

《研究ノート》

Waves of Change: Adaptation and Innovation among Japanese Fisheries Cooperative Members in the post-3.11 era

DELANEY, Alyne Elizabeth*

Abstract

The events of March 11, 2011 (3.11) caused significant disruption to life and work-ways in Japan's Tōhoku Pacific coastal communities, particularly in Miyagi and Iwate Prefectures. In addition to the significant loss of life, there was substantial loss of infrastructure, work tools, social capital and confidence.

This report focuses upon the adaptations and innovations currently taking place among Miyagi coastal fishermen in this post-3.11 period. Using a case study approach, the research focuses upon two communities: one with an older, more "traditional" group of fishers, and one group with a younger, average age to compare how they adjust and adapt to the changes wrought by 3.11. The adaptation under investigation is one responding to a Japanese governmental disaster recovery policy forcing FCA members to form corporate groups; the innovation aspect of the report involves investigations into social media usage among FCA group members.

In terms of the adaptation to governmental policies, given the extreme financial cost of replacing all equipment, the government proposed in the disaster recovery bill that in order to receive recovery funds, members of the *nori* cultivating subgroup must form cooperative work groups. Earlier research in one Miyagi community highlighted the importance of personal autonomy and independence to these subgroup members, who despite the corporatism seen in western Japan, continued as independent householders until the day of the 2011 tsunami. Consequently, adaptation to such policies was expected to be challenging for these FCA members.

Background research prior to beginning fieldwork pointed to a great deal of social media activity taking place among *nori* subgroup members in a different community. Consequently, fieldwork was undertaken to investigate why such innovative activities were taking place in one area, and not the other.

In both cases, the research highlights the importance of social and cultural contexts for better strengthening resilience and social sustainability in the wake of disasters such as 3.11. Demographics, kinship patterns, and social ties all play vital roles in groups' and communities' ability to adapt and respond to such external pressures and challenges.

Keywords : 3.11; Adaptation; Fisheries; Innovation; Japan; Social Sustainability

Table of Contents

1. Introduction
2. Methodology
 - 2.1. Shichigahama-machi

* Innovative Fisheries Management, Aalborg University, Denmark

2.2. Ōmagarihama, Yamoto-machi

3. Adaptation

3.1. *Nori* cultivation, Pre-3.11

3.2. *Nori* cultivation, Post-3.11

3.3. The Gambaru Noriyoushoku Group Program

3.3.1. Work Group Experiences

4. Innovation

4.1. Social media

5. Conclusion

1. Introduction

Are societies and cultures truly resilient? In the face of extreme events such as the 2011 Great East Japan Earthquake and tsunami (3.11), how do cultures innovate and adapt to new conditions? We know that cultures are fluid, continually evolving and changing. Their innate adaptive capacity and resilience are crucial aspects of social sustainability (Crate and Nuttall 2009), providing cultures with the ability to respond and recover to outside threats and “cope with external stresses and disturbances as a result of social, political, and environmental change” (Adger 2000 : 347). In social and cultural terms, such responses may be spontaneous, involuntary responses or they may be adaptive strategies deliberately undertaken (e.g., Adger and Kelly 2001; Smit et al., 1998).

Spread throughout the world from the arctic to temperate to tropical climates, fisheries and maritime cultures share numerous similarities as humans adapted to earning their livelihoods from shared, risky marine environments (Acheson 1981). The levels of uncertainty found in such environments, especially, has meant responses such as the development of institutions and shared activities to reduce their risk through joining and maintaining cooperatives (e.g., Makino and Matsuda 2005; Makino 2011), emphasizing egalitarianism (e.g., Barret and Okudaira 1995; Ruddle 1987; van Ginkel 2001), using kinship ties (e.g., Delaney 2003; Menzies 1993; Symes and Frangoudes 2003) and adopting new technologies (e.g., Ingold 1997; Macken-Walsh 2011; McCay 1978).

Yet, many of the changes taking place in today’s world are not the result of gradual societal change, but are the effects of sudden or extreme changes, such as earthquakes, tsunami, and climate change. Thus this report is not simply about communities’ capacity to adapt and be resilient, but is also about the emotional and physical relocations of populations adjusting to change and coping with the implications of such change (Crate and Nuttall 2009). These relocations involve a transformation of the human-environmental relationships which have traditionally grounded and substantiated their worldviews (ibid.)

