could neither retire nor harvest another resource while they have a loan out on the machinery. The cultivators must stay in *nori* production to recoup their investment. Many cultivators I spoke with in their early 60s spoke of cultivating only until the current loan was paid off at which point they hoped they could retire.

C. Competition, specialization, and overproduction

Traditionally, labor costs in Japan were relatively low. Female workers, especially, would often work in return for a set of clothes at the New Year and room and board (Takahashi, personal communication). As Japan's reconstruction continued and education levels rose, there began to be competition between home and industry. As in the US example (Barlett 1989), labor scarcity encouraged the substitution of capital for labor. Japan's push to industrialize meant there were a growing number of jobs available, both white collar and blue collar, which competed for the same workers as family enterprises. Universal education (through eighth grade) meant the populace became better qualified. As jobs and opportunities increased, even higher education and a better life became the goal of many families for their children. Of my informants, Taro Suzuka was the only person in the town, then Village, of Shichigahama to attend high school in his age cohort. After commuting to Miyagi Prefecture's technical high school, he began work in an office in nearby Sendai. In contrast, practically all of his, as well as the children of his cohort, attended high school with some even attending colleges. The Japanese literacy rate is among the highest in the world, at nearly 100% (Kawai 1995).

Specialization is also seen with industrialized agriculture. Of the 107 cultivating households, 44 specialized solely in *nori* cultivation. In listening to life histories and interviewing householders, it was common for different subsistence strategies to be utilized depending upon the season. A cultivator would have cultivated *nori* in the winter, line fished in the spring, perhaps dove for abalone in the early summer, and fished again through the late

summer and fall. As mechanization increased, however, specialization did, as well. Investment into cultivation and processing equipment ensures that the cultivators will stick with the crop even following bad years. In the US example, Barlett discusses how increased capitalization, specialization, and competition have led to increased farm size and decreased numbers of farms. Among *nori* cultivators, as well, their numbers have declined while the cultivable space has increased per individual. For example, in Yogasakihama, 17 cultivators use the same amount of space previously reserved for 199 families; Yogai with 91 families previously, now has only 13 families cultivating *nori*; and Sendai, only has 9 active members when they previously had 200.

With increased capitalization and specialization one often sees overproduction. In the case of *nori* cultivation, harvesters could produce three to five times the amount produced previously. Prices plummeted. Decreasing prices (combined with high overhead) has been cited by everyone as the primary reason for individuals to quit *nori* cultivation. Choichi Hoshi, a Toghama FCA member in his 40s stated one day, “I thought the prices would go back up after everyone else quit. I thought if I just stuck it out I was dumb.” Choichi and others like him felt that once others left the occupation, production would reach equilibrium once more. They did not take into consideration the long-term effect fully-automated machinery would have on *nori* production. Following the advent of fully-automated machinery and over-production, the National *Nori* Growers’ Association worked with the Prefectural and local FCA to set national harvest quotas. These quotas, however, benefit the food industry more than they do individual cultivators. Production was not slashed, but rather has attempted to maintain a constant of a considerable level.

D. Increased Interdependence between Farm units and Agribusiness

As capitalization increased and mechanization took hold, *nori* cultivators have become more dependent upon the companies that produce their equipment. Though a few individuals

like Taro Suzuka. have made some of their own equipment²⁴ most rely on the sale, and re-sale of nationally produced machines. In Shichigahama, most large machines are bought used from western Japan. An entire industry of machinery manufacturers, herbicide producers, net makers, and seeding laboratories have arisen around the *nori* cultivation. At the same time, a national organization arose, the National *Nori* Growers' Federation, to promote and protect the interest of *nori* growers. Celebrating their 50th anniversary in 1998, this organization publishes materials on the history of *nori* cultivation as well as current practices. They also publish the *Nori Times*, a national paper which comes out three times a month. This paper keeps cultivators informed of issues throughout the country such as import/export issues, environmental problems, and items of general interest such as “*Nori Day*” (February 6) events.

Cultivators rely on these organizations a great deal and are integrally tied to them. The Kyushu *nori* crop failure in the winter of 2001 was a concern, not only for the lost incomes and the lives of the cultivators²⁵, but for the effect this failure would have on the *nori* processing-machine industry. Shichigahama cultivators commented that the retirement (or even one year sabbatical since this meant thousands of cultivators would not be buying new equipment) of a large number of Kyushu cultivators could force many of these companies out of business. This leads us to one final point of industrial agriculture: the “consolidation of machinery manufacturers may reduce competition and further constrain farmers’ control over the conditions of agricultural production” (Barlett 1989: 267) with fewer companies available to cater to their needs.

Nori equipment manufacturers, as well, have decreased to a few main competitors. As anecdotal evidence, in 1969, 38 companies placed ads in *Nori Youshoku: Shashin to Gurafu de*

²⁴ Taro Suzuka, if you recall from the Chapter Three, quit his office job to start his own machine shop. He did not begin *nori* cultivation until his early 30s. Though he makes some equipment, this is limited to minor machinery (and additional work saving devices such as pulleys and winches). He must still purchase large equipment from the national suppliers.

²⁵ *Nori Times* (February 2001) reported at least three suicides following this crop failure so it was a great concern to FCA members locally as well as government officials regionally and nationally.

Miru. In the 1999 50th Anniversary Edition, only 15 companies placed ads. Analysis of advertisements in the two most recent years of *Nori Times* also showed the consolidation of manufacturers with far fewer represented than in earlier years. Interviews in the field also brought to my attention the decline in number of businesses catering to the needs of *nori* cultivators, especially in regards to the Ariake Sea problem in winter of 2001.

***Nori* Cultivation as Industrial Agriculture-- Transformation of a Way of life**

This section will review technological innovations from throughout the history of *nori* cultivation, especially in the post-WW II era (a description of practices of *noriyasan* in earlier years is briefly described in Chapter Two- Local History section). To re-iterate from earlier sections, understanding the role technology plays is crucial to talking about the *nori* way of life with any degree of accuracy. As members of Japanese society and producers of a food crop, the technologies these FCA members access remain crucial to their way of life. In order to meet this goal, I will document the four most important technological innovations for *nori* cultivation and discuss the impact these technologies had upon this way of life. I arrived at these four technologies through compiling opinions of *nori* cultivators, from published articles in *Nori to tomoni* (Zenkoku 1998) as well as my own analysis of *nori* cultivation.

Among these important technological innovations (to be discussed further below), those which had the greatest impact on the cultivation of *nori* seaweed include: 1) artificial seeding and bioengineering; 2), use of raft technology for cultivation; 3) freezing seeded nets; and 4) fully-automated household production. These, and other innovations, increased harvest and production amounts, have lengthened the growing season, and have made some aspects of the work easier for the FCA members. Today, electric winches pull 60 kilogram crates out of the boats, *kei* (small

Table 5.2: Technological Innovations with approximate beginning dates

1951-1955	Usage of various stoves to dry <i>nori</i> indoors began
1955~	Use of vacuums to harvest <i>nori</i> began
1956~	First semi-automated baking machines developed
1964	Began Large-scale Artificial Seeding
1965	Usage of revolving cutting machines (<i>shamisen</i>) began
1970	Freezing of nets began
1972	Usage of floating rafts began to be in widespread usage
1972	Usage of fully-automated machinery (national level) began
	Implemented national and regional productions goals
	Usage of Large washing tanks began
1981	Began using large, fully- automated machinery (Miyagi)
1987	Began computerized control of automated machinery
1992	Usage of Pulley and winch system began (Shichigahama)
1997	Usage of large washing tanks (Yogai hamlet)

* Adapted from Miyagi (1993), National (1998) and fieldnotes. It should be noted that many of the dates are from published literature on Japan; Miyagi cultivators' use of this technology usually occurred much later.

pickups) trucks transport the *nori* to family-run workshops, and automated machinery wash, cut, mold and dry the *nori* where human power was once required.

1. Artificial Seeding and biotechnology

The ability to artificially seed *nori* completely transformed the *nori* industry. Once the *Porphyra tenera* life cycle (see illustration) was discovered and documented by Dr. Kathleen Drew²⁶, Japanese scientists and fisheries technicians began to work towards seeding crops themselves. Prior to this point in time *nori* spores would adhere and grow spontaneously on the stalks and branches placed in the water. Once scientists understood that the spores developed on oyster shells and left, free-floating, when it was time to find a place to adhere and grow, then

²⁶ The Japanese *nori* cultivators are grateful enough to Dr. Drew that they hold a festival, Drew Festival, every April 14, now in its 38th year. In 2001, the 100th Anniversary of her birth, they held a more elaborate ceremony attended by her son and more than 200 individuals associated with Japanese and British botany, *nori* cultivation, and local government.

they could artificially seed *nori* and appropriate cultivation methods could be developed. Since these decisions were made over four decades ago, it is difficult to get data that lends depth to understanding the decisions involved in using this technology. In talking with cultivators, however, it does not appear to have been a difficult choice. Though not perfected in the early years by any means, seeding nets allowed real cultivation to take place; this could only be seen as a benefit to the cultivators when their only other option was spreading bare nets in the water and hope for the best. With real cultivation, for a little added work and expense the FCA members were guaranteed some amount of *nori* crop.

The town of Shichigahama built and financed its own *nori* seeding research center in 1960 from which time, local cultivators could purchase seeded oysters shells locally. In Shichigahama, 50% of *nori* was seeded with research center germinated seeds by 1963 (Miyagi 1991). Throughout Japan, artificial seeding methods had developed to the extent that seeding took place throughout the nation, greatly increasing national production levels. The 1964 harvest was forty percent larger than 1954 amounts (Ueda 1970) due in a large part to artificial seeding.

With the Shichigahama *Nori* Research Center located in town, cultivators had local varieties of *nori* available to them readily. The scientist on staff would (grow) the spores and provides these to the cultivators. Most cultivators, after purchase of the seeds from a research center, would add them to a saltwater trays kept in their workshops. In these trays, FCA members would insert oysters shells and leave them to germinate through the warm summer months (workshops kept warm, like a greenhouse). In September, seeded shells would be place in plastic bags extended from nets in the hopes that the spores would then adhere to these nets. This method was followed by cultivators throughout the 1960s, 70s, and 80s. Increasingly through the 1990s, however, more and more laboratories were providing seeded shells directly to the cultivators. Rather than doing the work themselves, cultivators could use their capital rather than manpower to grow the *nori*. During the summer of 1996, I witnessed the germination of

nori by four Yogai households. By the main fieldwork period, however, all had given up this activity in favor of purchase. The insecurity of not knowing whether the seeds would “take” was cited as the main reason for householders to purchase pre-seeded shells, though biotechnology also plays a role. As you would expect to see with industrial agriculture, the growth of *nori* related industries provides more businesses catering to their needs. In this case, the scientific laboratories providing, at ¥35 per shell, seeded oyster shells ready to be placed in the water immediately. As one cultivator explained, “it was too much trouble; too much could go wrong” in the seeding process.

Coinciding with artificial seeding came the search for hardier and more productive strains of *nori*. Bioengineering developed strains able to produce more branches per seed (Ueda 1970), especially desired today as they provide more *nori* per plant. As these varieties are increasingly produced in laboratories which ship seeded shells throughout the nation, local varieties disappear, much to the chagrin of at least one wholesaler (P. Ito, personal communication) who prefer that some regional differences remain. Wholesalers such as Ito would like to be able to market some *nori* as a regional specialty. The cultivators, however, prefer strains that are hardier and have better chances of producing a bigger crop. The more *nori* produced of a certain grade, the more likely they will be able to sell to larger packagers (such as those who make convenience store rice balls). Since Miyagi’s largest remains the packaged foods market (as opposed to raw *nori* for ritual gift giving).

1.a. New seeding method: On-land Seeding

A small percentage (10% in Matsushima Bayside communities; up to 30% in Pacific Ocean side communities) of cultivation nets are seeded using *rikujo saibyou gijutsu*, or ‘On-land seeding method.’ Individuals from the Seto Inland Sea region of Japan (National 1998) first developed this seeding technique. Some of the benefits of seeding on land include less wait time (approximately 4 hours per net as opposed to ten days in the bay), actually being able to see the

net is seeded (through the use of a microscope), and working communally as a group. An additional benefit for newcomers to this way of life is decreasing reliance on Matsushima Bay side community members. As I discuss in more detail in the Environment and Social Lives Chapters, Shichigahama cultivators remain in the position of needing to exchange access to fishing grounds with one another. Yogai, Toguhama, and Yogasakihama FCA members no longer cultivate *nori* in the Matsushima Bay due to eutrophication of the bay waters; Yoshidahama, Hanabuchihama, Shobutahama, and Matsugahama FCA members cultivate *nori* in their fishing territories located in the Pacific Ocean and do not have access to calm, bay waters. *Nori* is traditionally seeded in these quiet and calm waters. Consequently, Pacific-side FCA members have been tied to Matsushima Bay-side members as long as they have cultivated *nori*. With the advent of on-land seeding techniques, however, the latecomers to *nori* cultivation are slowly breaking free from their reliance on the Bay-side FCA members.

As seen with industrial agriculture, businesses often arise to cater to the *nori* cultivators' needs. This can be seen even in regard to seeding nets. One of the local *kikaiyasan*, (*nori* mechanics), a business which repairs and installs machinery, now also seeds nets for a fee. Cultivators now have the option to forego seeding nets themselves and order nets from an outsider, should they choose wish. At ¥1500 per net, the service is not inexpensive, especially since cultivators seed close to 1000 nets each year. As of 2001, few cultivators have chosen this route for seeding large numbers of nets due to the expense as well as the fact that nets seeded by this company did poorly in the 1999-2000 growing season. Should results improve, however, one can assume this business will grow, especially among Pacific-side cultivators who do not have use-rights to seeding grounds.

1.b. Cultivation with nets

The introduction of net-usage was one of the most important advances in *nori* technology. In 1928, professors from the Tokyo Fisheries University and a Fisheries research

center in Chiba prefecture began tests to see on what material *nori* would best grow and it was discovered it would grow well on a number of different ropes (Miyagi 1991). The following year (1929), in an experiment by 32 members of a Chiba prefecture fishing cooperative, fishing nets were spread out and for the first time, the method of tying nets to bamboo poles above the low tide line was used (Ueda 1970). In the same year, in a Miyagi research center, Dr. Kanzaki also conducted experiments and found *nori* adhered easily and well to nets. This method spread quickly and the cultivators in the Miyagi/Tohoku region were among the earliest in Japan to adopt this method of growing *nori* (Ueda 1970). Though there are some slight variations depending on the region and the environment of the growing grounds, this method is still the most popular for seeding nets. The current popular method for cultivation involves 'floating raft' (*betanagashiki*) technology.

Local lore²⁷ states that floating raft technology was first developed in Yogasakihama (one of Shichigahama's seven fishing communities) in the early 1960s. A scientist who worked for the Tohoku power company was investigating the growth of *wakame* (another type of seaweed) and oysters in the area of plant discharge. Floating rafts and docks are used in oyster cultivation and this scientist noticed *nori* growing well²⁸. The scientist began work with Yogasakihama FCA members on growing *nori* with a similar raft; once perfected, the FCA members presented their new technology at the National *Nori* Convention held annually in the early summer. Useful technologies spread quickly following presentation at this convention since representatives from every *nori* cultivating FCA attend.

Growing *nori* on floating rafts provided a number of benefits. First and foremost, rafts allow *nori* to be grown in deeper areas, further from shore. This meant new areas, historically

²⁷ Though I could find no documentation to support this claim, I did hear this information from a number of sources throughout the community. Additionally, the '*shamisen*' (cutting machine) used to cut *nori* from these rafts was produced from 1965 which fits with the timeframe.

²⁸ This is important because with traditional methods, *nori* is above the waterline during low tide and in the water again during high tides. The fact that *nori* would grow on a floating object meant that it could remain in the water twenty-four hours a day and still grow.

unusable due to the depth of the water, could now be put into production, fueling an increase in cultivators. Depth alone, was not the sole consideration for not using these areas previously. These areas were also deserts in terms of nutrients available. With the eutrophication (overload of nutrients) of the inland waters that came with marine pollution (Befu 1980), however, there are now enough nutrients in these ocean waters to support the growth of *nori*.

In Shichigahama, with the advent of raft technology, FCA members in Yoshidahama, Hanabuchihama, Shobutahama, and Matsugahama could now begin *nori* cultivation, joining their senior cultivators from Yogai, Toguhamma, and Yogasakihama. Today, given the environmental conditions of the Matsushima Bay, numbers of cultivators in these newly-entered communities actually outnumber the cultivators in the historically active communities. In addition to opening new growing grounds, the scale of production increased. Now large cutting machines could be used to cut *nori* in place of using vacuums and one's hands. Cutting left the root and bottom few centimeters growing of the net, allowing it to keep growing. In much the manner of having to mow your grass, *nori* could be cut and keep growing for several months.

2. Floating Raft Technology

As discussed in Chapter Two, *nori* was previously cultivated in much of Japan in shallow, in-shore bay areas. Doing so mimicked the conditions of naturally growing *nori* whereby the *nori* grew out of the water for a limited time when the tide was out. In Shichigahama, the Matsushima Bay (and inner Shiogama Bay and Teizan Moat) was the only area shallow enough to allow this to take place with the tides. Following the discovery in Yogasakihama (a bayside community) that *nori* could grow in the water without the low tide “air time,” new cultivating technology was developed (see diagram next page). Yogasakihama cultivators even exhibited this technology at the National *Nori* meetings (competition and exhibition).

The primary benefits of floating raft technology is that it enable cultivation to take places in areas otherwise unsuitable for *nori* cultivation. If you look in the waters surrounding Shichigahama, for example, cultivation areas more than tripled with this technology in place. Further, this technology is conducive to using the *shamisen* (rotary cutting machine) for harvesting the crop. Use of the *shamisen* enables *nori* to be harvested more quickly.

Such rafts have also become the common denominator in discussions of fishing territory and *nori* cultivation space. Space is talked about in terms of *daisuu* (raft numbers). For example, the Eboshi family had 20 rafts in Sendai, 20 in Hanabuchihamama, and 30 in Yoshidahama. There are two standard sizes, 6 net rafts and 4 net rafts (Yogasakihama and Yoshidahama use smaller, four net rafts while the others use 6 net rafts). Knowing the number of rafts a family cultivates can give one a fairly good idea of income and one reason why the numbers of rafts people cultivated was a difficult subject to broach. One informant suggested, in fact, that most people probably underreported amounts by about 20-25 nets. Another informant was upset (not for herself but for others) that such a thing was being asked; she informed me that number wasn't a good judge in any case because the amount produced was more dependent on cultivators' ages and the number of family members working.

Floating rafts, then, are important on a number of levels, only one of which is its use in *nori* cultivation amounts.

3. Flash-freezing Nets

The difficulty with a growing season beginning in October is that with the water inversion that takes place in December, *nori* often stops growing. Also, the *nori* is at risk of illness in the warmer Autumn months. *Nori* cultivators would often lose much of their crop at this time of year-- a big hindrance for full-time cultivating. This changed in 1964 when the deep freezing of nets became commonplace (Miyagi 1991). Scientists discovered that nets could be stored in freezers if they were flash frozen (at or below -30°C). That is, frozen very quickly so

that the cell membranes did not rupture. Once frozen, the *nori* would be good for up to two years, and could be thawed slowly anytime. Freezing of nets in this manner allowed cultivators to continue the harvest even after the water inversion took place in December. They have also been able to replace damaged nets from storms, accidents, red tides, and illness. Additionally, without the freezing and storing of nets in this manner, the *nori* season could not run through mid-April.

4. Mechanization

Of the important technological innovations mentioned thus far, all have to do with the growing end of seaweed cultivation. One of the most important technologies for the changing of the *nori* way of life remains fully-automated machinery for the processing of *nori*. As harvest amounts increased, the greatest hindrance to overall increased production was the inability of cultivators to process the *nori*. Every cultivator interviewed age 50 and older told stories of having to lay out each sheet, one by one, relying on the weather to dry the *nori* thoroughly. Rain and snow prevented them from working; even cloudy days were a bane. Without sunlight, the *nori* could not be dried. The ability to boost production lay in the need to dry *nori* more quickly, without losing days due to weather. As early as the late 1950s, kerosene burners and stoves were used in workshops to dry the *nori*. The 1960s and 70s saw increasing numbers of semi-automated machinery which could wash, cut, and dry the *nori*. By the mid-1970s, fully-automated machinery was commonplace throughout the nation (early 1980s for Shichigahama).

Along with floating raft technology, the greatest aid to increased production was the automated drying machine. These huge machines, ten meters long and drying up to 4000 sheets an hour²⁹ produced what would have been an unimaginable amount just a few years prior. Cultivators stated they would have been doing well to cultivate 2000 to 3000 sheets in a day in the past. With this technology, they now produce such a previous a day's worth in an hour. With

these machines came the advent of industrial agriculture of the sea in Japan. With production skyrocketing, prices plummeted and have yet to recover. One cultivator stated he thought prices would return to higher levels in time; twenty years later, he is still waiting.

The question of whether the introduction of automated machinery has been a boon or a bane must be saved for another time. Certainly, the invention and introduction of some technology was out of the local cultivators' control; the high cost of machinery [new drying machines can cost over ¥2,000,000 (\$250,000)] combined with the low prices has deterred some children from succeeding in the family occupation. It has also caused established cultivators to quit when they decide they can't take on another seven- year loan. This notwithstanding, FCA members do take charge of their destiny themselves. In experimenting with various nets in the 1920s, scientists worked with local FCA members. Yogasakihama FCA members invented a form of floating raft (section two of technological innovations), enabling them and others to harvest *nori* in previously unusable areas. The Yogasakihama invention was shown to others at the national *nori* growers' convention. These conventions, held annually, consist of competitions among *nori* cultivators. More importantly they provide a forum for the dissemination of new techniques and methods. These FCA members work proactively to educate themselves.

In addition to attending national meetings, the prefectural fisheries center and the FCA provide monthly workshops to discuss issues of relevance to growing *nori*: the environment (weather, tides, water temperature, salinity, etc.); technology (new techniques and machinery); and current issues (i.e., change in laws regarding hygiene standards for food production). Everyone subscribes to the national newsletter, *Nori Times*, which is published three times a month. Some cultivators who are very serious about their work formed their own educational society. Funded through the donation of a day's worth of production (equivalent to several thousand dollars), these men visit others throughout Miyagi and investigate better methods. All

²⁹ 4000 sheets per hour was the average size in Shichigahama. Drying machines come as

of these men are well versed in the science of *nori*, from understanding the meaning of salinity levels in the ocean to the biology of *nori* and pest algae, etc. They must also learn to adjust complicated machinery on their own, coaxing and cajoling it to work when the mechanic is not available. They understand their environment, knowing the meaning of different winds and tides, among other things.

