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# Transition in *nori* cultivation : evolution of household contribution and gendered division of labor

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Abstract: Consumers throughout the world have gained familiarity with the seaweed *nori* (*porphyra* spp) thanks to the popularity of Asian cuisine, particularly Japanese sushi. Few actually know much about the people who produce this seaweed, however. This article presents qualitative social science research undertaken in Northeastern Japan among a community of *nori* cultivators on their production process and cultural way of life. Natural scientists acknowledge that in order to manage natural resources, it is actually the resource users who must be managed. In order to manage resource users, with the goals of social and environmental sustainability, we must understand both society and cultural institutions. With this in mind, this article focuses on the division of labor among cultivators, particularly along gender lines and the impacts, on a cultural level, of technological change on *nori* production. Technological change has had a profound impact on both the manner of *nori* production as well as the household division of labor and work and gender roles. Women play a key role in *nori* production today. With better understanding of such outward manifestations of culture and society we can bring the human dimensions of systems to bear in order to better manage these, and other natural resources.

**Résumé :** *Transition dans la culture du nori : évolution de la contribution des femmes et division sexuelle du travail.* Les consommateurs, un peu partout dans le monde, sont familiers avec les *nori (porphyra spp)* grâce à la popularité des sushis japonais. Cependant, rares sont ceux qui disposent d'une connaissance sur les gens qui les produisent. Cet article présente une recherche qualitative en sciences sociales menée au sein d'une communauté des cultivateurs de *nori*, située au Nord du Japon, sur leur processus de production et sur leur mode de vie culturel. Les spécialistes en sciences naturelles reconnaissent que pour gérer une ressource naturelle il faut gérer les usagers. Mais pour gérer les utilisateurs de ressources, avec comme objectifs la durabilité sociale et environnementale, nous devons mieux comprendre la société et les institutions culturelles. C'est pour cela que cet article met l'accent tout d'abord sur la division de travail entre cultivateurs d'algues, et plus particulièrement entre les sexes, et ensuite sur l'impact de changements technologiques sur la production des *nori*. Les évolutions technologiques ont eu un impact profond sur la production des *nori*, la division du travail au sein du foyer et enfin la division sexuelle du travail. Aujourd'hui, les femmes jouent un rôle très important dans la production des *nori*. Une meilleure compréhension de ces manifestations extérieures en matière de culture et de société permet d'apporter une dimension humaine aux systèmes dans le but de mieux gérer les ressources algales et l'ensemble des ressources naturelles.

Keywords: Japan • Nori • Management • Communities • Women

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## Introduction

## "Growing [nori] ... is like raising a child; there are difficult days, but ... the final result provides such pleasure." Yukiko Sato

This article presents qualitative data on one group of Japanese *nori* (*porphyra* spp) cultivators' way of producing and managing *nori* and other maritime resources. In the fisheries and aquaculture literature, there is a wealth of information on the biology and ecology of seaweeds and fish species, fisheries management, governance, and society. Relatively little attention, however, has been paid to the roles of women and households in the production of resources, though there is a growing body of literature (e.g., Nadel-Klein & Davis, 1988; Hoefnagel, 1991; Martinez, 2004; Frangoudes & Keromnes, 2008).

Women do, in fact, perform a variety of roles when taking part in productive labor in the fisheries. For many years, especially since women were not often seen on fishing boats in western and industrial fisheries (e.g. on trawlers), they were not viewed as being a productive part of the fisheries. Yet, as has been documented in the industrial North, they provide invaluable labor as shore-side crew (van Ginkel, 2009) contacting suppliers, sellers, and buyers, doing the books, doing laundry for crewmembers (e.g. Frangoudes & Keromnes, 2008). Women do also work on boats, however, particularly in the inshore sector. For some, such labor is limited until the birth of children; for others it is a daily activity (at the subsistence level, such as in Cambodia), and for others still, it will become a daily activity as they become older. In Japan, for example, among the nori seaweed cultivators of the Northeast, women and men now work primarily as spousal pairs for growing and processing nori. As will be discussed in this article, women's labor is so important that the activity could not continue if they were either in ill health or refused to take part (Delaney, 2003). Women are needed, after all, to take care of the finances, are in charge of the reproductive labor (cooking, cleaning, etc.), and, as in Japan, now take on an equal burden of the seaconnected tasks such as going out on boats and seeding the nori, including some level of "veto power." Consequently, some would say, women actually have a stronger say in enterprise household activities than those in non-enterprise households (Smith & Wiswell, 1982).