In Japan today, though the numbers of fisherman and fishing households continues to decline, fishing

remains important for numerous coastal communities, districts, and regions, especially along the central and northern Tohoku Pacific Coast. Fisheries enterprise householders tend to play important roles in local community culture (e.g., organising local festivals and serving as volunteer firemen) and their occupation represents a way of life for them (Delaney 2003; Yagi et al 2010, Makino 2010).

Within Japanese fisheries, small-scale fisheries remain especially important for the Japan's economy and for local, coastal community society and culture. Small-scale fisheries are a mix of subsistence, artisanal, and commercial sectors which use a variety of gear types harvesting numerous different species (Berkes 2001; Pauly, Watson and Alder 2005; Chuenpagdee 2011). Japanese small scale fisheries are characterized by being small and enterprise householder-run, with membership in fishing cooperative associations (FCAs) and connections with fisheries extension agents. Japanese fishers have access to the newest biological advice and information, as well as to new technology and methods (Delaney 2015a). Such fishing families are characterized by innovation through the frequent uptake of new technologies, independence and personal autonomy (Delaney 2003).

Yet, what becomes of the members of coastal cultures in the face of extreme events such as 3.11. In what ways do cultures innovate and adapt to new conditions? How can they be shown to be resilient? Adaptation and innovation often go hand-in-hand; some come about as spontaneous responses to events, others are imposed from outside. The coastal communities of Miyagi and Iwate Prefectures were hit especially hard by the tsunami generated by 3.11. With more than 18,000 dead or missing, hundreds of thousands of buildings damaged or destroyed and with 133 municipalities impacted, reconstruction and recovery continues to be a massive undertaking (Aldrich and Sawada 2015; Delaney 2015b). Yet a great deal of help has been provided to the residents of the region. In the first two years after the disaster, for example, more than 600,000 volunteer visits had been made in Miyagi Prefecture alone (MPG 2014). Conducive governmental policies also helped: In October of 2011, the cabinet approved its third supplementary budget, "which included 9.1 trillion yen (US\$119 billion) to go toward recovery efforts following the disasters of 3.11" (Delaney 2015c).

This research report focuses on two types of actions undertaken by Miyagi FCA members in the aftermath of disaster: spontaneous innovation as seen through increased usage of, and presence on, social media; and, adaptations to requirements imposed from outside, such as those by the Japanese government through their disaster recovery bill.

2. Methodology

The research methodology uses a comparative, case-study approach in two towns in Miyagi Prefecture to investigate recovery from the 3.11 disasters: Shichigahama and Yamoto. Shichigahama was chosen due to the importance of the *nori* (type of seaweed) industry to the town's economy as well as due to breadth and

depth of empirical data available (going back to 1995). Yamoto was chosen due to the importance of the *nori* (*Porphyra* spp, the species of seaweed often used, for example, with sushi rolls) group to the local, branch FCA, as well as due to members' activity on social media, a noted contrast to Shichigahama; contact was first made with members of this group in 2014.

Data collection included extensive semi-structured, qualitative ethnographic interviews over several research trips (2013, 2014, 2015–16) with 30 informants and also draws upon an extensive background research in Shichigahama (1991–92; 1995; 1996; 1999–2001). A quantitative survey (n=41) was administered to the Shichigahama *nori* cultivating subgroups with a 100% response rate. This is compared to a Miyagi-wide survey administered by the national “Gambaru *Nori* Youshoku” NPO.

2.1. *Shichigahama-machi*

Shichigahama is Miyagi's smallest town (13 km²) with a population of 18,713 (2015), a decline of more than 10% since 2011 (peak of 21 131). Making use of the importance of the sea for this coastal community, the town's economy is primarily based upon the fisheries, including ancillary industry, and tourism. A power plant based within its borders also benefits Shichigahama's economy. The town is also home to the largest Jomon shell mounds in Japan, making it an area rich in historical significance. The increase of new housing sub-divisions has also meant an increase of commuters to city jobs in nearby Tagajō and Sendai cities. Though there were relatively few Shichigahama residents who died (90 persons) in the 2011 tsunami and, overall, the town's infrastructure and human capital remained intact, some neighborhoods and ports were completely destroyed. The fisheries industry was also decimated. Fisheries activities take place in seven port areas in the town with interviews undertaken in all port areas. One port area is approximately equivalent to Yamoto's Ōmagarihama port.