The majority of the FCA members I worked with in Shichigahama graduated from junior high before joining a father or family member full-time in the FCA. Most cite the lack of a higher education as the reason they still cultivate-- they "couldn't get work elsewhere if [they] tried" they say. Nevertheless, I argue that these men (and women, though the wives would never say it) are extremely well-educated. What they lack in formal degrees, they have made up for in experience and self-teaching. Almost none of the machinery and technology used to produce *nori* were available when these men and women started cultivation. They taught themselves as they went along with the introduction of each new item. The 107 families in Shichigahama could have left *nori* cultivation at any time; 697 did quit. Indeed, between 1961 and 1995, 58,824 families (National 1998: 16) quit cultivating *nori* throughout Japan. Since the Heisei Era (1988- present) began, cultivating families have been reduced by about one thousand a year until by 1995, only 9,901 families (Zenkoku 1999) remained, only 342 of them in Miyagi Prefecture (Zenkoku 1999).

Agency with the Adoption of Technology

Despite the introduction of machinery and technologies from outside their local community, *nori* cultivators have shown agency within the context of industrial agriculture. As Barlett (1989) describes, there is a technology treadmill at work in industrial agriculture and in this case, mariculture. Certainly, the introduction of large, automated machinery has meant that

large as 7 rows across, able to dry 7000 sheets per hour.

everyone must purchase these machines in order to stay in the business³⁰. This notwithstanding, each FCA member decides, to the extent possible, whether and when to introduce technologies into their own household production. The taping machine is a case in point.

Though the taping machine has been available for years, the cultivators choose themselves when to introduce the technology into their workshop. For many cultivators, price kept them from purchasing the technology and they have waited until the technology has become more affordable. For others, since they feel it is not necessary and more of a luxury item, they have delayed purchase. The introduction of this piece of technology has depended upon each family's particular situation and stage in the lifecourse (Plath 1964). For those who are now approaching retirement age, especially, this technology has proven indispensable. Many of these families now have elderly parents who need more care and attention. If the wife must be away to prepare meals or take care of business away from the workshop, husbands can tape the *nori* if they so choose.

Family enterprises such as *nori* cultivation have been possible partly because of the Japanese family (*ie*) system. A Japanese household has been described by Kleinberg as "... an enduring corporate entity -- managing agricultural, commercial, or artisan activities-- that brings together both production and reproduction within the framework of family life. It is normally formed around a stem family composed of nuclear units affiliated through parent-child relationships" (1983: 218).

Most Shichigahama cultivators lived in extended families of at least two generations; three generation households were fairly common and I knew of several four generation households. Within a multi-generation household, those middle-aged can focus their attention on *nori* cultivation with the grandmother aiding the wife with household chores. Difficulty arises as they age and the grandmother's health declines and she is no longer able to help with the household (or in some households, the grandfather's health declines such that he no longer goes

³⁰ Shichigahama *noriyasan* informed me there is one individual who still produces *nori* without machines. He lives in Chiba Prefecture; there is a reputed 2-year wait for his products. His picture can be seen in Tracy

on the boat and the wife suddenly, in her forties, finds herself on a boat for the first time). Thus, in some families, technologies have been introduced as they enter new stages in the lifecourse.

To backtrack to the introduction of the taping machine, one cultivator in Yogasakihama in particular comes to mind. Literally every time I came to call, he was the one taping the *nori*, not his wife. For those families where the husband dislikes this role, or where his energy is better spent elsewhere, they have purchased a taping machine.

The decision to purchase technologies or not could be said to be ultimately, an economic decision. One could argue that, in the end, it all boils down to economics. However there are other issues at play. In addition to the question of the stage in one's lifecourse (age), aesthetics and self-reliance (opposite of wasteful) should be considered. To continue with the taping machine example, *nori* wrapped by the machine is not as aesthetically pleasing as those done by hand. The paper strips keeping the *nori* together is neither as secure nor folded quite as nicely. Though opinions vary from person to person, several wives mentioned that the *nori* "looks nicer" when wrapped by hand. Of these women, some used taping machines, but nevertheless felt that "by hand" did a better job. I, myself, could tell which was done by hand simply by looking at the *nori*.

Other technologies, such as pulleys and winch systems for crates and equipment, have been incorporated, but not for economic reasons such as increased productivity, but rather as *noriyasan* have increasing physical difficulties associated with their aging population. For example, construction on the concrete wharves was completed throughout Shichigahama in the mid-1980s. The wharves were built to be higher than the high tide level out of practical necessity. The unfortunate consequence of this is that when the water is at low tide, the *noriyasan* must lift 60 kilogram crates over their heads to get them on land. When I first conducted fieldwork in 1991, none of the Yogai households used the pulley system currently in

Dahlby's article, "Tokyo Bay" in the October 2002 issue of *National Geographic Magazine*.

place to lift crates out of the boats. They continued to unload the *nori* by hand because they were able to do it themselves. Several *noriyasan* still pull the *nori* come to their workshops in rickshaws, eschewing the use of trucks as some families. Much in the manner of thrift, these families continue to use older technology and hand-power out of the simple preference of doing so because they are (physically) able to do so. The cultivators remain as self-reliant as possible. The majority maintain large kitchen gardens where they grow food for their tables and flowers for their *butsudan* (Buddhist family alters). FCA members who continue to unload *nori* from the docks and wrap it by hand do so because they are able and it would be *mottainai*, or wasteful (monetarial), to do anything otherwise.

Wastefulness (*mottainai*) is an important concept for understanding the FCA members in Shichigahama. They forego the use of the most up-to-date machinery because it would be “a waste of money” (“*okane ga mottainai*”) to pay for something which they can do themselves. They purchase automated machinery because they must in order to produce enough to live in today’s industrial society. The limiting factor on which machine to buy is not centered on the idea that the newest and fastest machine produces more and gives one a greater gross product, but rather, they focus on the amount of money that needs to be spent; it would be a “waste” to spend more than their needs require. Consequently, slightly older and slower models of drying machines are worth the extra time and oil it takes to run them. Along these same lines, nets, bamboo, anchors, and ropes are re-used and repaired until they finally fall to pieces and processing machinery is cleaned and ‘tuned up’ every summer.

There comes a point, however, in a cultivator’s career when purchasing is no longer “wasteful.” As they age, the FCA members are increasingly purchasing and using labor-saving technologies. Though my main informants unloaded *nori* by hand in 1991, by January of 1993, my main informants as well as every cultivating family in Yogai had put the pulley and winch system in place. (Though rather than purchase the equipment, Taro Suuzuka made the pulley

himself). At this time, I asked why they did not use the pulley system before. His wife explained “Grandmother helped before ... we lifted [the crates] with three people. Now she’s become old and it is only us two.” In this household, the grandmother helped them with the crates as they were too heavy for only the husband and wife. They waited to purchase (or in their case, build) the new technology until the grandmother was no longer strong enough to play a role, despite the fact that the technology was previously available. Mr. Suzuka also made a pulley system for their storehouse for the raft materials. They spent the money to purchase the pulley materials not for economic reasoning, such as they could now afford it, but because this way was “easier on the body” as Mr. Suzuka explained. In Shichigahama, technologies are chosen with the condition of one’s body in mind, not just the economics of the household. Numerous articles and reports (e.g., Kawai 1995) by the Japanese government and various fisheries agencies have highlighted the growing age of the Japanese population, and especially the fishing sector. Knowing the population is aging is important not only because of the obvious concern for declining numbers, but also because of the changes wrought by aging. In the *nori* cultivating case, FCA members choose technologies in part due to their stage in the lifecourse.

Cultivators, then, choose -- or choose to forego-- technologies for aesthetic, cultural, and age related reasons. In this manner they are individuals in an industrialized society who do not fit completely in the bounds of the description of industrial agriculture as laid out by Barlett (1989). As Barlett describes in the U.S. case, the cultivators may not be in control of production completely; as the rest of the nation is mechanized, so to, must they be mechanized.

Nevertheless, they can take some control of the situation by waiting to purchase equipment. Many of the FCA members purchase machinery through the repairmen, who in turn have bought them from mechanics in Western Japan. There is a significant market for used machinery and most Shichigahama *noriyasan* purchase used, rather than new, equipment. These used machines have been replaced in the workshops of cultivators in Western Japan often because they are no

longer the newest and fastest. The used machines are still an upgrade for those who purchase them. In Shichigahama, the small cooperative work group in Shobutahama (11 men and four part-time women) and a few of the youngest *noriyasan* are the only ones to purchase the large, automated drying machine as new items. In the *noriyasan* case, Shichigahama FCA members can still be competitive even without the newest technology.

Summary

Technology, then, plays a significant role in the *nori* way of life today. As seen in industrial agriculture elsewhere in the world, much of the technological innovation is outside the cultivators' control. They do, however, have some agency in choosing to use, or even invent, the technology which they use in this occupation.

As technology plays an important role in *nori* economics, the next chapter, Chapter Six – Economics, naturally follows this discussion of technological innovations by *nori* cultivators. Chapter Six discuss the Japanese economy and *nori* household economics. As seen in this chapter, some of the economic issues to be discussed are clearly out of the control of the local FCA members. Others, however, could be affected by FCA members' own actions. For example, to what extent has the introduction of floating rafts, increased production, but also decreased quality, thereby cementing the high usage of Miyagi *nori* as *onigiri* (rice ball—a low-priced convenience store item) *nori*? This is a question for which we will never know the answer, but it is important, nonetheless, for thinking about technological and economic issues.

Chapter Six

The Japanese Economy and Economic Anthropology

“Nobody’s doing this who doesn’t want to [do this].”
Shichigahama *noriyasan*, Winter 2001

Introduction

This chapter highlights economic issues and concepts aiding in the analysis of the Shichigahama *noriyasan* situation. The complex interaction between Japanese culture, the national (Japanese) economy, and the international economy ensure an analysis of the economics which will remain, in the end, inconclusive. Evaluating the Japanese economy, applying the economic concepts of consumption, production, household income, and risk, and explaining coping mechanisms employed by the *noriyasan do* take us one step further, however, toward understanding why they continue their way of life. Though many Japanese young people have in the past forsaken manual work for an office job, the decade-long economic downturn is bringing some sons back into the family business. In the 2000-2001 season alone, four sons from Shichigahama *nori* households returned home as a consequence of corporate restructuring and (business) bankruptcy.

Interactions between Japanese culture, the national and international economies and nori cultivation are complex. The harvesting of various seaweeds has a lengthy history in Japan with documentation of such practice going well back to the Heian Era (924-1197 A.D.) and even earlier (Ota 1993, 1995; Miyagi 1993). Though many of the same seaweeds are also produced in Korea and China (with differing intensity and some produced for the Japanese market), seaweed nevertheless continues to conjure of images of nostalgia and traditional Japan (Ivy 1995). A *National Geographic* article, “Tokyo Bay” (October 2002) even showed a picture of one of Japan’s last *noriyasan* to still process *nori* by hand³¹ as a symbol of tradition in Tokyo.

³¹ I do not believe National Geographic Magazine knew how unusual this *noriyasan* was, or they would have perhaps made more than a passing reference to his picture.

Japan's economy was strong and powerful through the 1980s, increasing the prestige and interest in items from Japan. This interest helped fuel the sushi boom in the 1990s (Cweirtka 1999). As sushi's popularity continues to grow through the United States and the rest of the world, so a foundation has been laid in the interest and acceptance of seaweed (especially *nori*) as an ingredient in various packaged foods (such as potato chips and rice cakes). Exports of *nori* from Japan to other countries continue to rise as *nori*'s acceptance grows (see Appendix A). The editors of *Saveur*, a cooking magazine, even named *nori* one of the "Saveur 100" (A listing of an "annual celebration of [the magazine's] favorite people, places, things, and ideas from the world of food and drink" for their 2002 list (Saveur 2003). *Nori*, though not popular by any means in countries such as the United States, has certainly gained increasing acceptance.

Nori is used most often in a dried, processed form. Stored in this way, it can last for months in a bag and well over two years in a freezer. If kept in sheet form, the *nori* is used as a covering for rice balls, *temakizushi*, sushi, and *norimochi*. Some people salt and fry it for beer snacks. Shredded, it is used for flavoring in potato chips, rice cakes, and as *furikake* sprinkled over rice. Few people eat *nori* in its raw form, though it can be made into a very nice cold salad. Despite the number of possible uses of *nori*, most *nori* is sold to middlemen for *onigiri* rice balls and in sushi, especially revolving sushi bars. These uses tend to keep the price of *nori* lower than it is for other uses such as for ritual gift giving (*nori* is a common gift item for *O-seibo* and *Chuugen* though not as popular as it once was).

The trend in *nori* production, while acknowledging year-to-year fluctuations, has been one of increase at the national level. Given these fluctuations, household income remains unstable and inconsistent. An income can literally double, or halve, from one year to the next depending upon environmental conditions. These inconsistencies, tied with the *noriyasan*'s first-hand experience that *nori* used to be "black diamonds," are cited by some as reason for households to leave the industry.

Women, always important for the roles they play in nori processing, have become indispensable for the seeding and harvesting of *nori*, as well. This change in women's roles has been one of the most telling examples of changes in the *nori* industry just in the past 3 decades. Several *noriyasan* commented that when a woman's health or strength fails, or when she has tired of the work and instability, her household will quit *nori* cultivation.

Given these points, and ones mentioned previously (e.g., the Prologue) one must ask, "why do *nori* cultivators persist?" The rest of the chapter will address this question while focusing attention on the Japanese Economy, *Nori* Economics, and Household Economics.

The Japanese Economy

In less than half a century (1946 to the 1980s), Japan went from a war-torn and devastated environment to the world's second largest economy. "Japan was the economic wonder of the industrial world" (Wolfe 2002) and "... [wa]s Number One" (Vogel 1979). Following such dramatic success, Japan found itself at the receiving end of bashing: Vincent Chin was murdered by angry, laid-off American auto workers who thought he was Japanese (Chan 1991), Congressmen smashed Japanese-made electronic consumer goods on the Capitol steps, and Japanese villains regained predominance in western books and films (Freedman 1999). Through the 1980s, the Japanese economy was booming; Japanese consumer goods made their way around the globe, Japanese corporations were buying up real estate in Hawaii, California and New York City (Rockefeller Center). Ryoei Saito even joked that he would take his record \$160 Million purchases, *Portrait of Dr. Gachet* (by Van Gogh) and *Au Moulin de la Galette* (by Renoir), with him to his grave (ibid.). It appeared to many that the 21st Century would be the Century of Asia. In 1991, however, the bubble burst, Japan's economy slipped, and as of 2003, has yet to recover.

Japan's success through 1991 could not have been predicted looking from a perch in immediate post-World War II Japan: 119 cities and 2.2 million houses (about 20%) were

destroyed in bombings and more than 9 million people were homeless. Hunger and malnutrition were severe problems. Many Westerners felt that Japan should never again rise above the levels of the Asian countries it had colonized by force (Takeuchi 1990). Towards this end, in immediate post-War Japan, the importation of raw materials was forbidden and much of Japan's limited industrial capacity was reserved for war reparations to their Asian neighbors. In 1950 Japanese per capita income was only \$153, less than even that of other Asian neighbors such as the Philippines. The Japanese economy was not galvanized back to life until the outbreak of the Korean War in 1950, and then primarily only as a result of special procurements for the UN and American forces (Takeuchi 1990).

The Post-War era witnessed Japan's drive to rebuild and expand their economy with key, strategic industries — shipbuilding, aluminum, oil refining, petrochemicals, nonferrous metals (Gall 1983). These were accompanied with a shift to high technology industries and innovative production technologies. Innovations such as building *kombinato* where the ports and unloading for raw materials takes place in the same location as industrial production, cutting down on time and energy needed for production, enabled Japanese industry to be more efficient. Quality was increasingly emphasized. Whereas the early industrial economy (late 19th Century) was based on industries such as textiles, the late post-war incarnation emphasized high technology and car manufacturing.

The demographic changes of Japan from an agrarian society to an urbanized, industrialized one had already begun prior to the War. This shift, however, increased significantly in the post-War era. The Japanese became able to purchase household appliances and by the 1970s, some Japanese people were even protesting Japan's move towards consumerism and materialism.

Urbanization has brought some difficulties to the continuation of "traditional" family life. As children leave for the city, family successorship becomes a serious issue. Though "U-turns"

and “S-turns³²” are seen, they are still relatively rare. Women are increasingly taking factors such as cohabitation (with in-laws) into account when considering marriage as a serious issue. Though this may have also been an issue in the past,³³ they are also marrying later. With greater wealth and leisure, young people are delaying marriage and being called “parasitic singles” by the press. The new economy has not brought strong support for traditional cultural values. This is the Japan of 2003 that *noriyasans* find themselves a part.

Nevertheless, Japan does have a tradition of appreciation for “traditional” occupations, especially crafts such as pottery, lacquer ware, and paper-making, but also includes others such as the *ama* (abalone divers). The Japanese domestic tourism industry has a significant portion of advertising based on nostalgia. This nostalgia includes longing for a past life lost such as in rural villages, including seaside ones (Ivy 1995). For very few, however, does this nostalgia extend to *nori* harvesting. The National broadcasting network (NHK) has run stories on the nutritional value of *nori*, but when focusing on the harvesters, the programs tend to look for people who practice the old-fashioned method of harvesting naturally growing *nori* as opposed to the industrial-type harvesting practiced by *noriyasans* today.

Economics

The Japanese case is one where vital economic and business practices are based on a cultural system that depended on mutual trust and obligations between business firms; a deep-rooted cultural belief in harmonious actions and decisions promoted and sustained industrial strategy (Freedman 1999: 7). Obligation, and the repaying of one’s debts, are important underlying cultural currents that effect the actions of individuals in Japanese society. This includes both one’s social and business life.

³² A “U-turn” is when someone goes to Tokyo from a provincial town, returning to the same provincial town at a later date (such as the end of a college education). “S-turns” are when someone heads to Tokyo and later returns, but to the provincial capital or large city, not the hometown.

Sheridan (1999) believes Japanese workers “generally expect to gain welfare, satisfaction, and happiness at their workplace. Many also expect to foster individual self-development and to establish a meaningful life through working” (1999: 130). She states that Japanese workers are increasingly demanding an increased quality of life. As I will show in Chapter Eight, Japanese FCA members work in a maritime occupation precisely because they desire these same life-qualities as the management and blue-collar workers of corporate Japan. FCA members, however, believe they will gain better satisfaction and an increased quality of life from working in an enterprise household than working for a Japanese corporation. As seen in the United States, many self-employed are willing to “sacrifice ... earnings in exchange for the nonpecuniary benefits of owning a business” (Hamilton 2000: 629).

Much of the Japanese business and economic literature focuses on corporate and factory work/life in Japan (e.g., Abegglen 1958; Dore 1973, Kumon and Rosovsky 1992). As Roth (1983) points out, [a] “research focus on large-scale enterprise with bureaucratic procedures has caused us to miss the process of linked careers involving a substantial portion of the population whose occupational fate may be heavily dependent on their personal relationships, including their kinship position” (Roth 1983: 257).

In understanding the particular case of Japanese FCA members’ way of life and choice to work the sea, knowing the economics of the industry and Japanese society remains crucial. These FCA members do not work and live in a vacuum. The strength or weakness of the economy, just as seen with the health of the environment, has a direct effect on the production of *nori* and the *nori* way of life.

³³ I know a woman who refused her [now] husband’s proposals three times before finally consenting to marry him in 1974—she knew he was the eldest son in a family enterprise), women today are actually refusing to co-habitate (with in-laws).

***Nori* Economics**

Nori Consumption

The manner in which *nori* is consumed is affected by the Japanese economy in a number of ways. First, it should be understood that though the oldest written documentation of the production of *nori* dates to 701 AD (cited in Ueda 1973), precisely who is able to get a hold of *nori* has varied by region and place. Japanese people residing in mountainous areas, just as we see with other seafood, were far less likely to consume *nori* than coastal residents. “It’s been said it wasn’t unusual to hear about Japanese who had never eaten *nori* before World War Two” (Zenkoku 1999: 23). “I rarely had *nori* until I married [and moved to Shichigahama]” Akiko Shimada (47) mentioned to me one day as we visited in her household’s *chanoma*. “Because we lived far from the sea, [my family] always had *onigiri* (rice balls) wrapped in *shiso* (beefsteak plant) leaves.” Following the War, as production increased and distribution networks improved, *nori* was usually consumed as a special food item reserved for picnics, festivals, New Year’s and other big, family events consumed in the form of *norimaki* (sushi rolls) (Zenkoku 1999).

Historically, *nori* has been a valuable food item and difficult to come by if one did not live in a coastal area. Prior to the late 17th and early 18th Centuries, all *nori* was gathered by hand from naturally growing stock (*iwanori*) After this time, *nori* was cultivated in Edo (Tokyo) and Hiroshima, but individuals elsewhere in Japan would have only been able to procure *nori* from the wild. This began to change in the late Tokugawa Period, though it would not be until the Post World War Two era that *nori* was readily available throughout Japan.

Prior to the late 1970s, the vast majority of *nori* produced was consumed by households (National 1998). Coastal residents able to obtain fresh *nori* (or *iwanori*) consumed it in the forms of *nori* salads and in soups in addition to more processed forms. Cultivators also make beer (*tsumami*) and other snacks from *nori* (field notes). The most common usage of processed *nori* is seen in the forms of sushi and *onigiri*. *Temakizushi*, sushi you make by hand at home,

especially, is a popular small-gathering, party food. With various ingredients such as egg, tuna, *umeboshi*, *nato*, and cucumber placed in serving dishes, individuals pick up a square of *nori*, spread rice on the square, add the food of choice, and finally dip in soy sauce and eat. *Onigiri* involves placing a food item of choice such as tuna or *umeboshi* (pickled plum) inside a ball of rice with *nori* wrapping the outside. *Onigiri* are the Japanese's answer to the sandwich--common at outdoor events such as picnics, field day events, and lunches.