In Shichigahama, and most of Miyagi Prefecture, *nori* production<sup>1</sup> is conducted by enterprise households; a concept similar to family-owned and operated businesses based on the household scale. In enterprise households, since work and family are essentially one, kinship and succession are particularly important (Kleinberg, 1983). In the not-too-distant past, all members of the household were needed to help with production; today, most work takes

place by husband and wife pairs. In some families, grandparents, or more rarely, a son, will also serve as a third or fourth working member. The primary cultivator can, and many do, take part in alternative economic activities outside the growing season, but during the season he must work full-time. Cultivators harvest on a large scale and consequently must have rights (or borrow or rent) to space in multiple lots and areas. An outside occupation is often, though not always, taken up in the off-season for increasing cash flow in the months between harvests (April to November). Nevertheless, people's primary activity-level, identity, and income result from *nori* cultivation.

Cultivating *nori*, though potentially lucrative, is not an easy way of life. The labor is difficult, smelly, dirty, and cold. One woman laughed as she described her grand-children visiting and exclaiming: "Grandma, you stink!" the scent of *nori* permeating her clothes and hair. Work can be dangerous, as well. Even though *nori* cultivators work only in the in-shore, within sight of land, in the years prior and during fieldwork, cultivators had been known to slip on the boats and break bones, fall into the sea and even lose limbs to cutting machines.

#### Nori

Nori (porphyra spp) are red algae which grow in temperate, cold seas; it is commonly used in East Asian food dishes. Japanese cuisine is particularly well known for its use of seaweeds in the preparation of sushi, soups, and various other dishes. Cultivated in Japan for several centuries, nori production techniques changed little throughout the majority of that time: gathered, processed by hand and then dried by the natural elements, the production of nori was limited by human power and the shining of the sun (Miyashita, 1970 & 2003; Miyagi Prefecture, 1993). At this time, Nori cultivation took place simply by placing fields of bamboo and branches in the shallows for the algae to grow upon naturally. True cultivation, which includes seeding, did not begin until after World War II when understanding of the biology of the algae and new growing and processing techniques (Miyashita, 1970; Ueda, 1973; Ota-ku, 1993) developed and improved. Mechanization provided the possibility to process nori with semi-/automated machinery meant that households could produce as much nori in an hour as they previously produced in an entire day.

Production levels are quite high, and more than enough to meet the demand. Japan's economy was strong through the 1980s, increasing the international prestige and interest in items from Japan. This interest helped fuel the sushi boom in the 1980s, and "[by] the 1990s Japanese food, and sushi in particular, had acquired a firm position in the Western culinary repertoire" (Cweirtka, 1999: 57).

<sup>&</sup>lt;sup>1</sup> In contrast, in western Japan, most nori production takes place in corporate work groups rather than at the household level.

## Methods

This article is based upon eighteen months<sup>2</sup> of fieldwork that took place in northeastern Japan, though research has been on-going in the community for a longer period. Research involved standard, anthropological research methods, including participant observation and qualitative interviews with more than seventy individuals. Semistructured interviews were held with *nori*-producing householders, community residents, Fishing Cooperative Association members, Fisheries Research Agency staff, and numerous others working in peripheral, related industries. In addition, participant observation took place in workshops, on the wharves, and on boats.

## Results

#### Setting

Fieldwork took place in Shichigahama (population 21,000), Miyagi Prefecture. Though in recent years the town has partly become a bedroom community for the neighboring city of Sendai, it has nevertheless retained its remote fishing community atmosphere in many ways; access from the rest of the mainland can be reached only across a few bridges, the main road circling town takes in views of several of the ports and sandy beaches, and coastal hamlets retain narrow roads and walled gardens. Long-term, resident households continue to live in the port communities while newcomers live inland in subdivisions built on former rice-paddy land.

Meaning "seven beaches," Shichigahama is divided into seven communities, each one with its own port and containing numerous inland hamlets with dry fields, rice fields, tracts of forests, and shopping districts and housing. The seven communities in Shichigahama can be roughly divided into two groups: those facing the Matsushima Bay and those on the Pacific Ocean. The hamlets facing the Matsushima Bay and each share similarities based upon their environment and the environment of their fishing grounds. In the recent past, the residents of these three communities harvested shellfish (asari and oyster), fish, shrimp and seaweeds as members of the local Fishing Cooperative Association (FCA); 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* (Undaria pinnatifida (Harvey) Suringar, 1873; 1 household) seaweed does take place, but *nori* is the primary resource harvested from these grounds.