Map 1 Miyagi Prefecture Source: Google Maps

(<https://www.google.dk/maps/place/Miyagi+Prefecture,+Japan/@38.3993406,141.3105434,13.09z/data=!4m5!3m4!1s0x5f8892ddfbe0dc71:0xce6fb9385107a4ad!8m2!3d38.2688373!4d140.8721?hl=en>)

2.2. *Ōmagarihama, Yamoto-cho*

Yamoto, once an independent town, merged with Naruse to form the city of Higashi-Matsushima (39,689) in 2005. Like Shichigahama, the fisheries are important for the town's economy with oysters and

nori production being particularly vital. The Japan Self Defense Force's Matsushima Airfield is also located here. Like Shichigahama, the archaeological record is rich in this area with a museum built to document the long history. Interviews focused on the *nori* cultivating subgroup operating out of the Yamoto Branch FCA, which is located at the port area of Ōmagarihama. All 550 homes located here on 3.11 were destroyed in the tsunami and 286 residents were killed, including six (of 19) *noriyasan* (the term used for people who cultivate *nori*; “-san” is also a form of politeness used in referring to the people). By December 2011, an Ōmagarihama Support Group¹ was formed and used social media to document their recovery work and drum up support. Many of the group's members have their own websites, have value-added activities and businesses, and are also members of the new Fisherman Japan started by Yahoo! Japan.



Photo 1 House Ruins, Ōmagarihama, Yamoto-cho. December 2015. Source: Alyne Delaney.

Together, Shichigahama and Yamoto provide an opportunity for both comparisons and contrasts in understanding adaptation and innovation among coastal peoples during the recovery period. In both communities, members of the local, branch FCAs' *nori* subgroup were interviewed, as well as wives and family members. Given differing adaptations, innovations, and responses to working conditions, research next focused upon what are underlying differences among group members, which may account for differences in activities.

3. Adaptation

Social science often uses adaptation in human systems in terms of the “success” or survival of a culture” suggesting that adaptation itself is “a consequence of selection acting on variation through cultural practices

(adaptations) which have historically allowed a culture to survive” (Smit and Wandel 2006 : 283). Thus, adaptation can be said to be an adjustment to circumstances. Innovations, in contrast, are often made in response to a need (economic, physical, etc.), but often on a smaller scale and in a specific context, as opposed to broader environmental change. For the purposes of this paper, a change in working practices is an adaptation to the outside regulations imposed while the use of social media is an innovation in the context of needing to increase revenue, for example.

Throughout history, Japanese coastal communities have been adapting to environmental, political, and societal changes. A changing economic and political landscape caused towns and villages to consolidate (Rausch 2012, 2015) as Yamoto-cho did in 2005. Changing demographics in the form of an aging populace with few (family business) successors, along with failed policies of agricultural cooperative lending, pushed the consolidation of fishing cooperatives (Delaney 2015) in the name of economic efficiency. An earthquake and tsunami as powerful as that experienced in 2011 will also inflict environmental and infrastructural damage and changes requiring adaptation such as the consequences seen through subsidence, the failure of seawalls, the loss of boats, homes, and workshops, and the deaths of community residents and family members. “Disaster reconstruction” as Oliver-Smith notes, “is fraught with ambivalence. On the one hand, people whose lives have been disrupted need to re-establish some form of stability and continuity with the past to continue their lives. ... On the other hand, the disaster may have revealed areas where much changed is needed” (1996 : 313).

The difference between what is adaptation and what is an innovation may often be a grey area; indeed, adaptation and innovation often go hand-in-hand. Innovations can be stand-alone evolutionary events, but they are often also a part of a response to a need for adaptation.

For *nori* cultivators in Miyagi Prefecture, one of the greatest adaptations they have been forced to make in the post-3.11 era is the introduction of corporate work groups. Doing so was a requirement set by the Japanese government for receiving recovery funds. And doing so not only completely changed the way in which they work, it also went against an extremely important shared cultural trait: self-identification with being independent and having personal autonomy (Delaney 2003).

3.1. *Nori cultivation, Pre-3.11*

In many of the fishing communities in central Miyagi Prefecture, *nori* is the most valuable marine harvest species. Miyagi is one of the greatest producers of *nori* in Japan, typically in the Top Five in production amounts. *Nori* has been harvested commercially in Miyagi since the 1850s, though intense attempts to harvest it prefecture-wide did not begin until the introduction of nets in the 1930s. The possibility for true cultivation of *nori* did not begin until the early 1950s. The rise in numbers of households producing *nori* is directly related to new technologies; the decline in numbers, is related to increased expenses, limited fishing ground space, and difficult environmental conditions (Delaney 2003).