Shun Ito, an employee of the Shichigahama FCA, and a native of Yugasakihama, mentioned in one interview that the use put to the *nori* is different today than the past, affecting the price. "In the past, 50% of *nori* went as gifts (*O-Seibo*, *Chuugen*); now 80% goes to large amount sellers (*ryouhanten*)" who form it into foods such as *onigiri*, that sell for a low price. Though less *nori* is being sold in the form of ritual gifts, attempts are being made to sell *nori* in this manner. In the 1999 fresh foods fair *nori* was in the "Best 5" of food items to be given out for the mid-year gift-giving season (*Nori Times* November 11, 1999) following such common items as tea, soy sauces, and cooking oil. In AGF's 2000 gift sales (a food corporation), *nori* tied for 8th place in Osaka (11.3% of sales) and was 9th overall (10.7) in the country though it did not make the cut in Tokyo (*Nori Times* November 8, 2000: 6). In sales overall (*jisaisei no aru shohin* Best 10) *nori* was 7th in Tokyo, 8th in Osaka, and 8th in the country overall (*Nori Times* November 8, 2000: 6). So *nori* is not as popular an item in the gift season as it once has been.

Since the 1970s, there have been three major 'booms' to change the previous pattern of the majority of the nation's *nori* being consumed in the home. These booms represent a fundamental shift in the market for *nori*, one from a status good to a cheap input. First, from the late 1970s, sushi shops and lunch box chain stores opened and grew tremendously (*Nori Times*, 11/8/00). From 1985, the OL boom began. "OL"s are office ladies: young women hired out of high school or junior college to make copies, run the phones, and serve tea in Japanese offices. According to the National *Nori* Growers Federation, (1998), as more and more women went to

work, boxed lunches became more common at work. The Japanese boxed lunch has been used to explain Japanese notions of *amae*³⁴ (see Benjamin 1997) and an example of the importance of externalities (Hendry 1993). Presentation and the way things look are especially important in Japanese culture. Lunches, for example, should never contain leftovers but should consist of foods made especially for the occasion. Central to OL fashion at this time was the lunchbox and the ubiquitous *onigiri* (National 1998). Rice, of course, is a staple in Japanese lunches, but *nori* is also often seen wrapping rice balls and sushi rolls. Convenience stores began to cater to the growing numbers of OL's and began selling *onigiri* at this time. Today, *nori* is ubiquitous in convenience stores and supermarkets in the form of *onigiri* (rice balls) and *norimaki* (sushi rolls).

The third boom for *nori* retailers has come about primarily as a result of Japan's poor economy. Throughout the 1980s, *nori* had been on the losing end of the public's gradual shift to designer brands as status symbols. Ritual gift giving taking place at the New Year (*O-Seibo*) and mid-year (*Chuugen*) periods, saw an increase in designer goods to the detriment of traditional gift items such as *nori* and tea. *Nori* was no longer as appreciated as a gift. Shun Shimada complained one day, "Today you give *nori* [for *O-seibo*] and the response is 'oh, *nori*, thanks.' But in the past it wasn't that way. People were really appreciative -- 'ooh, *nori*! THANK YOU.'" *Nori*'s decline in popular consumption has been aided by the Bursting of the Bubble, yet its perception as a fine food/gift has probably been irreparably harmed.

With the collapse of the Bubble in 1991, Japan's newest form of fast food, the revolving sushi bar, took off in popularity. As *nori* is an important raw ingredient for sushi, the increasing popularity of these revolving sushi shops in the 1990s was welcomed by the *nori* suppliers (Zenkoku 1998). Revolving sushi shops, rice balls in convenience stores, and lunch corners in grocery stores (featuring rice balls and sushi) are the cornerstone of *nori* sales in today's Japan. Though these 'three booms' have secured a place for *nori* in the Japanese modern diet of fast

³⁴ *Amae*, to quote Benjamin is "the feelings and behaviors appropriate between people who have a relationship

food on the go, it has also cemented the idea of *nori* as an inexpensive food item in the consciousness of the Japanese (*Japan Times* 2000). Some *noriyasan* complained convenience stores were the reason *nori* prices were so low: with a sticker price of ¥100 for rice balls, food packagers pay as little as possible. Others argued, however, that without convenience stores there would not be a market for most of the *nori* sold in Miyagi (since *nori* is no longer as favored as a gift item). Arguments from both sides have merit and it is assuredly a little bit of both.

In addition to the Japanese market, there is an international market for Japanese *nori*. The United States is the largest importer of all types of *nori*; this includes *yakinori*, flavored *nori*, and sushi *nori*. Other top importers include Taiwan, Hong Kong, Britain, Australia, and the Netherlands (*Nori Sokuhou* 2000.2.21 (#26)). The United States has been the undisputed number one importer of *nori* for years and its numbers continue to increase. As the revolving sushi boom in Europe expands, however, imports are also increasing in Great Britain and the EU. Consumption of *nori* elsewhere continues to expand as globalization of sushi and Japanese foods continues.

***Nori* Production**

Nori production in Japan is industrialized agriculture. As such, technology (see Chapter Five) plays a large role in the both the manner and the amount of *nori* produced. Production also needs comment in connection with economics. Production, after all, is what drives household incomes and supports this way of life.

As with most agricultural products, the value of *nori* depends upon the season and the amounts produced. The season runs from November through April in Northeastern Japan; January through March in southwestern Japan (seeding, of course begins earlier as Chapter Two describes). Given the seasonal nature of the product, *nori* is quite valuable in the beginning

of loving dependence based on an intense individual hierarchic bond between them” (1997: 107).

weeks. The Shichigahama *noriyasan* rely heavily on the income they receive from these early months. One *hitohaku* (measure of 100 sheets of *nori* bundled together) may fetch ¥1500 in November; the *noriyasan* may receive only ¥800-900 for the same quality later in the season; lower quality may fall as low as ¥300. For example, in February of 2001, a very good year for the Miyagi *noriyasan*, the average price for a sheet of Shichigahama *nori* was ¥13.12 (¥1310 for a *hitohaku*). By April 19, the average price had dropped to ¥8.49 per sheet (¥850 per *hitohaku*).

As *nori* production increases throughout the nation in January, prices begin to fall (since auctions are held every two weeks, any significant fall in prices would begin in February. There are production goals at the national and local levels in attempts to level out harvests and keep prices relatively flat. In general, the focus of Miyagi *noriyasan* is quantity over quality. There are, however, three general producer types in Shichigahama: quantity, quality, and worker.

Quantity Many of the Matsushima bay-side cultivators could be characterized as working towards quantity, rather than quality. Maintaining a large number of rafts, they harvest *nori* as often as possible. Rather than sparing days to ‘wash’ the nets. Many often go and do this in the afternoons, after the *nori* is going through the machinery. This *nori* may contain some vestiges of *aonori*, nets may be spotty (holes where *nori* may not grow), machinery may not be adjusted as often according to the state of the *nori*. These cultivators will maintain a large number of rafts (some, even more than 100).

Quality Nets are washed often, machinery is adjusted continually. Fewer rafts are built (some may have as few as 35-50). Many of these individuals also practice some other type of maritime harvest activity (fishing, diving). Awards from the annual *nori* judging often go to members of this group.

Worker There is one cooperative *nori* facility in Shichigahama. In the co-op there are 11 men who cultivate *nori* together. Each will work a schedule of every-other day. They work much like the quality-types in that they may wash the nets more often than some others.

They do not work with their wives; hourly workers are hired to wrap the *nori* in the afternoons. These men earn a set wage per month. Profits go towards purchasing new machinery. This group has also won a number of awards over the years (they've been in existence 13 years).

Some of the reasons as to why one *noriyasan* may be one type versus another include personality, history, location, and stage in the lifecourse. Many of the Yogai *noriyasan*, for example, may lean towards quality, and yet could not afford to go to the cultivation grounds as often as others in, for example, Matsugahama. This is the result of the distance they must travel to get to the growing grounds they rent; gasoline and oil is a significant chunk of their operating costs (see Table 6.1). It may not be efficient. Those who entered *nori* production later without the historical background of others also produce less as they fish and dive for other products in addition to cultivating *nori*. And some in the co-operative work group said they have joined because of the ill health of their wives -- or the refusal of their wives to participate (for the younger members).

Aside from differing work styles, these types have more in common than not, though the quality and worker types do have younger workers. One group does not seem especially better off, economically speaking, than any other, however, if you look at external economic indicators such as the house, cars owned, and consumer electronics owned.

As production has increased, has income increased? An increase in income is difficult to gauge. Some individuals say yes; others say no. Gross income has increased. Expenses are much higher, however. Numbers of household workers involved in the production of *nori* was much higher than the past. In that sense, per capita income has certainly increased. Almost all *noriyasan* do outside work in the off season, but that has also been the case historically and not a result of the times. Thus outside labor is not a useful indicator.

It is important to note that prices do not seem to be set solely on the idea of supply and demand. *Nori* packagers and product producers appear to have a top price. Though I only

attended three auctions in the 2000-2001 season, I quickly noticed the same numbers flash across the screen. ¥980; ¥1040; ¥1180; ¥1360. There seemed to be a set price. One packager explained, for example, that *onigiri* are set at ¥100 (though I noticed some were ¥110 and 120 in spring of 2002). Given the price of the rice and other ingredients, packagers can not afford to pay more than ¥9 per sheet, putting the *nori* price at ¥4.5 yen per *onigiri* produced. Given the Ariake Kai disaster of 2001, prices were going higher than this typical price. Consequently, discussions centered on the difficult time middlemen would be having. Anyone spoken to who had any knowledge of the *nori* industry appeared to believe that the *nori* producers would not be the only ones to suffer from the poor season. Middlemen, packagers, and machinery makers would also suffer (at the national level) as well as the neighborhood stores which serve the employees of these companies.

Imports and the Ariake Kai Disaster

Nori is not subsidized in the same manner as Japanese rice. There are import restrictions in place, however, to protect the industry. From 1972 until 1997, the Japanese government had a quota of 250 million sheets of South Korean *nori*. In 1997, the imports were limited to 120 million sheets (*Japan Times* 2001). Following the Ariake Kai disaster in the Winter of 2001, the South Korean government urged Japan to revert to the pre-1997 import levels. The government declined, however, increasing imports by only 30 million sheets (to 150 million sheets). Given that the Japanese domestic output is estimated to be around 10 billion sheets, the South Korean numbers represent a very small percentage of the *nori* consumed in Japan. Even so, some Japanese *noriyasan* continue to be concerned about the possibility of rising imports from Korean, and maybe even eventually China. Korean *nori* has actually become somewhat popular among young people as Korean *nori* is flavored and salted while Japanese *nori* is not. “Korean” rice balls (beef with Korean salted *nori*) were a recent addition to convenience store shelves by the end of the fieldwork period in 2001. The Korean industry is set up differently than Japan,

however, with harvestors selling *nori* to the processors, rather than households performing each step themselves. Their standard sheet size is larger, however, and quality levels range widely. Consequently, other *noriyasan* do not fear increases in imports from Korea in the near future.

Household Economics

Risk

The FCA members in this study are faced with risk in a number of arenas. Risk is all about trying to make the best decision given that the future is unknown. “One of the most distinctive facts about most everyday economic behavior is *aversion to risk*. Most people design their lives so that bad outcomes and surprises, which are usually caused by faulty information, are minimized” (Plattner 1989: 8). Since risk is viewed as the relative deviation from the average, the best decisions are those which minimize the expected deviations. The best way to do this is by diversifying. In so doing, one removes the idiosyncratic risk associated with any one segment of the market. Though almost 50% of the *noriyasan* in Shichigahama specialize exclusively in *nori* production (as a maritime occupation), most engage in other economic activities to generate income and reduce risk.

Harvesting of any natural resources is risky and the procurement of maritime resources, whether flora or fauna, is especially so. Some of the risks faced by FCA members include income (expenses versus harvest income), harvests (crop harvest amounts and prices), environment (weather, water temperatures, currents, and external inputs such as nutrient load), and resource depletion.

a) Coping mechanisms

One never knows from month to month, much less year to year, what one’s income will be given that the factors which affect price (environment and production) are primarily out of one’s control. For example, as stated above, Miyagi’s 2000-2001 harvest grossed just over \$80 million, up from \$44 million in 1999-2000. Shichigahama cultivators grossed \$20 million in

2000-01 when the previous year they grossed only \$13 million. These numbers show a significant difference in income so it should be easy to see why this occupation is viewed as one where *anshin dekinai*, where one can not be secure about one's income. The environment plays an important role in the quality of *nori* produced, ultimately deciding prices. For example, warm weather may increase disease; a change in currents may bring small shrimp to the area which then get caught up with the *nori*, increased rainfall (or snowmelt) may decrease salinity levels negatively affecting *nori* growth and appearance.

b) Outside Employment as a Coping Mechanism

Economists would be interested in the type of risks people face and the coping mechanisms they develop to limit these risks. Outside employment is an example of a coping mechanism FCA members could utilize to limit the risks associated with their inability to guarantee a fixed income. Maritime-related alternative employment includes fishing (Yogasakihama and Pacific side communities); harvesting other seaweeds (Toguhama); diving for shellfish (Yogasakihama and Pacific side communities) and other creatures such as sea urchin (Hanabuchihama/Mastugahama); and off-shore trawling and gill-netting. The benefit of non-*nori* FCA-related work is that you can choose to harvest other species whose seasons do not overlap; shellfish and urchin, are products which can be harvested after the *nori* season is completed. Non-maritime related employment opportunities are slightly more limited for seasonal work. Some common work choices for the summer months include factory work in the food, steel, and oil industries, deep sea fishing, working in construction, farming, working in *nori* equipment repair, and operating food stalls at the tourist beach. Taking part in such alternative employment helps *noriyasan* cope with almost 7 months without income. In the past, household members may have also traveled seasonally to gain employment elsewhere (*dekasegi*), though this does not occur today.

Prior to the commencement of research, the possibility of children working outside the home and contributing to household incomes was hypothesized. Fieldwork, however, did not support this hypothesis. Only in households where the household head was incapacitated did a child's salary appear to go towards the household's income such as Kentaro Oshimo in Toguhama. Kentaro works *nori* with his mother (his father is bedridden) and in the daytime leaves to work in the Shichigahama schools. Though in his 30s, he supports a family of six (parents, wife, and one child). When asked about the possibility of grown children helping with household expenses, many informants laughed or quickly shook their head. Grown children who remained single and in their natal household, did not contribute economically to the household. These children used their salaries for material items such as electronics and clothing, but they did not pay for utilities or food. In some cases, the parents even continued to support formerly independent children with families such as Shitematsu Takahashi of Yogasakihama. Mr. Takahashi supported a family of 5 in the beginning of the fieldwork period, but by the second season, his family had grown to 9 members (great-grandparents (90s), househead and wife (60s), unmarried daughter, plus widowed daughter (30s) and three grandchildren (8, 5 and 1). This family was obviously unusual. Single men such as Kenji Suzuka (35) and Osamu Wagatsuma (32) who worked in offices, but remained at home, were not unusual. Their parents continued to work as the primary providers, paying household expenses and saving money for retirement and children's weddings.

c) Fishing Cooperatives as Coping Mechanisms

In the case of Fishing Cooperative Associations, the FCA itself is a coping mechanism. FCAs help members cope with both income and harvest risks. Though FCA members do not control prices on harvests and expenses, membership in the FCA provides the best possibility for low expenses (through bulk purchase of equipment) and high prices. This comes about primarily through the combining of *nori* of the same quality level for bulk sale—thus increasing the overall

price since middlemen will not buy a good grade of *nori* if there is not enough at the same grade for their purposes. An FCA is also a coping mechanism through its banking (credit union) system whereby low-interest purchase and disaster loans are provided for its membership.

The eleven members of the cooperative work group have an additional coping mechanism—that of working together. This cooperative has reduced its risk through decreasing its overhead. These FCA members have far fewer machines than they would own had they stayed eleven separate households. Further, income is still forthcoming in case of temporary illness.

Household Incomes

When I first conducted research in Shichigahama in 1991, the difficulties associated with high expenditures and low unit prices were often cited as reasons for the successor problem in the community of Yogai. These same problems were mentioned again in 1999-2001. Taro Suzuka told me that sons wanted to be salaried workers. Life as a white-collar worker was warmer, economically more stable³⁵, and also, incidentally, provided the lifestyle that brides desired. Change to white-collar work, however, may also “bring lifestyle changes that may be significant. As Krannich et. al. (1994:152) suggest, “In some cases ... alternative economic activities may be incongruent with the social meanings associated with resource use and the lifeways of some cultural groups.” A purely economic analysis overlooks some impacts on certain occupational groups and individuals less able to adapt as their circumstances change (Carroll and Lee 1990; Harris, et al. 2000).

White-collar work usually does not in most situations provide a larger income than that provided through FCA membership (fishing, aquaculture, and mariculture). Just as simple economics does not explain why some FCA members remain, so does it not explain why some

³⁵ Though white collar work has long been held to be ‘economically stable,’ such work is much less stable in the early 2000s than ever before. “Restructuring” of businesses has caused many Japanese to be out of work when a generation ago they would have had a job “for life.”

leave because, if FCA membership provides one with a larger income, why then is the population shrinking?

A fishing and cultivating life is an economically unstable and insecure life. You never know what your income will be from year-to-year. Equipment is purchased in advance of each new season, when one never knows what will come. Both Vogel and Kalland discuss the lure of white-collar work, especially for brides:

“The young Japanese girl hopes to marry a salary man even if his salary were low because his life is steady, he has leisure time, and she can be free of the anxieties and work connected with independent business. Independent shopkeepers, craftsmen and farmers complain that they cannot compete with salary men in attracting desirable brides” (Vogel 1963: 9-10).

Though Vogel wrote about the new middle class in the 1960s, the complaints of enterprise householders continue today: In Shichigahama, just as Kalland described Shingu in 1980: “The situation for Shingu fishermen is severe indeed” (Kalland 1980: 164). In Shichigahama, “*Noriyasan* daughters don’t enter *noriyasan* households” as Toguhama’s Hamabata informed me one day as we were discussing succession problems among FCA households, “because they know [how much work it is].” This is a slight exaggeration as I knew of a handful of *noriyasan* daughters now cultivating (though some thought they were marrying a ‘salaryman’), but it showed a general truth, especially among the current young generation. Most wives interviewed in Shichigahama came from other enterprise households such as farming, shopkeeping, and carpentry, though a few even came from the homes of white-collar workers.

Kalland questions the amount of leisure time actually available to salaried workers, though he agrees with much of the rationale provided by Vogel as “the life offered to a wife of a salary man is secure” (Kalland 1980: 164) and consequently more desirable. The benefits of becoming a salaried employee include being

“employed for life (i.e. till they reach 55-60 years old), and on retirement they receive a lump sum. The salary is climbing steadily, and if the company is of a certain size many allowances are given: free medical care for the family, free holidays, health insurance, kindergarten and so forth, It furthermore carries prestige to be employed in a big and well known firm. To be married to a fisherman does not carry any prestige, nor does it bring social security. The work is dangerous and demanding. It requires good health, illness is disastrous, and the income is unstable which makes housekeeping difficult.” (Kalland 1980: 165)

Thus, in Shingu in the 1970s, marriages were taking place later and later with the fishermen taking the “left-overs.” Kalland is quick to point out that this doesn’t mean the brides are inferior in any way, they have just, for one reason or another, not married at a younger age. Though successors were few in Shichigahama and it is difficult to talk about numbers with any real meaning, those I interviewed in their late 30s and early forties had indeed married later (one had his first and only child born when he was nearly 40), and those in their early 30s had yet to marry. One mechanic was (jokingly) saddened to hear I was married, but asked about any sisters who might be available for a young *noriyasan* who had just turned thirty. The age of marriage for men and women has been increasing in Japan for a number of years. Late marriages makes life more difficult for FCA members who need the work of their spouses before the parents are too old or ill to help out in the critical first few years when children need constant supervision.

The difficulty of FCA members finding wives is found throughout Japan, not just Shichigahama today or Shingu of the 1970s. One evening a friend in Tochigi Prefecture called me up to say he thought of me while watching one particular television program. Apparently he was watching a show which highlights the plight of rural, unmarried young men and brings in girls for ‘dates’ who are willing to marry. The program shows them meeting and then follows a few as they go out on dates, takes them home to meet the parents, etc. On this particular evening, the show featured tuna fishers from Kessenuma (Japan’s largest fresh, not frozen, tuna port) who earned on average over \$400,000 (¥ 500,000,000) a year, yet they could not find wives. My friend, a struggling potter, could not believe the fishers earned such a high income, yet could not find anyone willing to marry them.

What do Shichigahama wives have to say about a fishing and cultivating way of life? Is life really so difficult? Several said, “I didn’t understand. It was an arranged marriage.” When I asked if didn’t the go-betweens explain the *nori* life? The response was, “they just said ‘oh she’ll just do a little of this, a little of that. She’ll be in the house most of the time.’ ” Susumu Shimada’s widow, Yoshiko, said this with much bitterness (see Chapter Three). Yoshiko found herself in the midst of changing times. When she married in the 1970s, most husbands cultivated with their fathers close to home in the Matsushima Bay (and before that in the Yogai and Shiogama Bays and in the Teizan moat). The transition to rafts on the deeper ocean also tended to coincide by chance with the retirement of the elder household males. Thus, brides suddenly found themselves needing to join their husbands on the boats, an occurrence which had not happened previously. If sons quit school at the end of junior high, as they did in the past, then they could join their fathers just as the grandfathers retired or died. Higher education, however, has necessitated mothers taking the place of sons and grandfathers. Thus, for most wives, though they were not expected to ride the boats when they married, the new way of doing *nori* soon meant they were compelled to join their husbands.

Even though wives working on the sea was not foreseeable at the time of many marriages, most women seem happy enough with their life. “When I married in, my husband went out on the boats with my father-in-law. When he (father-in-law) became ill, I first began on the boats. ... [riding] the boat was difficult in the beginning [with seasickness] but now I’m used to it.” She then continued, “I’m proud to be a *noriyasan*. Before I didn’t know what it meant, what work they did. But now I enjoy watching [the *nori*] grow and feel proud.” One wife even took the exam to drive the boat when her husband’s eyesight failed.

In most enterprise households in Japan, in addition to working in the enterprise, women must also run the household, including finances. Tax time was a busy time of year and more than one wife complained to me of the work involved. Of course, they keep good track of

receipts and the FCA provides organized documentation on what's been bought and sold (at least, what's been officially sold through the FCA) which makes their job easier. Details on incomes were difficult to come by, as one would imagine. FCA members were fairly competitive and secretive of the exact numbers of rafts and the amount of their income. Though I can not say that underreporting one's income to the tax man is a universal trait of mankind, we know citizens of the United States do so and citizens of Shichigahama certainly inferred that this is also the case among the self-employed. Given their secrecy on incomes, I never asked for exact income data. Generalities should be enough for a discussion on incomes levels. Certainly, I found that though no one would divulge their own exact income, most were willing to discuss incomes generally. I found that estimations of income, such as the minimum amount needed to stay in the black, were consistent across the board. Thus, I feel the numbers are useful and pretty accurate.