The Fishing Cooperative Association members in the remaining four communities face the Pacific Ocean and 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 for such species as the flat-fish species of hirame and karei, as well as fish further out and on large trawlers which travel the globe. Additionally, many have family members who run fish stalls in a nearby fishmarket. 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. There are also several sandy beaches facing the Pacific, making it a popular spot with residents of the region in the summer months, providing additional income for some families who run refreshment stalls and Japanese-style inns catering to tourists. So in this community, the fisheries activities vary among the two environmental areas, but they share nori cultivation.

## Technological Change

The number of Japanese communities cultivating *nori* grew throughout the eras following the Tokugawa Period (1603-1867) with the spread of cultivation knowledge, as well through the efforts of the Japanese government to improve and increase *nori* production (Miyagi Prefecture, 1993). Joining forces in the early years of the Showa period (1925-1989), government and academic researchers worked together to improve *nori* production. One of their most important breakthroughs was the introduction of nets for cultivating *nori* (Miyagi Prefecture, 1993). Such technological improvements set the stage for a new era in *nori* production, the advent of which began with the close of World War II.

The first twenty-five years following World War II were prosperous years for the *nori* industry. *Nori* could be seen drying out in the sun in coastal communities throughout the nation, from Kyushu to Hokkaido. People from differing backgrounds, including shopkeepers, farmers, and whitecollar workers, began growing *nori* by joining the fishing cooperative. Though since membership was only open to official household-heads, women were usually not the official members. This was the period where *nori* became known as *kuro daiya* (black diamonds) to residents. The sale of *nori* provided a substantial income, especially to those high in the social hierarchy in the FCA system<sup>3</sup>. Further, though the work was hard, inclement weather provided numerous rest days since *nori* could not be dried on rainy or cloudy days.

As technological advances were made in all aspects of *nori* production in the 1960s/1970s, hand-cut (men and

<sup>&</sup>lt;sup>2</sup> In all, research took place in the same community in 1991-92 (10 day-long visits); 1993 (one month); 1996 (2 months); 1997 (2 months); 1999-2001 (18 months); 2004 (2 weeks); and 2008 (2 weeks). <sup>3</sup> Members were formerly ranked; the higher the rank, the larger the cultivating space awarded. Today space is divided equally. Higher ranking was accorded to those who were

older or original members.

women's tasks) and hand-processed (the women's task) seaweed all but disappeared. The changes in processing nori with automated machinery have increased production tremendously; they also increased household expenses dramatically. Increased producer expenses, tied with environmental damage and social changes, pushed households away from nori cultivation. The nori producing population peaked in the early 1970s and has fallen since; in Shichigahama, the population fell by more than 85% from 1973 to 1999 (804 to 121 families.). Nationwide, the period of 1993-1998 saw a decline in the Japanese nori producer population by nearly 25% (National Federation of Nori Growing Fisheries Cooperative Associations, 1999). Most sources cite rising costs with a low crop price to explain the fall in *nori* cultivating households (a similar story to fisheries around the world).

### The seasons of nori cultivation

The end of summer the busiest time of year for nori cultivators since this is the time to seed the nori. First, lotteries, attended by household heads who hold the FCA membership (men), are carried out to decide individual lots within the common fishing/cultivation ground. Lotteries are held to ensure equity and that one person does not get a poorer quality space. Following this event, as many family members are gathered together as possible in order to get all nets put into the water. Once nets are in place on the surface of the water, householders position seeded oysters shells below the nets so that the spores will adhere to the nets. Putting the poles and nets in the water is a timeconsuming and physically challenging process usually undertaken by the men. Some of the work is done communally, but most is done at the household level. Since the seeding takes place en masse with every cultivating household in the community, brief greetings and exchanges take place on the water and boats are sometimes tied together as friends join one another for tea breaks. Men and women take part in this task together.

Thus, though *nori* cultivating householders do cooperate and work communally on some tasks, a certain degree of secrecy still remains, just as much of the literature describes with fishing. In this case, households are particularly secretive about when they will pull the seeded nets from the water for transfer to cultivating grounds or for storage in the freezer.