Incomes, of course, vary from household to household, just as needs vary. Some households have three workers, newer machinery, or relatively young spouses. Some have children in school and have tuition and future weddings they will have to outlay. Others consist of only one elderly couple. Incomes thus varies. Everyone agreed, however, that “without at least ¥10,000,000, it's not good.” (“*sen man en nai to mazui*”). This \$85,000 was needed to stay out of the red, not earn a living, thus I was not surprised to hear some people say you needed ¥20,000,000 or ¥25,000,000 (\$170,000 or \$212,500), an amount more in tune with living and paying social obligations. The “¥10,000,000” was a safe, base line that everyone could say without giving away their own income.

A minimum amount of income must be met because expenses and debt runs very high. The summer maintenance of the baking machine alone can run as much as ¥1,000,000 (or \$8,500). Eiko Katori told me she agreed with number I was hearing elsewhere and informed me

“[t]he maintenance [fee] is the hardest. That and the rental fees [for borrowed cultivating grounds].”

Eiko Katori and her husband gave me a breakdown of their expenses the day before taxes were due. They were both in agreement that a family needs at least ¥20-25,000,000 to live, “with the amount depending of course upon the family.” Those with high school and college age children needed a lot more for the commute, uniforms, etc. Plus, “when those children get married ... [more money would be needed].”

During my fieldwork, most families seemed to average about what the Katori household said was needed. Namba in Yoshidahama was reputed to have earned the greatest amount in 1995-96 at just over ¥30,000,000. In the following three years, incomes as well as expenses rose. The Namba son admitted his family had made more than ¥30,000,000 in 1999-2000 and expected to make more than ¥40,000,000 (>\$333,000) in 2000-01. As mentioned elsewhere, the Toghama *noriyasans* were coming off of a difficult season (1998-99) when I arrived

Table 6.1: Approximate Household Yearly Expenses

Table 6.1: Approximate Yearly Expenses (from E.K, 2/2000)	
Seeded oyster shells	35¥ per shell/15,000 shells
Nets	3,500¥/net, 100 nets/year
Anchors	10,000¥/anchor, 20/year
Maintenance	50-100 Man/year
Gas/oil	annual amount
Herbicide	6,900¥/box, 70-80 boxes
Plastic trays (suu)	7600 ¹ @93 each (every 2
years)	71 Man
Ropes	6000¥/rope, 10 per year
Bamboo	200 Lg, bundles ¹ at 350¥ each
Take-out-dirt machine	one new machine/year
Miscellaneous	boxes, gloves, etc.
FCA use fee	
Fishing Ground rentals	varies with family (S.T.#s)
Total	¥8,472,500
<u>[US \$70,604.16 @ 120¥ = US\$1]</u>	

into the field. “We have enough to eat, but social obligations will be a problem.” Which means that their income for the year was closer to ¥10,000,000 than ¥20,000,000.

The 2000-01 season was a different matter altogether. Though I left the field just as the rafts were pulled from the water and only have statistics for the growing season (rather than direct quotes), the year was a good one for almost everyone in town. Suzuka Torau commented to me one day “since you get around the town [you know], everyone’s glad [at the Kyushu crop failure], aren’t they (“*mawari iku kara minna yoronkonda deshō*”)? When I said some insisted they couldn’t be happy at the expense of others, he said their “true feelings’ was they were happy.

The Shichigahama FCA posted gross earnings of the *nori* harvest at \$20,500,000 for the 2000-01 growing season. With 107 cultivators working this season, incomes average

approximately \$192,000.³⁶ Sendai is listed as earning \$3,395,206 in the 2000-2001 growing season for only 9 cultivating members, putting their average income at \$377, 245. However, Sendai incomes are really lower and Shichigahama incomes are higher. These are general numbers, however, to give us an idea of the income of households. For Miyagi Prefecture as a whole, 2000-2001 saw a gross harvest of just over \$80 million which averages out to \$233,918 for each of the 342 (1997 population) cultivating households in Miyagi Prefecture.

Given such a profitable season, I asked one of the mechanics if people would be buying machinery now. He said they would, they'd "buy while [they] have the money." He also mentioned that some would quit, however. The bumper crop meant some would get out now. He also said there were new health regulations that required the purchase of an expensive machine by 2004. Some would quit rather than buy it; others would quit because of their age and the required 7-year loan; some would quit because they don't have room for the machine in their workshop. Some, of course, would hope for another successful season. Thus, even when the income is high, cultivators are not guaranteed to remain in the profession; just as when incomes are low, it is not guaranteed they will quit. Though the lucky constellation of factors which gave Miyagi *nori* such a fine 2000-2001 season are not likely to occur again in the near future (Kyushu failure plus good *nori*), most *noriyasan* feel that Kyushu's *nori* would be poor again in 2001-2002 given the environmental conditions³⁷.

Coping Mechanisms for Environmental Risks

As explained above, the uncertainty of the environment on natural resource extraction is pronounced. The weather varies continuously, some months are dry, others wet; some years are warm, others cold. Changes in weather, currents, ocean temperatures, and water nutrient loads all affect the growing of *nori*. Red tides will kill it; severe storms may break them apart. So how

³⁶ This statistic is misleading, however, as Shichigahama cultivators also market some *nori* through the FCA in charge of each growing ground where they borrow/rent space. Thus Shichigahama cultivators have income from sales via other FCAs not listed with the Shichigahama FCA lists.

to *noriyasan* cope with these events that are so obviously out of their control? The biggest help is education. *Noriyasan* read weekly monitoring and weather reports given out by the Maritime Safety Agency and the Fisheries Centers. These publications give tide information, water temperatures and describe *nori* conditions (good, poor, name of illness, shrimp, etc) at designated locations. They also provide educational seminars for *noriyasan* on environmental conditions. Thus, though man can not control the weather, the *noriyasan* can educate themselves about the conditions and act according to experience. For example, if the water temperature falls to a certain degree, then they know water inversion will soon take place and their nets will have to be pulled. They cope with the weather by adjusting their actions to certain conditions.

Coping with Resource Depletion

The Shichigahama *noriyasan* are in a unique situation in that they are cultivating *nori*, rather than gathering wild plants. This does not mean they do not have to worry about resource depletion, however. In the Shichigahama case, the limited resource is suitable cultivation space. As Chapter Three relates, the pollution and eutrophication of the Matsushima Bay has had a severe impact upon the lives of the Shichigahama cultivators. Each fishing community (or hamlet) has historically had its own fishing territories which none other than its members may access. For members whose fishing grounds are under increased threat from eutrophication and pollution, their coping mechanism has been the exchange of fishing territories with outsiders. Maintaining and fostering social ties with others, such as *doukyuusei*, friends, work acquaintances, and relatives provides FCA members with the connections they need to gain access to additional territories. The larger the network, the more possibilities they have, guarding against the unexpected refusal or illness of a partner. Potential deaths, illnesses, retirements, and refusals all give rise to the possibility that a new partner may need to be found in the future.

³⁷ Indeed, the *nori* crop was poor the following season (*Japan Times* 2001).

Gender Issues and Labor Allocation

Gender issues and labor allocation, mentioned earlier in this chapter, deserve some further elaboration at this point in time (a detailed section can also be found in Chapter Eight). Traditionally, women in Miyagi stayed on shore to process *nori*. This is in contrast to historical woodblock prints showing courtesans in boats. Women and girls did harvest *nori* from shore (*iwanori*), but did not go out on the boats. Women's primary roles included processing, counting, and stacking *nori*.

As the education of sons expanded beyond junior high school, however, households began to find themselves without an important helper. This resulted in the changing role of women. As grandfathers, working with the household head, began to die or retire, someone was needed to take their place. With sons working white collar jobs after high school (sometimes college), the onus fell to the wives. Though women may have been in a relatively weak position during this transition, today they are somewhat empowered: some women successfully argue for labor-saving machinery; others quit when they are not physically up to the job; some even convince the husband to change to another occupation when they feel they can not bear with the economic insecurity.

Summary

Economists believe, in general, that people are risk averse. Yet *nori* cultivation is a risky, specialized occupation. Consequently, there must be some situational or demographic differences which give the *noriyasan* incentive to behave differently. Demographics and history have a large part to play. As explained in earlier chapters, *nori* was a lucrative crop needing little outlay in the early years. Additionally, around the time the cultivation population peaked, few men went on to high school, much less college. Consequently, outside employment opportunities were limited.

Evaluating the Japanese economy in formalist terms and applying the economic concepts of consumption, production, household income, risk, and coping mechanisms employed by the *noriyasan* has explained some of the aspects of this way of life, there is not enough evidence to support why these final 13.5% have remained. More than for simple economic reasons, I will argue, in Chapter Eight that *noriyasan* have a preference for this way of life, for the autonomy and quality of life it provides.

Economists would not like an argument proposing *noriyasan* have a preference for risk and I am not attempting to say that they do. Some *noriyasan* enjoy the possibility of a “big” payoff certainly, but they do not necessarily have a preference for a risky way of life. The quality of life that *nori* cultivation provides is the incentive these *noriyasan* need to behave differently than the 86.5% of the Shichigahama cultivating households who quit or retired rather than continue.

Prior to discussion on autonomy, however, analysis on the social ties and exchanges heretofore alluded to, but not discussed in great detail, must be presented.

Chapter Seven

Social Networks and Social Ties

My partner in Matsugahama is Yanagi. We have exchanged with him since the 1960s At that time my brother was cultivating and he went over as a shidouin, a teacher. He taught FCA members how to do nori as they didn't know how to do it, they started later. He met this family through my machinery business. When he died, I took over. Today, I work with the son as the Yanagi's father has retired. Taro Suzuka, Yogai

We exchange with my mother's relatives in Gamo (Sendai). She came from there and my father shipped goods between there and Shiogama in the off-season. ... We have always exchanged there. Don't go anywhere else. ... We have all that we can handle in Sendai. Fumie Ehime, Yogai

I was sitting next to him at Pachinko parlor [a kind of gambling]. I just asked if he had any extra space and he said he'd let me know at the beginning of the next season. Well, he called and that's how I began cultivating over there. ... all gyomin [fishfolk] recognize one another even if you don't know them. Yoshi Aizawa, Yogasaki³⁸

Social networks remain central to the continuation of *nori* cultivation in Shichigahama. It is not an exaggeration to say that the majority of cultivators could not harvest *nori* today in Shichigahama without these social ties. FCA members living on the Pacific Coast of Shichigahama need the Matsushima Bay to seed their *nori*; those residing on the Matsushima Bay coast need Pacific Ocean waters to grow *nori*. Though exchanging access to one another's fishing grounds has become necessary given the pollution found in the Matsushima Bay, exchanges actually began prior to the complete *nori* crop failure of 1978³⁹.

Matsushima Bay-side cultivators were tapped in the 1960s by FCA members on the Pacific Coast in Shichigahama, Sendai, and Yuriage to serve as teachers (guides/instructors) to those FCA members who hoped to begin *nori* cultivation. *Nori* at this point was still considered 'black diamonds' and was profitable, if hard, work. Around the same time, these teachers began to ask their "students" for some cultivation space in the ocean; the Matsushima Bay was quite

³⁸ These quotes are a composite of direct quotes written in my fieldnotes as well as paraphrasing of what was said. Given the nature of the work, interviews were rarely recorded.

³⁹ Though it is difficult to reconstruct events that took place more than two decades previously, most noriyasan seemed to agree that the crop failure took place around this time.

crowded with more than 500 (Shichigahama) cultivating families dividing the fishing grounds into small spaces. Others followed. Since FCA membership was still ranked at this time, many families on the lower tiers could not produce enough to support themselves. The initial exchanges arose then from a desire of individual FCA member households to be able to produce more *nori*. Following the Matsushima Bay *nori* crop failure in 1978, these social networks became indispensable.

“Networks are a convenient matrix for studying individual action; they appear as a useful *technique* or analytical instrument ...” (Narotzky 1997:76). Narotzky tells us that “[t]he concept of ‘network’ in anthropology stems from Barnes (1990[1954] article on social class in a Norwegian parish and from Elizabeth Bott’s *Family and Social Networks* (1975)[italics original]. Especially in Economic Anthropology where the circulation of goods and labor is of interest, following networks can be useful (Narotzky 1997).

In Shichigahama where every FCA member who cultivates *nori* must exchange with others, understanding the networks is paramount to understanding the local situation. The need for these networks played an important role in the decline of the number of cultivators. As quotes earlier in this study have shown, secrecy and fear played a role in the middle years (mid-1970s to mid-1980s) of exchanges. One never knew whether they would still have a space the following season. Someone might *think* everything was set, and then get a dreaded phone call stating that, “I didn’t get as much space allocated to me as I expected ... so I don’t have any to provide you this year.” An apparently common practice was for a third party to offer slightly more money. To prevent this sort of disaster from happening, partners and rental amounts were kept secret to as large an extent as possible. For those without connections (*kone ga nai hito*), or who had difficulties year-after-year finding partners, quitting was a common result.

Exchange relationships are made up of trust, indebtedness, and obligation. They are maintained through socializing by networks members, reciprocity, as well as faith that one's partner will continue to think of more than himself .

Trust is a significant aspect of the exchange of fishing territories in Shichigahama; these exchanges are performed with trust (*shinrai kankei*) relationships. Yasuo Wagatsuma insists you must trust there will be equity in space allocation. In the same manner the partner must trust there will be equity when the seeded nets are dispersed. Furthermore, “when one person allows a new person to enter his fishing grounds then that could cost someone else space ... this is not as much of a problem as before when there were more people cultivating.” Mr. Wagatsuma's Matsugahama fishing ground space came from a *noriyasen* who sat next to him at Pachinko. He asked about the possibility of any space. His Pachinko neighbor said if they “have any openings in the fall ...[I'll call]” ... and he did.

Whom people access for exchanges varies from person to person. Some, especially in the early years, asked relatives or friends of relatives. Some contact friends, classmates, business acquaintances, FCA members known of, but never met in person (*kaomishiri* or *tannin*), mechanics, drinking buddies, and the like.

Table 7.1: Types of Exchange Partners

<u>Friendship</u>	<u>Business acquaintances</u>	<u>Kinship</u>	<u>Other</u>
Friends	FCA contact	Maternal relation	<i>kaomishiri</i>
Same-age mates	Mechanic	Fraternal relation	<i>tannin</i>
Friends' relations	Oil/petrol co.	Paternal relation	Friend's friend

The type of relationship being utilized affects the manner and terms of the agreement (refer to Appendix B for a brief summary). For an example, Toguhama's Hamabata Choichi and his partners will be described. Mr. Hamabata cultivates *nori* in four areas: Sendai, Shobutahama, Matsugahama, and Hanabuchihama. The Sendai tie was a *kaomishiri*, an acquaintance known

only to him by face. Hamabata “knew of him, of course, *gyomin* [fishfolk] all know of one another because [we’re] in the same work” but the introductions first took place through a mutual friend in Sendai. Since Sendai doesn’t have seeding grounds, he seeds the nets for his Sendai partner and no money changes hands, though he does have to pay the insurance on the raft. He doesn’t want to pay it, as it’s in the other persons name (since the other person is the right holder), but the Sendai person insists. He if didn’t pay the insurance, the Sendai partner might not give him space next year so ... so he pays the insurance. The Matsughama partner is a real friend; Mr. Hamabata even went directly to ask for an exchange. He seeds the nets in exchange for cultivating space and no money changes hands. The Shobutahama partner is also a friend so the same conditions as Matsugahama. There are also situations where an exchange is not needed but space or services are nevertheless requested/required. Mr. Hamabata rents out seeding space to someone from Hanabuchiama for ¥1800 per net (US\$15). He also seeds nets for two men from Obuchiama (on the Oshika Peninsula) since they don’t have any seeding grounds.

Though the conditions of the agreement varies with each exchange depending upon needs and personalities of the partners, there are some generalities. Seeded nets are, in general, exchanged with cultivating space at a rate two to two and a half times the number of cultivating rafts (see Appendix B). For 6-net rafts⁴⁰, 12-15 nets would be seeded for every raft space needed. If you rent space for 20 rafts, then 240-300 nets need to be seeded. Most cultivators have at least 100 rafts and seed at least 1200 nets each year. The extra nets cover the change in seasons (nets are replaced in the winter after the water inversion takes place) as well as insurance for damage such as from storms.

A number of cultivators (especially in Yogai and Toguhamma) rent out *nori* cultivation space in Yuriage. The Yuriage FCA, however, is in charge of this system as all cultivators have

quit or retired. Consequently, rentals are fixed at ¥8000 per raft. Rental fees in other grounds range from ¥2500 to ¥8000, though most are between ¥2500 and ¥6000. Yuriage's rate of ¥8000 compares with ¥2500 for another cultivator who exchanges with a friend. Though the results from this section from the survey were difficult to analyze (no single individual answered the survey section completely), generalities can be drawn from the survey as well as interviews. In general, friendship-based exchanges had lower fees. Among many exchanges, work was provided rather than money. In all of the cases where rates were ¥6000 or greater, a kinship relationship was involved rather than friendship, excepting the Yuriage instance which is a special case (set by the FCA not individuals).

Socializing as a way to strengthen these ties also varies with each individual. For some exchanges, the partners will meet and drink at the beginning of the season. In Yogai, the Sengoku household invites their Sendai partner, who is "like a brother" to the househead, for drinks prior to beginning seeding the nets. In Toguhama, an Obuchihama pair (two men and their sons) came at the end of the day (two o'clock) during seeding on land and brought with them two cases of beer. They talked about their sons (home from college on spring break), the upcoming season, the resident researcher, and the politics of *nori* cultivation in Miyagi Prefecture. Talking amongst themselves, drinking beer, eating the food provided by the wives, in this manner they cemented their relationship with Mr. Hamabata (whose introduction was provided through membership in a *nori* research fellowship society). Many families visit together at a hot spring with all of their partners following the end of the season (May), a practice which also often involves the *kumi*. In much the manner described by Kondo (1990), group excursions such as to a hot spring helps strengthen the relationship among members.

Visiting also takes place during the year. On numerous occasions I would walk into a workshop and find cultivators visiting from elsewhere. Some of these visits were by friends, of

⁴⁰ Sendai, Yuriage, Hanabuchihama, and Shobutahama use 6-net rafts. Yogasakihama and Yoshidahama use 4-

course, and some were with exchange partners who also happened to be friends. The socializing taking place tended to mirror the relationship: the more distant the relationship, the more formal the interaction; the closer the relationship, the more informal. Thus, friends tended to visit in the workshop during the growing season while exchange partners more often in the home in the off-season. As you would expect in Japanese society, many of the friends are *doukyuusei*, same-age mates. *Doukyuusei* are the same grade in school and by virtue of being the same age and going through school together, often have a close relationship. Of course, sometimes even exchange partners with a close relationship could not visit often given their physical distance such as those living in Sendai and Yuriage. In these instances, summer visits take the place of socializing in the workshops during the winter season (though geographical distance also plays a role in this activity).

I initially hypothesized that kinship ties would be very important for exchanges to take place. It appears that this was true in the beginning, though kinship was never the sole criterion. For example, Yogai's very first *noriyasan* to work as a teacher with the Sendai FCA was asked to do so by a man whom he knew as a soldier in World War II-- they served, and survived, together. Nevertheless, kinship ties were certainly more numerous in the early years. The Ebiko family still cultivates in Sendai with the initial introduction to the FCA being given by a maternal relative (it is interesting to note that though the husband is a *mukouyoshi* (in-marrying son-in-law), he comes from a farming family and consequently has no family connections in other fishing communities). As you would expect in a society where daughters marry out of the home and often the community, as well, it was the maternal relatives as residents in other communities who were usually in a position to offer assistance. There were some instances of fraternal and paternal aid, however, a possibility given Japan's kinship system whereby non-inheiriting sons

net rafts.

must also leave the household. Those who left the community rather than stay and become branch households were sometimes in a position to help.

Today, however, as borne out by survey results, kinship plays a minor role in exchanges. There are a number of reasons for most *noriyasan* to name friends and acquaintances as exchange partners currently. First, given limited traveling and experience outside their local community four decades ago (few even attended high school in Shichigahama), most did not have close relationships with people outside of their community of birth or Shichigahama. Sutomatsu's father (mentioned earlier) had contact with the Sendai FCA only thanks to his travels in World War II. Thus, in most instances, family members were accessed initially.

I found through the survey and interviews, however, that exchanges with relatives were often not very generous to the Matsushima Bay-side cultivator. Rents tended to be higher, the workload heavier, and the returns fewer. Additionally, the decade of the 1970s was difficult for cultivators. Competition for space was fierce and FCA members were very secretive about their exchange partners.

“That was a very difficult time. Unlike today, people didn’t work to help one another out. ... You never knew if you would find yourself without space in the next season. There was a lot of uneasiness (*fuan*). A-san might rent to C-san for 10,000¥ but then B-san might come along and offer 11,000¥. So when the next season came along, when you call C-san he tells you he doesn’t have enough space this year. That sort of thing happened a lot. It really was difficult.” Taro Suzuka.

Consequently, it should come as no surprise that cultivators would move towards exchanges which would better serve their interests. That is, exchanges based upon friendship (generalized reciprocity) rather than kinship (obligation).

Matsushima Bay-side cultivators, as the ones with shallow areas (where newer technology can not be used), right holders to polluted territories, and members of high population-density FCAs (almost 500 families in 1972 versus 44 today) found themselves in a weak position when it came to setting the parameters of the exchanges. Especially at the time of the *datsuraku mondai*, (*nori* crop failure, circa 1978) families were vying for space, as the above quote relates. With the disaster, the cultivating population fell dramatically. Yogasakihama lost 31% of its population in one year alone (1981). Today, even with a change in atmosphere where cultivators can ‘help one another out,’ some secrecy and asymmetrical power relationships remain. Cultivators remain reluctant to talk about with whom they exchange as well as the numbers/monetary amounts of exchanges.

With a great deal of general information, and a few explicit descriptions, I found the current terms of exchange tend to be more favorable towards the bayside cultivators when they exchange with friends rather than relatives. Exchanges with family members seemed to take place out of obligation to the (often natal) household. In a number of situations, strangers (third parties) were named. Though most of the surveys were completed anonymously, from interviews, I believe in most of these cases, a friend or acquaintance was used as the go-between.

The use of go-betweens in Japanese society is very important. “The Japanese lay great stress on smooth relations among members of a community. Every effort is made to avoid open hostility and face-to-face actions which might lead to argument and the consequent

embarrassment of one or other party” (Embree 1945: 223). Thus, when rents, amount of space available for use, etc. are involved, it is often best to use a go-between. Unless one feels one has a close enough relationship, in which case contact may be made directly such as when Choichi Hamabata described his relationships, “... Matsugahama? [that’s] a friend so I went directly.” Mr. Hoshi’s situation, however, seem somewhat unique as I heard of few other situations where contact was made directly.

Exchanges are influenced by notions of acceptable behavior in Japan. “The desire to avoid causing a *meiwaku* - a concept that translates as nuisance, trouble, inconvenience, or burden- is a social norm that permeates many facets of Japanese life” (Traphagan 2000: 153). A tricky balance must be as one may have need or desire, but does not want to cause undue inconvenience⁴¹. There are times when this can not be helped, such as when a fishing territory exchange is desired, and at these times one must calculate whether the relationship to the go-between is strong or close enough to allow for this burdensome behavior (see also Kinoshita and Kiefer 1992).

Traphagan discusses, in great detail, aging in Japan and the desire of the elderly to not be a burden. Hesitance to inconvenience or trouble others came to my attention quickly and forcefully when it came time to doing fieldwork; one informant once wrote to say “I don’t want to trouble (*meiwaku sareru koto shitakunai*) others [in the community.] ...” For exchanges, then, burdening others, obligation, and reciprocity are all concepts that must be calculated when working out these social relationships. Though some partners are “like a brother” and get together to drink or go to a hot spring together, it may take years for this sort of relationship to develop.

FCA members in one community tend to learn about each other through encounters at FCA meetings, seeding in close proximity, seeing one another cultivate, as well as through

hearsay. Consequently, when a friend asks you if you have space to lend “B-san,” though he may be a stranger, you probably at least know the face or have a vague idea of who is being spoken about -- especially today with just over 100 cultivating families as opposed to 804 in 1972.

Friends help one another access needed space. Many of these situations are ones where the cultivator may not even need more space. As Chôichi Hamabata was describing the numbers of rafts he had at each fishing ground, I interrupted when he mentioned only five in one location. Since this seemed a low number and not very efficient I asked him to elaborate. He then explained “[He] needed seeding space. I don’t need more cultivation space, but “B-san”, my friend, came to me and asked [if I would lend him some]. B-san’s my friend so I agreed.” Japanese expectations of societal roles-- reciprocity and obligation-- are critically important for understanding these networks and exchanges.

Personal connections are very important for the continuation of *nori* cultivation. As has been under discussion the *noriyasan* do desire autonomy in their lives, yet remain in the mainstream of Japanese society, following expected roles and obligations. The consolidation of the FCA showed this with great clarity. Though the FCA consolidated banking, purchasing, and administrative functions, the fishing territories were not consolidated. Each previous fishing territory remained under the administrative control of the now ‘district’ FCA. The difficult issues involved in negotiations over consolidating fishing grounds include not only difference in economic values of the resources (Pacific side is worth more due to pollution in the Matsushima Bay) and the desire to take care of (*mamoru*) one’s community’s/ancestors grounds, but also one’s social relations.

In the inner part of the Matsushima Bay, near the Shiogama Bay, stands Katsurashima, an island of 388 residents. Katsurashima is under the jurisdiction of the city of Shiogama.

⁴¹ As an ethnographer dependent upon others to receive introductions to new households, I was made all too

(Shiogama's four populated islands have a total population of 788 as of 6/20/02). Katsurashima island people use Shichigahama fishing grounds, and vice-versa. One would think that logically, if Shichigahama grounds consolidated then Katsurashima people could then use the Sendai grounds that Shichigahama FCA members no longer need. However, as Shun Ito pointed out, "People are connected and they don't want to sever ties in that way." After all, "your daughter married into a Katsurashima household, or grandma came from that family." Or, as with Torau Akama, a brother married into a household on the island. Obligations to others remain one thorn in the side of the consolidation movement.

This goes back to the trust relationship. As the partners in exchanges, friends, and relatives have provided help to one another through the years. One can only trust that this relationship will continue, just as one trusts that the partner will continue working with you (and not abandon you for better prices or conditions). Certainly direct relationships are the strongest. Ito san has pointed out that with a new generation coming to the fore, he believes the fishing grounds will consolidate. This, if it happens, will be due not only to a change toward "rational" thinking on the part of the younger generation, but also to the fact that they will be further removed from the initially agreeing parties.

Social networks have saved *nori* cultivation in this region of Japan. Though on-land (*riku*) seeding methods have been invented, this technology provides less than 20% of the total seeded nets in Matsushima and Miyagi Prefecture. Consequently, the Pacific side FCA members need the Matsushima Bay-side cultivators as much as they need them. Perhaps due to the fact the Pacific side is where the actual harvesting is done, Pacific FCA members still have more power in terms of setting the conditions of exchanges. Nevertheless, they need the other partner as well to seed, or rent the seeding space, for their nets. Thus the social networking taking place

aware of the concept of burdening and inconveniencing others by some informants.

to ‘help one another out’ (*o-tagai ni*) remains critically important to this way of life in Shichigahama.

The rest of this chapter focuses upon significant personality traits found in those who are current FCA members in Shichigahama, Miyagi, Japan. Among the most important traits are the FCA members’ stress on horizontal ties, desire for autonomy, and enjoyment of the occupation.

Horizontal Social Ties

Japan has been described as a vertical society (Nakane 1970). The predominant form of hierarchy found within Japanese social institutions [such as the household (*ie*) and *douzoku*, *kumi* and *han*, and school and clubs] is one based upon age, seniority and/or gender. As a hierarchical society, individuals are socialized to grant respect to those of higher status – people who are older, better educated, and often wealthier (though this often coincides with higher education), or who have seniority. The place of hierarchy in the household can be seen through the perceived status and role of household members shown through such practices as seating arrangement and language (Lebra 1976b). For example, in many households, the father and eldest son may have been addressed with more formal terms of address and they may also receive portions of more favored items at meals- even to the exclusion of other members (Lebra 1976b). Today, even if this practice is not followed as strictly as it once was the father will still probably sit in the seat of honor, the one furthest from the door. Among the Shichigahama cultivators whose homes I was able to visit, the head of the household sat either furthest from the door, or in the most comfortable spot (where he could lean against a wall). Following the understanding of hierarchy based upon gender and age, the househead receives his position and status through being male; his son, his status through being the eldest male child. This is a simplification as there was, and continues to be, a great deal of variation in household succession (eldest daughter or youngest child also being variations; see Fukutake 1967). However, the fact that there seems to be a preference for eldest son if possible, seems to belie the importance of the age and gender among

children in the household. Father and son may also be the first to bathe. An in-marrying young bride, the archetypal newest member of the household and female, by contrast was often the last to eat (Lebra 1986) and bathe and first to rise in the morning. Siblings were all treated differently than the eldest son and ranking could even be severe (Lebra 1984).

There are no equals in households (Beardsley 1959). An aspect of in/superiority is implied in every situation that bears on descent and relationship. Even today with demographic shifts towards nuclearization of the Japanese family (Vogel 1963, 1975), hierarchy can be seen through terms of address (elder/younger brother/sister, etc.). In contrast with some other cultures, the Japanese do not use given names when calling to elder and younger siblings. To do so would invite criticism from others (Benjamin 1997). As age is important for understanding where one fits within the hierarchy, terms are used to convey one's place and status. This respect can be seen in language as polite language is used in speaking with those of higher status.

Hierarchy is seen in other groups in Japan such as found with an *iemoto* (family form) pattern. These organizations (such as with tea and noh schools) are consciously based upon a model of the family (Benjamin 1997). "Relationships between equals in these organizations are much weaker than the vertical relationship" (Benjamin 1997: 71).

Nevertheless, even within such a vertical society, horizontal relationships remain important in Japan. *Doukyuusei* (same age mates) relationships have received a fair amount of attention in the literature on Japan (e.g., Traphagan 1997). Japanese society includes the social groups of the *kumi* and *han* (group). These groups are a collection of peers without hierarchy (Benjamin 1997; Bestor 1993). In a village, a household theoretically stood equal to others as a member of the village (Nakane 1967) and it is in the sub-group (not dependant on a ranking hierarchy) where this ideal of equality plays out. In the *kumi*, members cooperate with one another on communal tasks on an equal basis (Beardsley 1959) such as with the cleanup of irrigation ditches or installing the bamboo into communal seaweed seeding beds. Within the

villages, there may be different levels of groups of mutual assistance (*oaza, mura, kumi*), but all are characterized by equal level relationships-- all are cooperative work and mutual assistance units (Embree 1939). Agricultural and fishing cooperatives are an extension of these groups; many were formed along *kumi* or *han* lines for the purpose of mutual assistance and the spread of information (Fukutake 1967).

In the *han* (also the name for *kumi* in newer bedtown communities), the small working group in the Japanese educational system from pre-school on up, students use names as appropriate for equals. Teachers also refer to everyone as *tomodachi* (Benjamin 1997). Students use familiar, non-deferential language forms when addressing one another (Benjamin 1997). School provides a mixture of roughly egalitarian and hierarchical groups. Classmates, as with the *han*, may use names or surnames when speaking with fellow classmates in non-deferential language and this practice may continue long after school. *Dokyuusei* (*dooryou*; same class/age mates) is a common explanation for friendships, an explanation for non-deferential behavior, and a reason for being more at-ease and comfortable.

I argue in this section of Chapter Seven that Japanese FCA members, especially the *nori* cultivating group, remain in this occupation because it allows them to spend much of their time among “equals.” They stress the desire of being in horizontal relationships rather than vertical ones as a prime reason for staying in this occupation. “Not lowering my head”, “not taking orders from others” and “making decisions myself” are representations of the FCA members desire to work and live in relationships of a horizontal nature.

Not Lowering My Head

Much of our work in ethnographic fieldwork revolves around silent, participant observation. Participant observation remains a valuable tool of the ethnographic method, without a doubt. Direct questioning, however, should not be underrated. Many of my earliest interviews among the FCA members centered upon the drop in membership and why so many

families have retired. After hearing what was to become a familiar mantra (“prices are low, expenses are high, no heir would take over”) as to why others have quit, I often asked “Have you ever thought of quitting?” Once you get passed the familiar “nah, no one would ever hire me” response, things began to get more interesting. A wife provided one of the first glimmers into the important role personality plays when she answered, “Him? No, because he won’t lower his head!” (*atama o sagenai kara*). FCA members quickly describe their work as being cold, difficult, dirty, and (monetarily) insecure and say that young people won’t take over because they would rather work in an “office sitting in front of a heater.” For current cultivators in Shichigahama, the negative of ‘lowering your head’ to others outweighs the benefits of an office job: being warm and having a steady income (though not, interestingly enough, shorter hours).

What exactly is meant by “not lowering one’s head” and from whence did this idea come? Dore writes about the increasing equality found in a Shikoku village in the 1950s. In Shinohata, many former *kobun* (clients in a patron-client relationship) “came to attach greater value to the luxury of not having to ‘lower one’s head’ to anyone” (1978: 297). These *kobun* were able to afford this luxury from the economic independence gained from social changes made all the more rapid in the post-World War II period when “everybody has ... one vote; everybody’s child is equally welcome at any school; everyone is equal before the law, and everyone has the same right to ‘a wholesome and decent standard of living’” (Dore 1978: 282).

Barrett and Okudaira (1995) also highlight egalitarianism in Japanese Fishing Cooperative Associations (Hokkaido). They found that “cooperatives are ... likely to place a strong emphasis on leveling individual differences and competition between their members” (1995: 209). Such a push for equality found its way into life in Shichigahama, as well.

This is an instance where knowing the history of an area is important. For example, membership in the Yogai FCA did not initially call for equality in terms of resource allocation. When the Yogai FCA was formed in 1948 (members were formerly a part of the Toguhama

FCA), there were ten ranks. Later, as active membership dwindled, the ranks were reduced to four until finally today there are no ranked differences among the thirteen remaining members. According to Taro Suzuka, a life with ranking was difficult. “The lowest rank did not even receive enough space to live ... [while] the top received so much space they couldn’t use it all.” Rankings were based upon length of time in the FCA-- those families with the longest history⁴² were allocated the most space. Taro’s family was in the bottom tier as they were not active members in the FCA when it was formed (the father died during World War II and the two boys were only toddlers, thus they did not become active in the FCA until the late 1950s). Many current members, as branch households, were also at the bottom rung because they had to wait to join after setting up their own household (in the late 1950s and early 1960s).

Equality in the FCA took a number of years and was not a foregone conclusion even with a dwindling population. Fishing cooperatives can be quite diverse, perhaps as a result of the duality between individualism and collectivism inherent in FCA structure (Barrett and Okudaira 1995; Jentoft and Davis 1993). In fact, Barrett and Okudaira (1995) highlight a case in Hokkaido (Northern-most of the four main island in which the entrenchment of inequitable resource allocation helped fuel intra-community divisions among seaweed (*wakame*) cultivators well into the 1990s. Barrett and Okudaira also feel that two “dualities inform our understanding of the dilemmas that fisher cooperatives face: factional protectionism vs. community-wide cohesion, and in-group egalitarianism vs. elitism” (1995: 208).

Protectionism is inherent in the idea of fishing cooperatives as most of their origins lie in the efforts of groups to displace middlemen (Ando 1995; Barrett and Okudaira 1995; Marra 1986; Weinstein 2000). These groups form cooperatives in attempts to reduce their costs and improve prices (Apostle and Barrett 1992), not to conserve resources.

⁴² I believe those who joined first were also of higher social status, as well, as joining an FCA involved of a considerable sum.

Though fishing cooperatives can possibly accentuate differences within communities, “cooperatives are far more likely to place emphasis on leveling individual differences and competition between their members” (Barret and Okudaira 1995: 209). In the Shichigahama case, this can be seen through allocation of resource rights (with the abolishment of rankings) and the rotation of leadership positions within the FCA (see also McCay 1980). Though competition remains and secrecy regarding numbers of rafts and exact income remained, factionalization remained minimal, though it did exist⁴³. For example, while Yogai supported the FCA president (formerly the Yogai President and Town Councilman), Toguhama had two main factions and Yogasakihama had three. These factions, though they existed, did not prevent the FCAs from consolidating into one main FCA, nor did it prevent, in the end, the FCA members in these communities from voting to sell their (unused) fishing rights. Many of the factions were actually residential groups such as Ruddle discusses (1989). The equity principle has kept some *noriyasan* in the FCA when they might not have stayed otherwise.

Of survey respondents, (34 responses) the desire to “not lower my head” was consistently ranked (1 - 5 with 1 being important) as an important reason for cultivating *nori*. Though the valued supplied was lower than I had anticipated from interview responses, the mean response was 2.9. The only responses ranked higher included “working the sea” (2.87) and “deciding work myself (1.5 – to be discussed below).

Kleinberg (1983) quotes Dore when she states there are “two paths to social mobility in Japan, ‘the individualist’s route via commercial or industrial skill and the dependent employee’s route via advancement within a bureaucratic organization’”(Dore 1967:193). Kleinberg comments that since the “latter received government encouragement from the Meiji period on, we tend to overlook the vitality of the entrepreneurial alternative” (Kleinberg 1983: 243).

⁴³ Interesting to note that though factionalism surrounded strong leaders, geographic location (hamlet) also played a role.

Kleinberg (1983: 244) "... But if privacy is scarce in enterprise households ... I felt that the quality of personal relations between husbands and wives is richer than in families where work and family life are separated. ["The important economic contributions of women is recognized by all in pot-making households and spouses exhibit a camaraderie generally lacking in other Japanese houses"] Similarly, in Shichigahama, survey results showed that some FCA members enjoyed working with their wives and even named it as a positive point of *nori* cultivation (3.7 with 30 responses). Arguments do occur and tempers flare among cultivating husbands and wives, especially at the end of an exhausting season. However, I also witnessed joking among many couples (and some wistfulness from those who don't get along with their spouse when talking about others who do).

A number of *noriyasan* made the point (when asked about the retirement of others) that you can't continue without the wife's agreement. One Yogai cultivator quit between field visits in 1996 and 1997. When I asked about this, it was explained it was due to his "wife's health." He ran a gardening business in the off-season which he now runs full-time and has also turned some of his fields into apartment houses. Though the possibility of the wife's health and strength failing is legitimate, as Embree (1939) and Wiswell (Smith and Wiswell 1982) found in Suye Mura, women have greater say than is often believed. Indeed, Wiswell found that "it is true that women had no role in village administrative affairs and that at home they followed the standard pattern of subservience to the husband, but in day-to-day contact with men, in their sharing of labor ... in their outspokenness, they certainly acted with much greater freedom than any Japanese city dweller" (Smith and Wiswell 1982: xxxvii).

As Toguhama's Yasuo Wagatsuma stated, "The wife is a partner... because [you] work together. You can't work unless the wife agrees." There is a realization that the wife's opinion matters (Hane 1982). I had seen several retirements take place over my various field trips and a number of these were due to the wife's health. *Nori* cultivation requires the wife's help and labor. Consequently, the wife's opinion has some weight. Tosaburo Takahashi informed me one day that some cultivators have quit because of the wife. This is not only for poor health but also

from a desire to live a more (economically) stable lifestyle. He said directly, “some quit when a wife is tired of the insecurity [of the *noriyasan* life].”

Making one’s own decisions

White-collar work necessarily requires you to work under a manager whereby you lose your autonomy on the job. When I asked Hoshi Shigeru, a Toguhama *noriyasan*, why he was doing *nori*, the first reason he gave was not “like[ing] *sarariman* hours -- you work when they tell you... plus you “must answer to a manager or a company president.” Survey results also found that making one’s own decision as extremely important to *noriyasan*. In fact, deciding upon work themselves (*shigoto o jibun de kimeru*), was the top rank choice (averaging 1.5 with 42 responses) when asked to rank the good points of *nori* cultivation. This was higher than expected as I thought “not lowering one’s head” would be the top choice. This may have been a result of the greater impression this phrase made on me as I was interviewing. The general feeling is the same, however. Not lowering one’s head and making decisions for oneself both give a sense of autonomy.

Keiko Shimada of Yogai also mentioned she didn't think most *noriyasan* could be *sarariman*; you can't have tea when you want to drink tea, it's 8 to 5 every day (or more likely, even later). “With *nori*” she said, “even though there's work year round and you're busy, you can do it at your own pace.” In contrast, her son Kenichi leaves their house at 6:15 every morning-- he starts his engine up when they leave the house to go to the docks. “Some days he's home early, say six-ish, but some days he's not.” Keiko intimated that the freedom of working for yourself and setting your own hours was why they continue to do *nori*. Embree (1939) and others (e.g., Dore 1978; Smith 1979) have commented on a similar work-style among farmers. They work hard, but may stop and take a break, or smoke (*ippuku*), when another stops by. The ability to work at one’s own pace and take frequent breaks (averaged 2.5 with 34 responses) appeared to serve as important aspects of the *nori* way of life.

Outsiders may joke or even disparage the fact that these *noriyasan* never work. One of the town's oil delivery men and a mechanic both commented upon this to me on separate occasions. Each said "*noriyasan* could not work *sarariman* hours" rather than "would not." *Noriyasan*, however, despite their frequent breaks in the summer (and visit to one another's workshop in the winter) work longer hours. Enterprise households throughout the world work longer hours or may even earn less money (Hamilton 2000). The non-monetary benefits of entrepreneurship are thought to be substantial enough for individuals to choose to remain in self-employment. In the case of the *noriyasan*, making one's own decisions, not lowering one's head, and not taking orders from others are just some of those nonpecuniary benefits of self-employment.

Taking Risks

The income FCA members make from harvesting marine resources remains relatively insecure. As with agriculture, harvested amounts fluctuate year-to-year depending upon environmental factors such as temperature and weather (storms) as well as human-related ones such as timing of the seeding and choice of seeds. Life on the sea is further affected by the availability of a moving resource, polluted seas, and in the case of the *nori* cultivators, timing. Given these factors, it is no wonder that income varies greatly from year-to-year. *Nori* cultivators cited the lack of ability to plan on a definite income as one of the main reasons for others to quit. Are those who remain better able to live with insecurity? More than a simple ability to live with insecurity, of those who remain, some actually thrive on the gamble involved. This was observed through the optimism witnessed at the beginning of each Autumn. During seeding, hours are very long, as long as the end of the harvest, yet people are upbeat and friendly. The optimism is infectious. Even though comments are guarded and few state this optimism outright, the optimism in the air is palpable. This optimism was described by Yasuo Wagatsuma., a retired cultivator, farmer and town councilman: "*Noriyasan* thrive on the

enjoyment of ‘what could be’. One never knows how much you will make but you can always hope/dream.”

Summary

This chapter has touched upon the importance of social networks in the lives of the Shichigahama FCA members in today’s society. Tracing such ties enables researchers to track social exchanges and evaluate behavior for a better understanding of life in this time of environmental and economic crisis in Japan. Significantly, notions of trust, obligation, and reciprocity play a crucial role in the maintenance of exchanges between FCA members of different communities.

The second half of the chapter explored the importance of *horizontal* relations of FCA members through focus on the personality traits of Shichigahama FCA members. These traits are also important for exploring the issue of personal autonomy in Japan, the focus of Chapter Eight.

Chapter Eight

Social Lives: Independence and Autonomy

“Have you ever thought of quitting nori cultivation?”

Interviewer

“Nah. I couldn’t do anything else [because no one would hire me].”

Mr. I. Suzuki

“He couldn’t work anywhere else because he’s unable to lower his head to anyone!”

Mrs. I. Suzuki

To further support the substantivist stance of this study, this chapter discusses important social aspects surrounding the *nori* cultivators’ way of life. I argue in this chapter that notions of independence and autonomy in Japanese society and this “way of life” are extremely important to FCA members. Important enough, in fact, to explain why these *noriyasan* continue cultivating *nori* when simple, economic reasons fail. The chapter also discusses the lives of

Japanese Fishers, the division of labor of *nori* cultivators, and additional influences and considerations on FCA members' way of life.