The first *nori* harvest begins around the first of November. The daily routine remains much the same during the winter: cutting and processing *nori*, washing nets, judging and auctioning, which is organized by the FCA, the *nori*. *Nori*, is like grass which is "mowed" and continues to grow, enabling it to be cut again and again. Cutting *nori* involves pulling nets up and across the boats and over a long, narrow cutting machine. If they are lucky,

*nori* cultivators will not have the additional task of cleaning up and replacing damaged gear after autumn typhoons. The consequence of working in an occupation which is affected by the weather, *nori* cultivators they do not know when they will be forced to stay home so they work every day they possibly can, even going as far as to only taking one day off for New Year's. As they explain, "a year's living must be made in five months so…", so few take days off, even for mild injury or illness.

The *nori* cultivation season ends with the last scheduled auction around April 15. It is a difficult time of year. At the end of the season, everyone is exhausted physically, and if the season went poorly, mentally as well. Clean up involves bringing in nets from the sea. As final cuttings are made in each area, rafts made up of poles, anchors, and buoys are pulled in from the sea and piled on the wharves. Much of May is spent cleaning these materials and throwing out parts which can not be used again. New materials are ordered to have on hand for the summer and nets are washed with repair work begun.

Following this, the summer is full, of steady, methodical work. After nets are washed and repaired, they will be strung out and tied together in bunches for the seeding later in the year. Most *nori* households have at least one hundred rafts, made of 6 nets each ... washing, repairing, and tying of hundreds of nets involves a lot of labor. But it is labor which does not involve all householders. In most, the grandfather or father will repair the nets, though a few grandmothers and mothers take part. Husbands and many wives will take part time work in local food factories or energy refineries if possible. Some householders have others occupations such as selling food and drink on the beach to tourists.

#### Gendered division of labor

This section describes in greater detail, the various roles and activities nori cultivators (husbands, wives, and sons) find themselves performing day-to-day. Initially, division of labor by sex among the Shichigahama FCA members appeared quite pronounced. Upon further examination, however, it was found 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 nori, a monotonous task. In the past, sheets had to be counted out and bundled into stacks of 100 (10 x 10); today almost all of the nori cultivators own machinery which counts and stacks the nori. 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*<sup>4</sup>. This person serves as quality

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<sup>&</sup>lt;sup>4</sup> 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.

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
	Dock	Unloading crates	Together
		Using pulley	Husband/Wife
		Cleaning boat/dock	Wife/Husband
		Transporting nori	Husband/Wife
	Workshop	Dumping nori	Husband/Together
	1	Cleaning workshop	Wife/Husband
		Adjusting machinery	Husband
		Counting/Taping nor	<i>i</i> Wife/Husband
		Boxing nori	Wife
		Piling Boxes	Husband/Wife
		Providing for guests	Wife/Husband
		Lunch	Wife/Grandma

**Table 1.** Examples of division of labor and roles.**Tableau 1.** Exemples de division du travail et rôles respectifs.

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 meal or on some necessary errand such as visiting a *Fujinbu* (Fishermen's Wives Association of the FCA, a group for wives of FCA members which works for a healthy environment, conference, judging *nori* in Sendai, or attending a funeral. Though in at least one household the husband actually performed this labor regularly as he preferred it.

During the growing season, first thing in the morning, wives often find themselves waking other family members up. If time allows, a wife may prepare 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.

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.

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 small truck or a 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 is too wet), but the husband does the physical adjustment to the machinery. A woman will rarely adjust anything unless her husband is away and not expected back for a long time.

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 *usually* 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 Japanese kinship, division of labor also constitutes an ideal, but not always followed, norm. Though the fact that men drive boats and women process the *nori* has ties to the division of *nori* cultivation historically, today there are any numbers 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.

#### A changing Society's impact household division of labor

The issue of the division of labor among *nori* cultivating households is an interesting one, and one related to the recruitment of households' labor. Consider, for example, that women did not go out on the boats a generation ago. Now, the overwhelming majority of work groups consist of husband and wife pairs. The opportunities provided by higher education have enabled many sons who would have stayed in the family enterprise to leave and work outside the home. This, in turn, has meant wives<sup>5</sup> and mothers must take over the role of the sons.

What do Shichigahama wives/daughters have to say about their 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." " as one widow explained.