Previous chapters touched upon important issues in understanding the *nori* way of life: local history, the health of the environment, technological innovation, and economic well-being. Living in an industrial society with their particular history are significant factors in the decisions these individuals made when deciding to continue as FCA members and work the sea. The proximity of the community to the Matsushima Bay was a strong draw for locals; the degradation of the environment is also a reason to quit. Industrial agriculture ensures increased production as well as increased expenses. Despite the challenges of outside forces on Shichigahama FCA members lives, a dedicated few (13.5%) chose to continue *nori* cultivation. The Japanese individuals who cultivate *nori* in Shichigahama today do so out of a desire to remain independent and control their own lives; they desire the autonomy to control their own lives to the greatest extent possible.

Independence or Autonomy?

The term independence is fraught with multiple difficulties and I use the term with trepidation. Autonomy may be a more useful term as the meaning of independence is unclear and conveys a feeling that these individuals are seeking to break all ties with others. Fishers throughout the world, after all, tend to be described as “independent” in the popular press and scholarly literature. This latter meaning couldn't be further from the truth. Japanese FCA members are members of Japanese society. As such, Japanese culture does serve to mold these individuals' worldview and behavior. Nevertheless, “people in Japan do not passively accept fate determined by history, culture, or other people” (Long 1999: 9). Within the template of Japanese culture, these FCA members mold and give meaning to their own lives. Independence, then, is a Japanese independence: an independence of not just fishers, but of shopkeepers and farmers, entrepreneurs and artists. In short, through the snapshot of FCA members lives, I will

describe and explain an independence of Japanese enterprise households for this is really the rubric under which Japanese FCA members fall: they are independent operators; householders who maintain their own businesses. In enterprise households, occupational and household roles overlap and coalesce.

In many ways, it is easier to explain what I mean by independence, by what it is not. I am not describing people who seek autonomy in the manner described by Kiefer (1999) among Japanese retirement community members at Fuji no Sato. In her 1999 chapter, Kiefer discusses Japan's reputation as a group-centered society. "Group-centeredness implies that the members of social groups are more closely interdependent in Japan than in individualistic societies like the United States" (Kiefer 1999: 194). She then goes on to explain that "[g]iven unequal abilities of people to contribute to the work of their social groups, this means that the dependency of some people, at some times, is more likely to be accepted or even encouraged in a group-centered than an individualistic society" (Kiefer 1999: 194). Residents of Fuji no Sato, desire to lead autonomous lives and escape from social dependence on others, using money to buy services that would otherwise be provided by family members.

Shichigahama FCA members are not seeking this type of autonomy in choosing to work the sea. Most (93% of respondents) live in extended households (greater than the general Japanese populace) taking care of their aged parents, children and grandchildren. They help neighbors with funerals, volunteer in the fire brigade, and organize community festivals each year. They lend aid and give money as proscribed by societal expectations (*giri suge*) such as when illness or death strikes. Though they hold a desire for autonomy in terms of decision-making (*shigoto jibun de kimeru* or, "decide work by/for myself"), these individuals are not seeking to escape from expected societal roles and behavior. FCA members are active, mainstream members of Japanese society who choose to emphasize social roles of their choosing, social roles which happen to be of a horizontal nature rather than a hierarchical one

(see Chapter Seven). In eschewing the need to lower their heads to others, and desiring to make decisions for themselves they are emphasizing values of Japanese autonomy and independence.

Autonomy in Japan

This section looks at the autonomy of individuals in Japanese society, a key element of Shichigahama *nori* cultivators' decision to remain in the FCA and work for themselves. A great deal of emphasis in anthropology has been placed on the group-oriented nature of Japanese society (Benedict 1946). The groupishness of Japanese society has been argued, especially by those in *Nihonjinron* [literally, 'discussions of the Japanese' (Dale 1986: introduction)] as resultant from Japan's unique set of geographic, ecological, and racial conditions (Margolis 2002; Nakane 1971; Reischauer 1977). The sense of self literature also points to the self as being embedded within a group (Allison 1994: 84; Margolis 2002), primarily the family, home, and work. The group cooperation which characterizes Japan is argued to have been necessary for individuals living on an isolated island with few resources. Intensive wet-rice agriculture and the ensuing high labor demands, coupled with racial homogeneity, have been argued to support this hypothesis. Self, then, in Japan is thought to be embedded in human relationships (*ningen kankei*). This socially contextualized self (Allison 1994) is often thought to have provided the feudalistic foundation for the success of Japan's economy and modern society (Margolis 2002; Allison 1994).

Central to the "self as a rooted in the group" (Rosenberger 1992) argument remains Nakane's *Japanese Society* (1970). According to Rosenberger, Nakane concludes that

"in Japan individual autonomy is inimical to group cohesion. ... The group's cohesion depends on people's daily integration within the frame (*ba*) of one group or locality- not only through work but through emotional participation that 'disregards objective intellectual observation and analysis of individual qualities' (Nakane 1970: 123). Built on personal relationships between superiors and inferiors, the group consciousness provides emotional security, but the group alters people's ideas and way of thinking' (ibid.: 10) " (Rosenberger 1992: 7).

Nakane's analysis includes a Japanese self that lacks autonomy and is immersed in an emotional relationship with the group (Rosenberger 1992). Nakane uses an elite male group model of verticality, opening her up for criticism. Nevertheless, as Rosenberger points out, "by discrediting individual autonomy in Japanese society, [Nakane] has opened up a space for questions about the processes of interaction between selves and groups" (Rosenberger 1992: 7). Though other scholars (Bachnik 1992, Lebra 1992, Rosenberger 1992, etc) reject Nakane's proposition of the elite male group model, they continue to use Nakane's concept of a frame (Margolis 2002) to understand the Japanese self in terms of "multiple relationships, groups and contexts" (Rosenberger 1992: 7; referencing Bachnik 1992). The various authors in Rosenberger's *Japanese Sense of Self* make it quite clear that "Japanese choose appropriate behavior situationally, from among a range of possibilities, resulting in depictions of the Japanese self as "shifting" or "relational" (Bachnik 1992: 152). Bachnik is concerned with how Japanese link appropriate behavior to situations they find themselves and how they manage to switch between these various situations. I am concerned with not how Japanese individuals code-switch between groups, but rather why they choose to remain a part of a maritime-based occupation FCA. Though Japanese FCA members are as adept at switching between groups as any other Japanese, they embraced the more informal and horizontal nature of the FCA group.

This chapter is concerned with FCA members' conscious choice to be FCA members -- and live with the autonomy they desire. Doi (1977) proposed that the vertical relationships found in Japanese society exist because of the desire of individuals to be passively cared for by another (*amae*). He suggests that all people have this desire (including Americans), but that the "Japanese are conscious of it, verbalize it, and have ways to achieve it partially through their hierarchical relationships" (Rosenberger 1992: 8). Even though Shichigahama FCA members may desire indulgence, as any other member of Japanese society, through their choice of continuing the family enterprise, they are choosing autonomy over indulgence. FCA members

never once verbalized their way of life as a way to be cared for by others. Quite to the contrary, theirs is one which allows them their own decisions and a fate dependent upon their own actions. As one Yogai cultivator emphasized to me, “if I work harder, I may receive more. If I was to work harder as a salaryman, I would still receive the same.”

The focus on group orientation in Japan by scholars, though valid, has tended to override the other, less obvious aspect of Japanese society: the desire for autonomy. According to Traphagan,

“Autonomy and the ability of an individual to function as an autonomous entity are important values in Japanese society. The communal benefit gained through the activity of individuals is largely a by-product of the autonomous action of those individuals. Although in many cases people may be concerned with the greater good, they are equally likely to be motivated by self-interests that correspond to the interest of their community. Clearly, being recognized by others as one who is oriented toward social good in a cultural milieu that values social utility and harmony is a means by which to maximize the acquisition of social capital” (1997: 5).

Though Traphagan refers to the importance of autonomy among the aging, there are several points that pertain to the fishing community as well. First, the positive benefit (continuation) received by the seaweed cultivating sub-group is gained through the exchanges of access to fishing territories. Following Traphagan’s logic, the fact that everyone benefits is a by-product of each individual’s actions, that of working for one’s own good. FCA members worked to gain access to other fishing grounds for themselves and their families; the consequence is the evolution of a system which benefits (for the most part) everyone in the fishing community. On occasion, FCA members provide services or territory to a new partner even at times when they don’t need anything in return. In this situation they have been asked by a third party to help out a friend/family member. The individual providing the services does not have to do so, but it is in his interest to do so as it raises his social capital.

In writing about autonomy, Traphagan (1997) is specifically referring to the elderly who have an interest in being autonomous since they do not want to become a burden on anyone. This is slightly different from the autonomy of the FCA members which I will describe in the

following pages. Certainly, FCA members as individuals in Japanese society do not wish to be a burden⁴⁴, either. They are more concerned with autonomy in the sense of making decisions for oneself by oneself. More than simply having “the ability to function as an autonomous “entity” FCA members actually *desire* to function with autonomy in their everyday lives.

Certainly, “[I]ndividuals are autonomous entities who function within a web of interdependencies that are exchanged in reciprocal form’ (Lebra 1976a: 337). As mainstream members of Japanese society, Shichigahama FCA members are aware of their ties with others as evidenced through their discussion of *ningen kankei* (human relations) and *shigarami* (a weir; the description of the way Japanese relationships hold together) (Lo 1990). Thus, they are conscious of the fact that their actions are always affected and effected by others. Nevertheless, they view the ability to decide day-to-day activities on their own, without being ordered by others, as extremely desirable.

In this sense autonomy in this situation is the desire of making your own decisions, an independence of sorts. In Kleinberg’s discussion of potters in Kami-Tachikui, she describes apprentices as “searching for life-work that ultimately links mastery of skills with autonomy in the application of these skills” (1983: 243) as a reason these apprentices have given up on the salary-man ideal. “The enterprise household “may allow a man more personal autonomy than most work situations” (Kleinberg 1983: 243). Furthermore, according to Pelzel and Wagatsuma (1979, quoted in Kleinberg) “the psychological rewards arising from self-employment justify certain sacrifices ... [such as] extended work schedules” (Kleinberg 1983: 243). FCA members are not resisting their societal roles, but the hierarchy found when working for a company or corporation. At the time of the crop failure in the Matsushima Bay, Yogasakihama’s Ito Masaichi could have quit, but he mentioned that he did “not want to serve under others” (*hito ni*

⁴⁴ Being a burden is different than causing an obligation. I knew, as a fieldworker gaining introductions through others, I would cause them and myself to be obligated to others. I was not prepared, however, to hear that the process of such was causing the family who served as my introduction to be burdened.

tsukawareru). Thus he remained in the FCA even in the face of economic difficulties and insecurity.

Kalland talks about many of these same values among the fishers in his ethnographic account of Japanese fishers in Shingu, Kyushu (1981). Kalland lived the Kyushu community in the mid-1970s just as the technological innovations and pollution problems were reaching their peak throughout the country (Chapter Four; Befu 1980; McKean 1981). As seen in Shichigahama, Shingu fishers had outside opportunities available close to home, in this case through the proximity of the city of Fukuoka. Many Shingu fishers quit the occupation and Kalland notes that those who remained were the sons of skippers⁴⁵. Kalland believes that the sons who continued fishing were affected by their fathers' attitude: if the father was satisfied and enjoyed fishing, then a son was more likely to fish, as well. Indeed, "those who enjoy fishing do so first of all because of the independence this occupation requires; the freedom from fixed hours and bosses, the excitement felt every day, and which by many is compared to the excitement felt in gambling" (Kalland 1981: 162).

Some of my descriptions of personal autonomy, alternatively described as independence, may converge with descriptions of other fishing populations found throughout the rest of the world. I did not begin fieldwork thinking of these FCA members as stereotypical, independent fishers, however. Similar attributes may be found among fishing populations with similar subsistence strategies (water) and occupations (scalloping versus gillnetting). In New Jersey, for example, 70% of survey respondents felt "fishing is better in respect to earnings, their enjoyment of the work, and overall satisfaction" (Gatewood and McCay 1990: 18). Satisfaction, however, varies with the fishery. Crewmen, for example showed considerable less satisfaction. For those "who value personal freedom and independence more highly than making money" (Gatewood and McCay 1990: 20) bayfishing may be the way of life for them. Those on the water longer

⁴⁵ Shingu, due to the resources harvested, used net groups. Skippers are in charge of the net group).

than others may enjoy different aspects of fishing. Gatewood and McCay (1990), however, found that despite differences, there are some aspects of job satisfaction that characterize fishing in general, such as “working outdoors” (Gatewood and McCay 1990: 22).

Other descriptions of US fishers include disliking to work for others, loves to be out on the ocean, and needs to be physically strong. Fishing is more of a way of life than a ‘job’ (e.g., Acheson 1981; Gatewood and McCay 1990). Even in times of crisis, many fishers show significant job satisfaction and may even persevere longer than fishery managers expect (Gatewood and McCay 1990) in the face of management decisions because they are in the fishery for the intangibles it provides.

Stereotypes are not always true. Fishers and FCA members are not all men --more than 80% of the *noriyasan* in Shichigahama work as husband and wife pairs— and they do not always enjoy being on the water (e.g., longliners in Gatewood and McCay 1990). If my descriptions of these Japanese FCA members fit with the stereotype of fishing it is not for simply finding what I expected to see, but rather from a similarity that comes with the territory. As Smith describes:

“... all fishermen have a great deal in common when viewed in a cross- cultural perspective. The commonalities may be traced to such cross-cutting factors as: uncertainty of the resource ... territorial openness (e.g., mobile marine biomass movements are difficult if not impossible to direct or limit) and multiple subsistence potential (e.g., land *and* sea exploitation are usually involved in a fishing community’s subsistence base and individuals usually select one or the other pattern on the basis of age and/or sex)” (Smith 1977: 7).

Fishers also share an awareness of the danger of the sea. Among Shichigahama cultivators, many families pointed out turning to seaweed cultivation and fishmongering precisely because it was viewed as safer than working in the off-shore areas. As Matsugahama’s Sanae Kikuchi. explained “My husband used to work the big boats ... [but] after we married, my [natal] family suggested *nori* cultivating because it was safer.” Nevertheless, since it is an occupation and way of life that places you on the ocean, *nori* cultivating still holds some risk. Boats do occasionally run over objects (rocks, rafts), collide, and risk getting swamped. Though I never heard of any deaths associated with *nori* cultivation at sea, numerous injuries take place

each year. In the five years (1996-2001) I spent in and out of the field, I heard of a number of accidents: Ebiko Fuchiko broke her wrist when she slipped on the snow-covered boat and Tsuneo Shimada fell into the water when he went out alone one day. Fortunately, Harumi Kondo was traveling home and saw the accident and was thus able to help pull him back in to his boat.

Accidents happen on land, as well. Masao Shima, a town hall employee, lost his hand to a cutting machine when just a toddler. Though this accident occurred in the 1960s, Yogai's Elder Kanda also mangled his hand in a *nori* washing machine in January of 1999 (it was subsequently amputated). And of course, Taro Suzuka's younger brother died from tetanus which he contracted from a work-related injury in 1968. Japanese FCA members are quite aware of the danger of their chosen occupation. The autonomy the work provides them serves as a reward to justify some of the danger.

As I have stated previously, though the FCA members desire autonomy, they are not seeking to break ties with society. Indeed the situation they currently find themselves in (pollution in the Matsushima Bay) occasions a greater use of social capital and contact with outsiders than needed previously. Today a single cultivator in Yogai may deal with FCA members in at least seven different communities. Contacts with these individuals are made not for the purpose of doing work in the FCA as a member of the board of directors, but simply through the needs of cultivating *nori* in the past's world of limited space and severe hierarchy and today's mechanized world and polluted marine environment.

The degraded environment with which Shichigahama FCA members must contend with is not unusual for Japan (see Chapter Four). Their solution to this problem whereby they use social networking to gain access to alternative fishing grounds, however, is somewhat unique. Rather than give up their autonomy and quit the FCA, or fail under organizational rigidity (see Barrett and Okudaira 1995 for a Hokkaido, Japan example of failure due to rigidity of the system

and fishing group protectionism), the Shichigahama FCA members developed an informal system which provided them with on-the-job autonomy through the use of social networks. Though attempts at compensation were attempted and continue to this day, litigation involved for the compensation of lost resources in the (Livelihood Act) law takes years with no guarantee for a favorable income.

The Matsushima case is a complicated one, as I related in Chapter Four. The FCA members have not been able to sue for compensation because the cause (“a *single* cause” [emphasis mine] in the words of the Fisheries Research Center employees) has not been found. In questioning and in my survey, I asked “Do you want to sell your right? If so, why?” The vast majority said they do NOT WANT to sell their right, but “I can’t use it [the way it is].” “If I sell, then I will at least receive [some money]” for retirement. For many, they would rather have the area productive and used. But as we near the end of twenty-five years since the first massive die-off with out compensation in sight, the selling of the rights is thought of as a way to get something, anything. As one cultivator explained so eloquently and succinctly, “I don’t want to sell the right, but in order to receive compensation [of some sort], I must part with it.” Since the territory under discussion can’t be used and since there aren’t many successors, they feel this is the best they can do in the situation. So in their minds, it’s not a question of wanting to sell, but a way to gain something from what has heretofore been a bad situation.

Some compensation has been received as a result of public works projects. As none is available for the Matsushima Bay pollution, these cultivators have accessed social networks and used their social capital to gain admittance into fishing territories elsewhere. Given the importance of these social networks today, the ability to access and utilize these networks was paramount to survival in the difficult decade from 1978-1988. The ability of the FCA members to continue and foster relationships over the long haul remained of primary importance.

What was one reason among so many for households to quit *nori* cultivation? “*Kone ga nai kara*, “Because they didn’t have connections⁴⁶.” Why didn’t they have connections? They didn’t have the wherewithal to foster these connections. Though peripheral to the most important points of personality which I will touch upon next, having a personality that enables one to make and keep friends is vitally important to access new fishing grounds.

Japanese Fishers

Kalland contends the “fishing population in Japan has often been regarded as being very lowly people, and it never had very high status. The scanty literature in English on Japanese fishermen strengthens this impression” (1980: 161). Additionally, Norbeck’s ethnography on Takashima states explicitly that the Takashima fishers were recent newcomers and did not want to be labeled a part of the neighborhood (stigmatized) fishing community (Norbeck 1954). Any non-fisherman, according to Norbeck (1954), could tell you that “fishing communities are traditionally dirty and *ryoshi* (fishers), if not themselves dirty, are at least a little lazy and unreliable. Fishing is, in the first place, a profession of the lowly. Fishermen are likely to be a little *yaban* [savage] and to disregard or treat lightly conventional forms of etiquette” (Norbeck 1954: 112).

Such descriptions may possibly be accurate for the past in the Seto Inland Sea, but does not accurately describe Shichigahama. Fishers in Shichigahama were never stigmatized. I uncovered many examples of sons working in the fishmarket or beginning seaweed cultivation for safety sake, but not because the fishing was somehow considered too lowly. In Shichigahama, as elsewhere in Japan, many do seek upward mobility through education (Kalland 1981; Vogel 1963) as the successor problem shows dramatically (Kawai 1995). As Japan industrialized and white collar work gained importance and prestige, traditional occupations such as farming and fishing became “dirty, smelly, and hard,” (*kitanai, kusai, kitsui*), descriptions

⁴⁶ *Kone*, or connections, has been described as having a negative, backdoor connotation. Though used fairly

formerly reserved for other forms of manual labor. Very few informants (from a range of occupations such as shopkeepers, daycare teachers, and fishmongers) gave any indication of fishing and cultivating being a lower prestige occupation, other than to comment that it has become less acceptable to sons thanks to higher education and the growth of white collar jobs. The Tohoku district, of which Miyagi is a part, was historically home to a greater number of famines and difficult life (Hane 1982), and this may have played a part in leveling classes in compared to the Seto Inland Sea.

Furthermore, fishers offer no apologies for their lack of formality and their use of coastal dialects⁴⁷. They may “disregard ... conventional forms of etiquette” but I would argue this is proper etiquette according to middle-class, white-collar families. Following notions of cultural relativism, for these residents, their behavior is acceptable to themselves. In 1991 during my first foray into fieldwork in Shichigahama, I worked as an English tutor in several Sendai middle-class homes. When one housewife would take me into another’s home she would say “*gomen kudasai*” and bowed very low upon the *tatami* mats while greetings were given. This happened not only during the first introduction, but with each subsequent visit. Behavior was quite formal and formalized. Thus, when visiting with Shichigahama FCA members early on in our acquaintance, I was quite surprised to see an old man come into the house, go wash his hands in the kitchen, and then come sit down by the door (legs bent over the edge), all without giving any greetings. On another occasion, while drinking tea with the grandmother of the house, a saleswoman kept ringing the doorbell, while the grandma sat and complained to me that “we don’t use that door.” This family did not use their formal entrance and the grandmother waited for the woman to finally walk around and find a door that was in use. Though both these examples may be extreme, they underscore the lack of formality among most FCA members.

often, one informant suggested I use another term, *tezuri*, when asking about connections.

⁴⁷ Two dialects are in common usage in coastal Shichigahama. A coastal dialect that shares much of *zuzuben*, the dialect of this area of Tohoku, and Hanabuchi dialect. Named after the community of the same name, the Hanabuchi dialect is considered “rough” even by coastal standards.

Greetings are terse, language is often loud and sounds ‘angry,’ but this is acceptable and appropriate behavior on the coast. One woman laughed constantly when I began fieldwork because her husband was always ‘yelling’ at me, telling me it was too cold for my *chibiko* (small child) when I was out jogging with my 18-month old son. Some community members joked that coastal residents act and speak this way due to working outdoors and on the water. Whatever the reason for their manner to have evolved in this way, it is acceptable and appropriate behavior along the coasts and I would not place a value judgement upon it as Norbeck (1954) seemed to do in his Takashima ethnography.

To reiterate, then, in Shichigahama, like Shingu (Kalland 1980) and unlike some other fishing communities in Japan, the fishing population was never held in particularly low esteem. Though often poor, and perhaps lower in the social ladder than other community members such as teachers, fishers were neither stigmatized nor considered outcasts (Brameld 1968). Yogasakihama residents were notoriously poor (a large population with little land) and Hanabuchihama fishers were famously ‘rough’ (including being the first to brave their North Pacific in tiny 20 ton boats in search of salmon and ocean trout), but they were never stigmatized. Farmers’, shopkeepers’, and even white-collar workers’ daughters frequently married into Shichigahama fishing families.

Kalland found in Shingu, “[t]he fishermen have a self-image (which is partly shared by the others) that they are dirty, hard drinkers, uncultivated, aggressive, and vulgar; behaviour which is counter to the idealized Japanese behaviour of being clean, polite and well-educated in the arts of tea ceremony, flower arrangement and the like. In short, the occupation of the fishermen is not ‘nice looking’ and they ‘smell’ ” (Kalland 1980: 161). The dress of Shichigahama FCA members may not be nice looking and their grandchildren may indeed complain, “grandma, you smell!” but pride in the occupation was felt by most. Some wives who

came from farming backgrounds, though they didn't know what life in a fishing/cultivating household was like, even said they feel "proud" when they see their harvest in their hands.

Women as Fishers

I hope this dissertation has successfully conveyed the idea that both men *and* women work together as *nori* cultivators in Japan. Given the persistence of the stereotype of fishing, whereby fishers are men, however, I felt the concept of occupational roles deserves some discussion.

Women play key roles in fishing communities. Though some women do fish in Japan (Norbeck 1954), I did not know of any women who fished in Shichigahama. Women, nevertheless, are "deeply invested and actively involved in the fishing economy and culture" (Gilden 1999: 5). As documented in other areas of the world, women are often found behind the scenes (Gilden 1999; Nadel-Klein and Davis 1988) in fish processing and other vital on-land aspects of fishing (Gilden 1999; Nadel-Klein and Davis; Davis and Bailey 1996; Dixon et. al, 1984). In Japan, the United States and Canada, women take care of the business books and taxes (Binkley 1995). They also provide "vital organizational, economic, and emotional support" (Gilden 1999: 5). In Shichigahama, of course, women also work on the boats for *nori* cultivation.

Women are often the ones at home who organize the business aspects of the *nori* household. They join wives associations, stay up-to-date on changes in the fisheries regulations when husbands are away, they file taxes, and balance the books. Tax time, falling as it does in Japan in February, the middle of the harvest season, is a trying time for Shichigahama wives who (usually) take this task on in addition to everything else they do (a few husbands do calculate the taxes).

Women also provide invaluable economic services to the family. "Often, their occupational flexibility, including the ability to add and drop part-time jobs, allows them to act

as economic buffers when families must adapt to financial difficulty” (Gilden 1995: 5). Part-time income smoothes out any gaps in income. Perhaps even more important (in the United States), outside jobs enable wives to provide much needed health insurance for the family.

Wives give the family unit emotional support which would otherwise be lacking. Trawl fishers are away for lengthy spells and trips home may be changed at the last minute. In these instances women provide the emotional support families need, including helping the spouse feel appreciated by bundling the kids up and meeting him at the dock, any time day or night (Binkley 1995). They also “[help] their families adapt to change” (Gilden 1999:5). A maritime-based life has changed significantly from only a few decades ago (or even a few years such as in the US). Researchers are investigating the ways lives have changed such as Oregon Sea Grant’s project, “Adapting to Change” (1995-1999).

In Japan, fishing has changed dramatically with mechanization and technological innovation (Befu 1981; Kalland 1980). In the United States, “... the fishing industry has changed dramatically from an open profession with few regulations and abundant freedom to a highly regulated industry. People who were drawn to fishing’s independent lifestyle--where hard work, skill, knowledge, and luck determined personal success—are having a hard time adapting to the “new” fishing industry, which is strongly influenced by regulations, politics, scarcity, economic stress, and gear conflicts.” (Gilden 1999: 8).

The Oregon Sea Grant, among other groups, is attempting to expand knowledge of women’s roles in fishing communities (Gilden 1999; Mederer 1996; Smith 1995) and document these changes through publications resulting from the above-mentioned “Adapting to Change” project.

In many communities, women are members of wives’ associations. In Shichigahama, wives are members of the *Fujinbu*, Wives Association, an organization for the wives of FCA members. These women have their own leadership and conference schedule linked with other local, regional, and national groups. They can have a significant role in politics (McKean 1981)

or they can simply work locally on beach clean-ups and education issues. Similar groups are seen throughout the US (e.g., Gloucester [MA] Fishermen's Wives Association and the Newport [OR] Fishermen's Wives Association).

Division of Labor

This section describes the various roles and activities *nori* cultivators (husbands, wives, sons) find themselves performing day-to-day. Initially, division of labor by sex among the Shichigahama FCA members appeared quite pronounced. I found, however, upon further examination that though there are standard occupational roles, the caveats are never-ending. Deviations from what is described often take place according to special events, personal preference, and emergencies. For example, in most households, women wrap the *nori*. Wrapping *nori* is

Table 8.1: Examples of Division of Labor and Roles

Table 8.1: Examples of Division of Labor and Roles			
Time	Location	Activity	Primary/Secondary/Last Resort
Morning	Home	Laundry	Wife/Grandma
		Breakfast	Wife
		Tea	Wife/Grandma/Husband
	Boat	Driving	Husband
		Arranging crates	Wife/Husband
		Arranging machinery	Together
		Pulling boat	Together
		Unloading crates	Together
	Dock	Using pulley	Husband/Wife
		Cleaning boat/dock	Wife/Husband
		Transporting nori	Husband/Wife
	Workshop	Dumping nori	Husband/Together
		Cleaning workshop	Wife/Husband
		Adjusting machinery	Husband
		Counting/Taping nori	Wife/Husband
		Boxing nori	Wife
		Piling Boxes	Husband/Wife
		Providing for guests	Wife/Husband
		Lunch	Wife/Grandma
		Rinsing machinery	Husband
Evening		Home	Dinner
	Laundry		Wife/Grandma
	Cleaning		Wife/Grandma
	Workshop	Counting/Taping nori	Wife/Husband
		Boxing nori	Wife
		Piling Boxes	Husband/Wife

monotonous. In the past, sheets had to be counted out and bundled into stacks of 100 (10 x 10); today of the *nori* cultivators who own machinery, all but one own machinery that counts and stacks the *nori*. Today most of the work involves putting tape (paper strips) around the 100 sheets and then putting it into a box, though the person present must still be aware of the feel of the *nori*—it may be too heavy, light, or have too few/many sheets—and is in charge of stamping the *nori*⁴⁸. This person serves as quality control and it is usually a woman. It was not unknown, however, to see men perform this task, most often when a woman was away such as to prepare a

⁴⁸ Stamping nori is a complicated task. Nori is stamped in batches. One *hitohaku* (10x10 sheets) is judged in place of the whole batch. Because quality varies, they break batches up attempting to get better prices.

meal or on some necessary errand (such as visiting the *Fujinbu* (Fishermen's Wives Association of the FCA) conference, judging *nori* in Sendai, or attending a funeral).

During the growing season, first thing in the morning, wives often find themselves waking other family members up. If time allows, a wife may fix breakfast, put the laundry out, or have *onigiri* (rice balls) prepared for a late breakfast or mid-morning break. If it's the middle of the harvest, however, breakfast may simply consist of a cup of green tea before everyone heads out to the boats. Some younger families even purchased breakfast food from a local convenience store rather than have to make it (especially in the seeding season).

Aboard the boats, the husband (or father) usually drives the boat to the cultivation grounds. The only exceptions to this rule take place during seeding when wives may steer the small boats or when the husband's strength is needed to move something around and the wife then steers. Sato Fumio's (died in 1997) wife was the only one to drive the boat on a daily basis since he became (legally) blind.

On the sea, the husband and wife share duties, with the wife working to move things around if needed while the husband is driving. Both pull the boat along the nets. Back ashore, wives we usually help load the crates onto cables while the husband operates the controls. This varies, however, and one sometimes sees women at the controls, usually in cases when the husband is dumping *nori* into the washing machines (*nori* is rinsed with salt water and then fresh water before it is cut).

The wait for the first *nori* to come out of the baking machine (2 hours) is a busy time. The wife may be ferrying *nori* from the dock in a *kei* truck or a *rikusha* (rickshaw); later she will be straightening the wrapping area. Meanwhile her husband is adjusting machinery, moving water hoses, and dumping more *nori* in the tanks. Adjusting the machinery is almost without exception, the husband's task. A wife may tell him the *nori* is too heavy (which means it's not

drying enough), but the husband actually adjusts the machinery. A woman will rarely adjust anything unless her husband is away and not expected back for a long time.

Other times of the year you see different activities. In the spring, men and women work together to pull the rafts out of the water and take them apart. Only men, however, pull out the bamboo from the seeding grounds as this is a job that takes strength. During the summer, tasks are shared, though more of the work falls to women as many, though not all, men take outside occupations. (In some households, the wife will also work out of the home in food and beverage factories for a limited time, though in 2000 no one was invited to work in local factories, something attributed to the poor economy.) Most of the summer is spent working on the nets. Women (and men) and grandparents wash and repair the nets, combine nets in stacks of six and/or ten, and color the nets.

Sexual division of labor is thus not followed strictly. Though upon initial investigation it appears, for example, only women wrap *nori* and men work with machinery, upon closer examination this is found to only be a guideline. Men's roles follow their position of head of household (driver) and their function as the (generally) stronger sex. A woman's task of wrapping the *nori* may also be tied to her role as caregiver and meal-provider, roles which keep her closer to home. Thus when someone makes an afternoon trip to clean the nets or cut more *nori*, it will be the husband, not the wife who goes back out on the boat.

Much in the manner of "eldest son as household successor"-ideal in kinship, division of labor also constitutes an ideal, but not always followed, norm. Though men drive boats and women process the *nori* has ties to the division of *nori* cultivation historically, today there are any number of acceptable alternatives. Shichigahama FCA members are pragmatic. This practicality, where household members jump in when needed in almost all parts of *nori* cultivation, is perhaps part from whence their success stems.

Summary

Nori cultivators' willingness to take on a number of roles and work independently without resources of salary or retirement funds, combined with their desire for autonomy ("making decisions themselves," "not lowering their heads") helps to explain why 107 *nori* households cultivate today when at least 697 families chose to quit. Survey results support this observation.

The survey (results also listed in Chapter One, Methodology) found that 93% of respondents listed "working for oneself" as a positive point in *nori* cultivation. Of these, 92% believed working for oneself as one of the top three reasons for cultivating *nori* (42 responses, only 2 listed it as #4 and one listed it as #5; 3 people did not list it at all).

Interviews elicited a greater amount of desire to "not lower one's head" as an extremely important reason for not working in another occupation. Survey results did not find as much agreement on this point as others, such as 'working for oneself.' Nevertheless, with a mean of 2.9 (34 responses), refusal to "lower one's head" had the third lowest mean of any of the good points of *nori* cultivation. The only other point to come in higher was "working the sea" with a mean of 2.89 (33 respondents). Thus, "working for oneself," "working the sea," and "not lowering one's head" were felt by respondents to be three of the most gratifying points of *nori* cultivation today. Interestingly, "working with one's wife," though the mean was only 3.70 (30 responses), was thought to be the most important reason by several (3) and was even ranked 3 or above by half (15) of the respondents answering this question. "Making money," on the other hand, (mean 4.6) was ranked the lowest of any of the good points. Money, obviously was not the *main* reason for *nori* cultivation in Shichigahama, though some did list "getting money" as a reason to enjoy *nori* cultivation (mean 2.82 with only 28 responses).

When asked about the bad points of *nori* cultivation, economic reasons were overwhelmingly felt to top the list. The "high expenses," with a mean of 1.70 (41 responses)

received one of the lowest means of any response in the survey. No respondent listed “high expenses” lower than fourth. Further, though “poor health” was listed as the top reason to quit, the category “high expenses” was a strong second (2.87).

Even given the high expenses, health reasons were cited more often and higher as the reason to quit the *nori* way of life. 88% (40 of 45) felt one’s health was a reason to quit. With a mean of 1.62, this was a strong affirmation. Along these same lines, though not felt as strongly by as many, one’s “age” (mean 2.7, 39 responses), and “family members’ health” (mean 3.1, 40 responses) were found to be a primary motivation for quitting in the future. These results are not surprising given the age of the respondents (mean 58.25) and the fact that these are the people who have survived until now. It makes sense that if these individuals stuck out the coming of automated machinery (high expenses) and the *datsuraku mondai* (*nori* crop failure), then age would be one of the few things to prevent them from continuing forever.

Age and health are two things *nori* cultivators can not control. Shimada Testu, 68, had a stroke on August 15, 1999 and though he and his family took a leave of absence from the cooperative during the 18 month fieldwork period, he is not expected to recover enough to be able to work on a boat. Their neighbors, the Ebikos, were still working, even in their mid-70s (both were 76 in 2001). Though Mrs. Ebiko seemed ready to quit, her husband was not. She said he would probably work until he died.

Many of the *nori* cultivators interviewed said they wanted to keep working until they were 70. These individuals felt they should be able to rest after 70, that more than half a century of working was enough. Obviously, the willingness to work until one is in his/her 70s, while also showing the cultural value of hard work and the economic necessities of life without a private pension, makes a strong case for the importance of this way of life. Indeed, what is better proof that the *nori* way of life is important to these individuals than the willingness to continue working when others will retire when at least 10 years younger (though some would

argue the lack of a retirement pension drives this phenomenon)? Personal autonomy and its accompanying quality of life give these *nori* cultivators the way of life they desire, the way of life for which they are willing to endure hardship and economic insecurity.

Conclusions and Recommendations for Future Research

This thesis has emphasized the importance of cultural and social traits in the search to understand why a small minority (13.5%) of the *nori* cultivating sub-group of a Japanese FCA have remained in this occupation when so many others left. Given high production costs and limited returns, such behavior could be seen as irrational (in neoclassical economic terms). I began the study by examining some research which suggested fishers are not rational (in the classic economic sense), and compared that to opposing research in fisheries and economic literature, especially that on the formalist/substantivist debate.

Literature was presented through case studies from peasant and maritime studies briefly as a way to show the issues inherent in substantivist/formalist formulations. Though Shichigahama FCA members are in no way peasants, this literature was useful in explaining the debate as well as providing some common themes with fishers. Early studies reported that farmers were so culturally conservative that they would not adopt new technology even when it was demonstrably advantageous to do so. Later researchers learned to view the innovations from the farmers' perspective and see that these innovations were not necessarily improvements. The same thing can be seen in fisheries studies. Early research labeled fishers as being rugged individualists who live from day to day and are strongly conservative in work organization and equipment. Studies have emerged recently to show that fishers are willing to share information, adopt new technology, and plan for the future. In Shichigahama, especially in the Yogai hamlet, failure to adopt new technology often rested on one, individual's ability to pay back loans and two, on the number of years they have until retirement. Thus, investment may be delayed not simply because of suspicion of technology itself, but rather because of household and personal issues.

Shichigahama FCA members show cultural traits such as “making decisions oneself,” “not lowering one’s head,” and taking risks are more important in this context than the economic security of an outside occupation. Though these other, salaried occupations enable householders to better plan household budgets and schedule leisure time, they do not provide the desired personal autonomy, working environment (boat/sea), or even in some cases, time with the wife which FCA membership provides.

Shichigahama FCA members are rational on a number of levels, even in formalist terms. They have invested in technology and innovated to a great extent (Chapter Five). They have even been able to cooperate when necessary such as with on-land seeding, pulling nets from the sea, and staking the fishing territories. *Nori* cultivation can be lucrative work, though fishing in general has meant an increase in labor to increase his/her standard of living. Standards of living have risen only with increased labor and production, for fishing as well as *nori* cultivation in Japan. In fact, “in real terms, a fishermen earns about half what an average clerical woman earns (Kawaii 1995: 43) in Japan today. Is it any wonder that these FCA members are leaving the occupation?

The decreasing numbers of *nori* cultivators in Shichigahama is not a localized phenomenon. As membership numbers have fallen in Shichigahama, so too, have they fallen throughout Japan. The five-year period prior to 1998 saw a 24% decline in the numbers of *nori* cultivators Japan-wide. Even given the economically rational decision to quite *nori* cultivation, in substantivist terms, choosing to remain a *nori* cultivator is also rational.

Some of the difficulties faced by *nori* cultivators elsewhere in Japan are known to a limited degree. Eutrophication of the Seto Inland Sea (Befu 1980), environmental disasters (Ariake Sea) and public land-reclamation projects (such as Haneda airport) have each played a role in increasing the difficulty of the continuation of the *nori* way of life. For example, one of

the original sites of *nori* cultivation, practiced for over 300 years, is now a kilometer or more from the sea (Oomori Ward, Tokyo). These same problems are seen in Shichigahama, as well.

Other factors important to this study which explain the Shichigahama case are local history and environment. If the history is known, one realizes that there is a certain amount of “boom and bust” cycle to *nori* cultivation in Shichigahama. Though cultivation had begun prior to World War Two, the cultivating population did not reach its peak until 1972. Even though some of these individuals came from non-fishing households, the majority came from FCA households. By beginning *nori* cultivation, fishing households were simply following a common practice by coastal residents—that of a broad-based subsistence strategy. Though many households are third generation cultivators, very few go further beyond this. Prior to *nori* cultivation, households cultivated oysters. Prior to oysters, other marine resources were utilized. Local residents take advantage of water natural resources their marine environment provides.

The state of the environment is a difficult issue and one with only limited positive results currently. Eutrophication of the Matsushima Bay and even coastal Pacific waters is a severe problem and one seen repeatedly throughout the world. *Nori* has failed to grow as a result of this eutrophication and new technology and altered social practices have consequently been needed to continue cultivation in the Shichigahama region. Floating raft technology was developed to grow *nori* in deeper waters; exchanges of access to fishing territories now take place with residents of different communities throughout the town and region. Though Japanese law provides for compensation of the loss of resources, in the Matsushima area, such compensation has rarely been extended. This fact has increased the number of retirees and has helped to limit the number of successors coming into this occupation as “there is no future.” And while the sale of fishing rights was hotly contested for many years among bayside members, some see the selling of rights as a way to get money for something they no longer use anyway. Compensation

by default, if you will. Some fishers have even said, “I support the reclamation because my children will not succeed [me]” (Kawai 1995: 76).

The Japanese economy has a role to play, as well. *Nori* is no longer the status, specialty item it once was; ¥100 (90¢) convenience store *onigiri* and conveyor-belt sushi form the bulk of *nori* usage. Though *nori* is increasingly being used in non-traditional items such as potato chips and *sembei* (rice cakes), this, if anything further lowers *nori*'s status from ritual gift item to common fast-food ingredient.

Finally, the importance of social ties can not be understated, though they often go unnoticed in industrial societies. Social networking and social ties remain invaluable for *nori* cultivation. There is a tension between wanting to be “one’s own boss” and the need to rely on others for access to fishing grounds. Nevertheless, this situation is increasingly being viewed as “helping one another out” (*o-tagai ni yaru*) rather than dependency on, and subservience to, others. Admittedly, there is a degree of unequal relations, vaguely reminiscent of working under someone else. However, the Shichigahama situation is actually quite different. Further, through emphasis on friendship and *doukyuusei* ties, rather than kinship, some cultivators have worked out a system that is relatively advantageous for all involved.

The Shichigahama case offers an in-depth look at a class of fishers and FCA members found throughout the world—namely, members of industrialized society. Their behavior, then, should be one of interest to maritime and fisheries researchers in general, to the extent that it confirms or contradicts research in other locations. These FCA members represent the importance of local, social factors, age, gender, the national economy, environment and pollution, technology, and psychological factors such as expectations for future returns and “quality of life.” With fisher bankruptcies and fishing territory closures taking place the world over, from the North Sea, to the Atlantic, to the Pacific, these FCA members represent a

compelling example from a nation often described as a success in the fisheries literature; success in some ways, but not all.

Along these lines, Japan's system of managing the commons has been reviewed favorably far more often in the literature than unfavorably. This case provides an example of a commons managed "well," yet right holders nevertheless suffer from natural resource problems. The Shichigahama fishing commons suffer not from over-harvesting and over-exploitation, but from outside sources. Water pollution and non-point source pollution problems have received limited attention in the commons and anthropological literature. Of those studies which have looked at ecological issues and the sea, most have tended to focus on mariculture (fish culture) and degradation from pond aquaculture (such as with shrimp in Latin America and Southeast Asia). As the Shichigahama case shows, pollution issues are vital issues, playing a major role in the continuation or retirement of hundreds of FCA members (while also affecting the lives of the tens of thousands of people who live, work, and visit the Matsushima and Sendai Bay regions annually).

The Japanese coastline at 29,751 kilometers (World Fact Book 2002) is lengthy. As with the United States, a significant amount of the population resides in coastal areas. Even so, there are relatively few ethnographic studies available on coastal areas and coastal issues. When the regional area of Tohoku is added as a condition, numbers of studies are even fewer. In addition to the above-mentioned contributions, this study of Shichigahama FCA members will contribute to the Japanese and Asian Studies literature through its focus on coastal and regional (Tohoku) Japan.

Recommendations for the Future

The Shichigahama situation is unique in the way FCA members have accessed networks and used social capital to enter extra-community fishing grounds. In most other respects, however, this community shares the same difficulties faced by coastal communities throughout

Japan: pollution is a major threat; populations are aging and declining; successors seek work elsewhere given the three “Ks” (*kitsui*, *kitanai*, *kusai*—difficult, dirty and smelly; some also say *kiken*, or dangerous), and real income is small given their gross income.

Further research on the solutions Shichigahama FCA members have employed to these problems warrant additional investigation. Additionally, as mentioned (such as in Chapter Seven), the FCA consolidation issue for years rested on the contentious problem of fishing ground consolidation. For the time being, this issue has been sidestepped with branch (formerly independent) FCAs retaining control and maintenance of their fishing grounds. The consolidation movement is a national, not local one, with Ministry of Agriculture, Forestry, and Fisheries pushing for this move. As consolidations continue in the future, it will be useful to see how other communities react to the changes and the steps these community members take to preserve their way of life.

Additionally, the pollution problem has received some attention, but more anthropological inquiry into this issue is warranted. We know pollution effects lives and resources negatively, but we need to better understand how the people view and respond to such pollution. It is hoped that better understanding of these points will enable some limited amount of prediction to take place, thereby improving the lives of others.