This widow found herself in the midst of changing times. When she married in the 1970s, most husbands cultivated with fathers and fathers-in-law close to home in the local bays and inlets. The transition to rafts on the deeper ocean also tended to coincide by chance with the retirement of the elder household males. Thus, brides and daughters suddenly found themselves needing to join their husbands on the boats. 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. The possibility of 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 the necessity of wives working on the sea was not foreseeable at the time of many current marriages, many women appear content 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 *nori* cultivator. Before I didn't know what it meant, what work they did. But now I enjoy watching [the *nori*] grow and feel proud."

Why use wives' labor rather than wage labor? Part of it surrounds the role of the wife as a member of the enterprise household. There is no need to pay for hired help when the helper is a part of the family. Some households do employ outsiders or relatives during busier times of the year - and fishing cooperatives do employ part time workers to help with the judging of the *nori* by unloading boxes, a task which was formerly completed by householders - but for most householders, to employ outsiders would be wasteful (*mottainai*) and go against their sense of thrift.

Enterprise households have long relied on the labor of all family members, especially women to make the business viable. Kleinberg (1983: 244) points out "...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 are 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 (Delaney, 2003). Arguments do occur and tempers flare among cultivating husbands and wives, especially at the end of an exhausting season. However, joking among many couples was often witnessed (as well as some wistfulness from those who don't get along with their spouse when talking about others who did).

A number of *nori* cultivators made the point that you must have a wife's agreement to continue this way of life. Though the possibility of the wife's health and strength failing is legitimate, women may also insist on quitting, and the family than says the retirement is due to her health. As Embree (1939) and Smith & Wiswell (1982) found in the village of Suye, women have greater say than is often believed. Indeed, Wiswell wrote 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 & Wiswell, 1982: xxxvii).

As one nori cultivating husband 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 cited as due to the wife's health. Nori cultivation requires the wife's help and labor. Consequently, the wife's opinion has some weight. More than one husband informed me some cultivators were known to have retired due to consideration 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]." Thus, women can voice their opinion on aspects of the future of the enterprise, through their labor, and also through the book-keeping roles.

## Discussion

As this article has shown, women and households are extremely important for the cultivation of *nori* in Japan. The work is undertaken at the household level, following the Japanese cultural institution of the *ie* (family/household). This means that roles and households membership follows Japanese understanding and expectations of family and kinship. At the practical level, however, division of labor, though following some general divisions, is actually quite fluid and often based upon particular circumstances and personalities.

One such particular circumstance householders and

<sup>&</sup>lt;sup>5</sup> Many of the wives mentioned in this situation are actually daughters. The custom of an in-marrying husband joining the household is quite acceptable in Japanese culture and not uncommon. Many families must practice this custom due to a lack of sons. When there are sons, the eldest may not continue the family if there are others to take over. Even if there is a successor lined up, the enterprise is not guaranteed a future without a marriage and the recruitment of brides/ sons-in-law to a fishing/cultivating households.

women now find themselves is that of modern cultivation techniques and a mechanized world. Though some significant technological innovation came about from the work by Shichigahama locals (e.g., the invention of floating raft technology), most comes to them from western Japan and they must adapt and work from the current conditions, such as perpetual low prices due to the technological treadmill and overproduction. Though not discussed in this article, outside factors also play a great role in nori production and whether producers decide to continue or retire: production levels and quality (e.g. environmental problems such as die-offs and typhoons), import allowances or limitations, prices of technology. Yet as it is hoped this article has shown, much which takes place at the individual and household level also plays an important role. Understanding division of labor, gender roles, and enterprise households provide a cultural lens into the world of nori production, helping us better understand ways to manage such marine and algal resources. Specific knowledge on the reality of local practices could help inform the structure new educational and recruitment schemes, capacity building projects and management plans, all of which consider the reality of whom in households do the actual work.

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Finally, it is with sadness that I report that since this article was written, the community of Shichigahama was hit by the Japanese earthquake and tsunami of 11 March 2011. Though I do not know the fate of all of the FCA members at this writing, I do know that most coastal homes, workshops, boats and FCA buildings were destroyed in the tsunami. According to the Japanese Ministry of Agriculture, Forestry and Fisheries, 100% of aquaculture and more than 90% of commercial boats were destroyed in Miyagi Prefecture. This article, written as a description of *nori* cultivation in the present, has suddenly

become a description of the past. The average Shichigahama cultivator is in her/his 60s, and each house-hold owned more than a million dollars worth of equipment, now destroyed. The industry will change as a result of this disaster. We can only wait and see as these people recover, the extent of these changes, in the production of *nori* in Northern Japan.

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