APPENDIX A

Importers of Japanese *Nori* (2000)

Yaki/ Flavored <i>Nori</i>				Sushi <i>Nori</i>			
Rank	Country	Weight(kg)	Value(¥1000)	Rank	County	Qty (1000)	Value(¥1000)
1 (1)	USA	93,577	374,722	1 (1)	USA	24,466	309,142
2 (4)	Taiwan	61,455	109,798	2(6)	Britain	966	19,699
3 (6)	Britain	23,015	98,248	3(7)	Australia	939	11,948
4 (3)	Hong Kong	56,315	87, 195	4 (2)	Holland	579	11,588
5 (2)	Australia	19,741	85,926	5 (3)	Israel	389	6,485
6 (7)	Holland	14,072	66,650	6 (8)	Hong Kong	561	5,513
7 (8)	Canada	10,699	46,297	7	Italy	803	5,379
8 (5)	Singapore	10,729	52,487	8 (5)	Germany	366	4,775
9 (10)	Germany	9,540	41,991	9	Arab Em?	171	2,356
10 (9)	New Zealand	8,911	38,626	10	Belgium	110	2,197

*Nori Sokuhou 2001.2.21: 8

APPENDIX B

Quick reference to *Nori* Cultivation in Shichigahama

Shichigahama Coastal Communities

Yogai	Matsugahama
Toguhama	Hanabuchihama
Yogasakihama	Shobutahama
Yoshidahama	

Cultivation Grounds

Yogasakihama (limited)
Yoshidahama
Hanabuchi
Shobutahama
Matsugahama
Sendai
Yuriage
Katsurashima

Seeding Grounds

Yogai
Toguhama
Yogasakihama

Net/Raft information

Average # of nets/household:	1200
Minimum # of rafts:	60-100
Maximum # of rafts	159-175
Yoshida, Yogasaki, Matsugahama	4 nets/raft
Sendai, Yuriage, Hanabuchi, Shobuta	6 nets/raft

Exchanges involve the following conditions:

1. Trade seeding space for cultivation space
2. Trade seeding space + labor (seeding nets) for cultivation space
3. Pay a fee for use of cultivation space
4. Pay fee for use of cultivation space plus provide seeding space
5. Pay fee for use of cultivation space plus provide seeding space + provide labor

General Types of Exchanges:

Friendship based exchanges most often involve type 1 and 2

Kinship based exchanges most often involve type 3, 4, and 5

Yuriage-entry exchanges are type 3 only

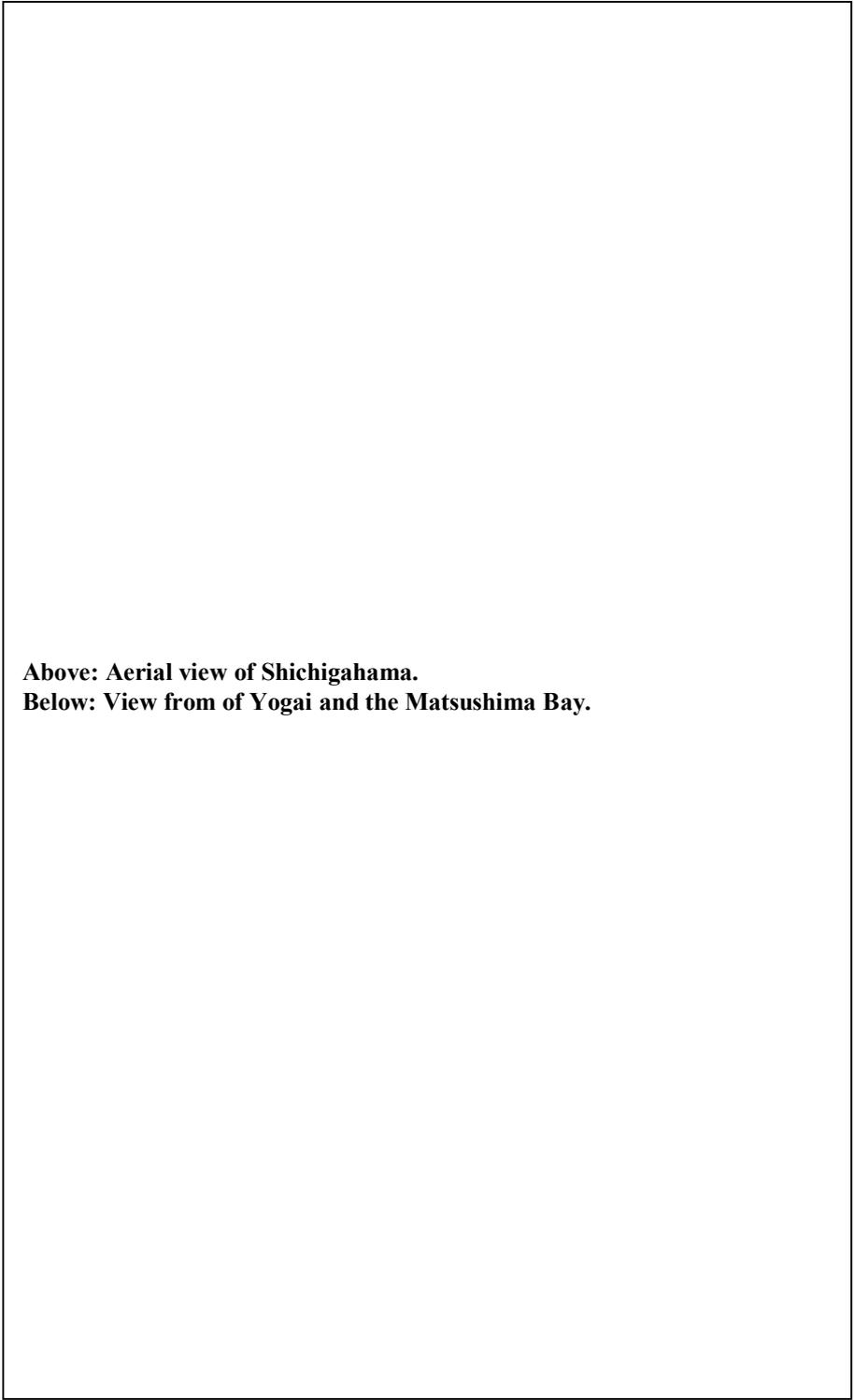
Seeded Nets exchanged at 2-2 ½ times # of cultivated raft space available

For example, for (the space of) 20 rafts in Sendai, 240-300 nets would be seeded.

For example, for (the space of) 20 rafts in Yoshidahama, 160-200 nets would be seeded

APPENDIX C

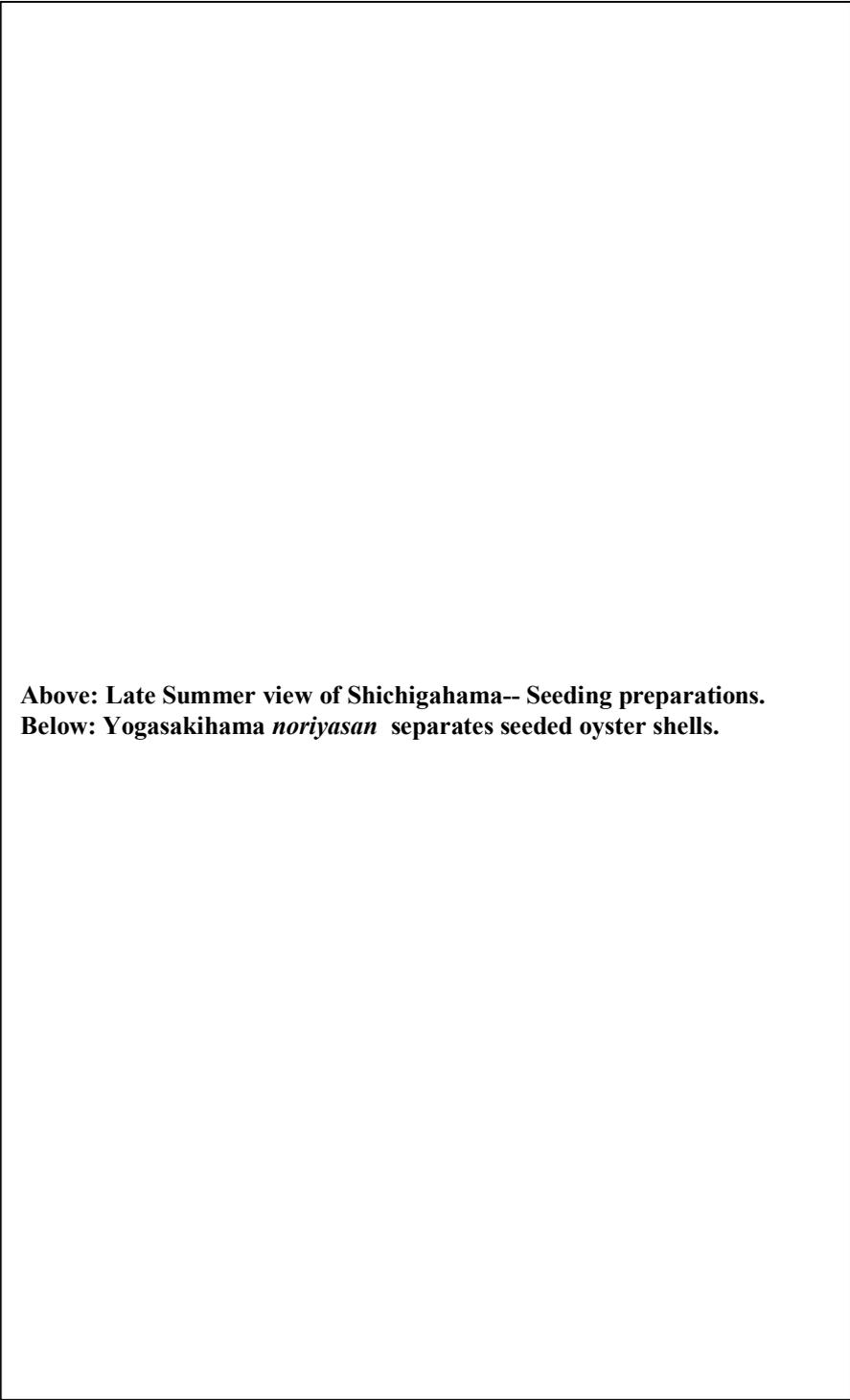
Pictures from the Fieldsite



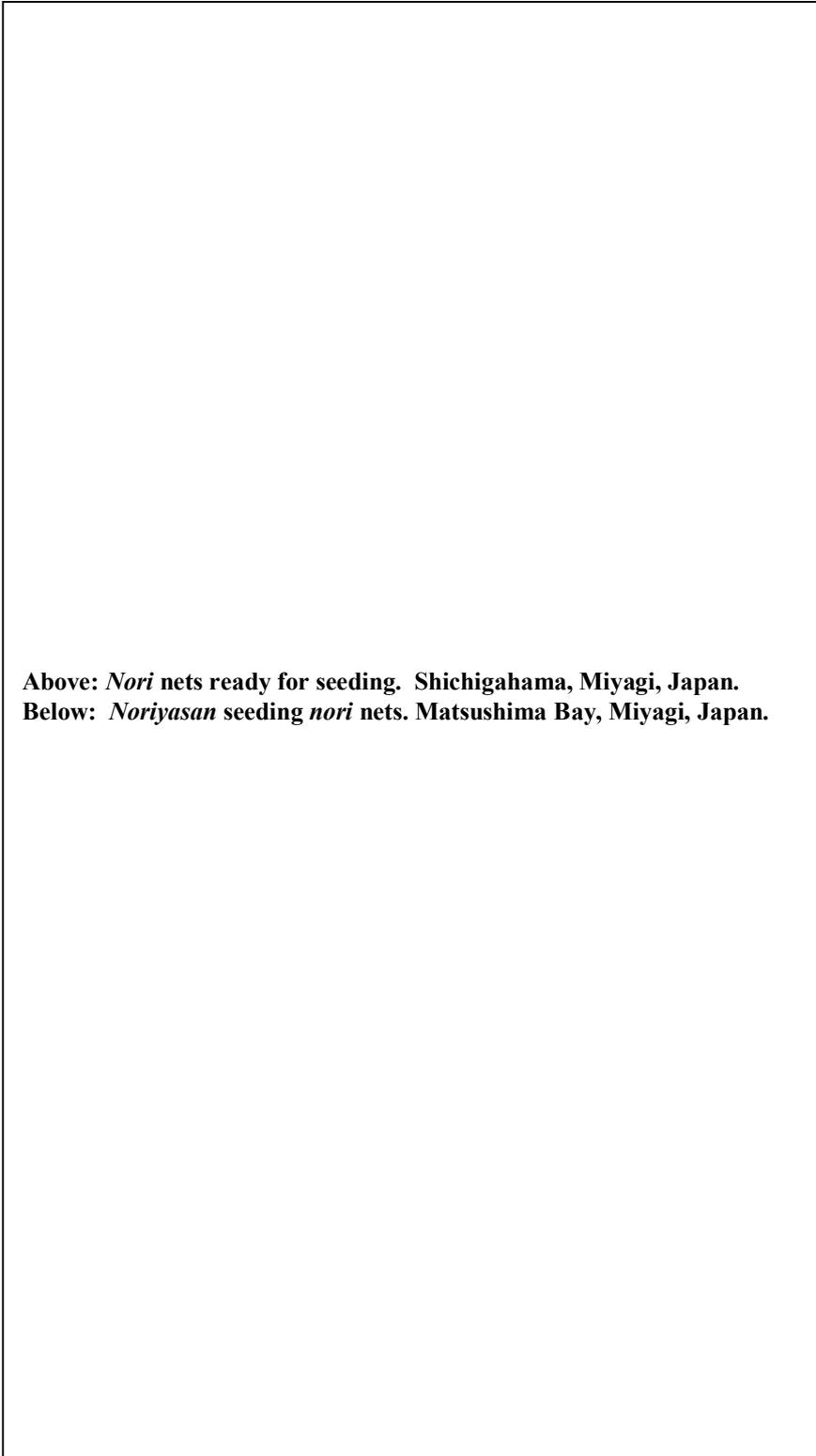
Above: Aerial view of Shichigahama.
Below: View from of Yogai and the Matsushima Bay.

Above: Shichigahama *noriyasan*—Yogai
Below: Shichigahama *noriyasan*-- Toguhama

**Above: Yogai *noriyasan* with the FCA President, Etsuo Sato.
Below: Shichigahama *noriyasan***



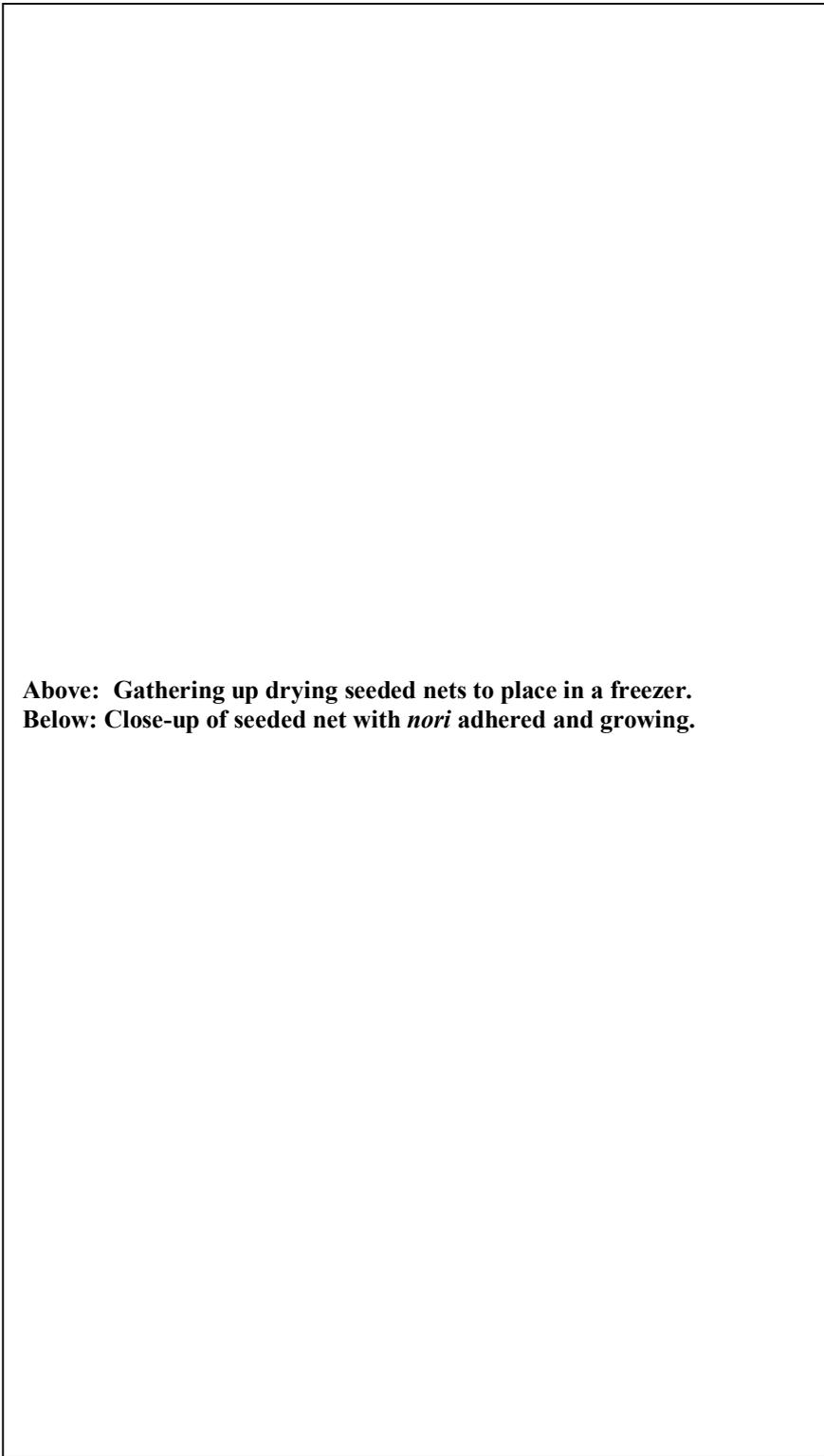
Above: Late Summer view of Shichigahama-- Seeding preparations.
Below: Yogasakihama *nori* separates seeded oyster shells.



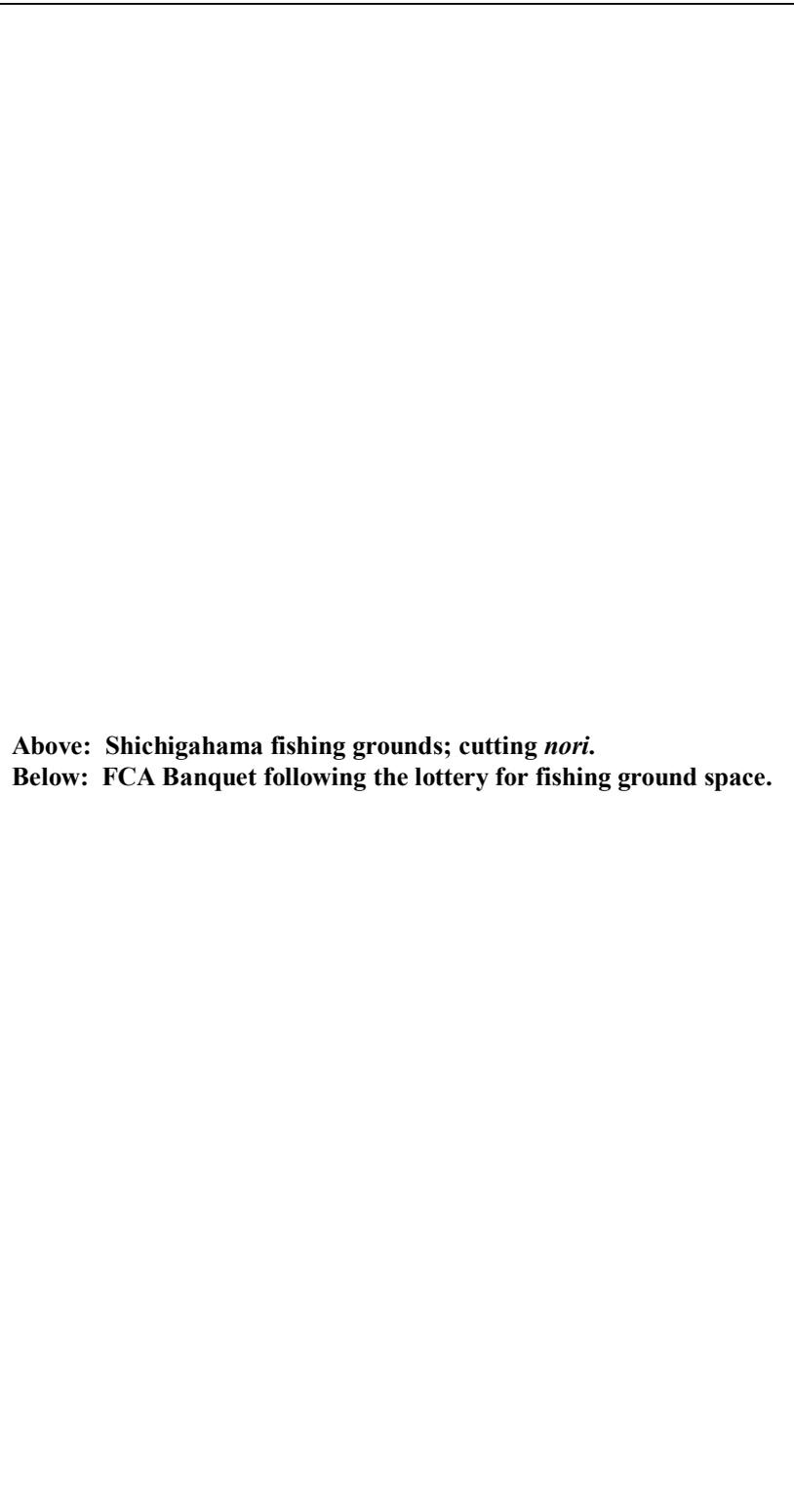
Above: *Nori* nets ready for seeding. Shichigahama, Miyagi, Japan.
Below: *Noriyasan* seeding *nori* nets. Matsushima Bay, Miyagi, Japan.

**Above: Author with Shichigahama FCA official. Minato Festival,
Yogasakihama.**
Below: Summer Shichigahama scene.

**Above: 2001 winning *nori*, Shiogama Shrine, Shiogama, Miyagi-ken.
Below: *Nori* wholesalers inspecting Shichigahama and Miyagi *nori*.**



**Above: Gathering up drying seeded nets to place in a freezer.
Below: Close-up of seeded net with *nori* adhered and growing.**



Above: Shichigahama fishing grounds; cutting *nori*.
Below: FCA Banquet following the lottery for fishing ground space.

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