At its peak production, *nori* was referred to by fishers as “black diamonds” due to its high value.

Today, as many areas of western Japan increasingly suffer from poor environmental conditions for *nori* (e.g., increased water temperatures and eutrophication) the *nori* producers from this area are becoming more important. Even so, following a similar trend seen throughout the industrialized world in fisheries, the numbers of cultivators had been in decline for many years. “In Shichigahama, the *noriyasan* population fell by more than 85% from the early 1970s to the late 1990s. Most sources cite rising costs associated with mechanization and a low crop price to explain the [reduction] in *nori* cultivating households.” (Delaney 2007 : 109).

In 2004, there were 103 full-time *nori* cultivating households in Shichigahama; on the day of the tsunami there were 75. Following the disaster, despite no deaths in the fishing population, only 41 households returned to *nori* production in Shichigahama with the vast majority of these being in their 60s.

In Yamoto, there were 19 householders producing *nori* at the time of the disaster; today there are 12. Six *noriyasan* died in the tsunami and one retired. The age breakdown is significantly different from Shichigahama with only one *noriyasan* in his 60s, six in their 50s, one in his 40s, and two each in their 20s and 30s.

The 12 men formed four work groups of three people in 2012. At the end of 2015, one group remained, though they were unsure about the future. They stated in 2016, however, they would also disband.

For those who choose to remain active FCA members and *noriyasan*, much of their work-life is tied into their identity and way of life. As is well-documented (Delaney 2003; Delaney 2007) *nori* cultivators in Miyagi prefecture are fiercely independent and, unlike many in western Japan, they prefer to maintain their personal autonomy by working as independent enterprise households. Though Shichigahama had one work group out of more than 100 *noriyasan* prior to 3.11, the majority interviewed cited the difficulties of such groups, and the advantages of working on their own, as to why they wished to remain independent (Delaney 2003, 2007). Management problems were viewed as the primary, negative issue with groups (Wilhelm and Delaney 2013). Consequently, knowing how important their independence was to these individuals, the proposal by the national government to provide recovery funds only to work groups, immediately raised “red flags;” how would the *noriyasan* respond? What would such a fundamental change in working mean for them and their way of life?

3.2. *Nori cultivation, post-3.11*

Repeated field visits² provided an opportunity to see exactly how views may or may not have changed over time, from planning to work in groups, to actually working in groups, to the time (November 2015) when groups were legally allowed to disband.

As one *noriyasan* explained, “Before the earthquake, there was almost no cooperative work. There was quite a bit of competition among fisherfolk. The most important thing was to look after ‘number one’³”

(Shichigahama *noriyasan*). Furthermore, work groups were reputed to suffer from “freeloader” (whereby some individuals do not do their fair of work) and management problems.



Photo 2 Shichigahama work group with husbands and wives as equal partners. Tōguhama, Shichigahama-machi, Summer 2014. Source: Alyne Delaney

Despite these individual and cultural arguments for independence, from the government’s economic perspective, work groups are a good idea. *Nori* cultivation is a highly mechanized industry and mechanization is incredibly expensive. In a 2001 survey (Delaney 2003), most respondents stated the high cost of machinery as the greatest negative point of *nori* cultivation. In 2001, *noriyasan* estimated they owned close to a million USD worth of equipment. By 2011 mechanization continued to increase with replacement of this equipment (combined with building new workspaces, etc.) was estimated to be US\$ 2 million. Consequently, given such large sums of money, the government, though realizing households needed help as disaster insurance was almost non-existent, was not willing to provide recovery funds at the household level. And yet, work groups undermine the positive points of *nori* cultivation also mentioned in the same survey (Delaney 2011) such as “making decisions oneself,” “not lowering one’s head to others,” and “not being used to working with others.”

Overwhelmingly, time and time again, *noriyasan* stated they would have liked to remain independent if they could have done so. As one group leader said “absolutely I would have liked to continue as an individual. If you had a workshop or a house left maybe you could continue alone ... but when you lose both [to the tsunami] ...” One young Yamoto FCA fisher noted in 2014 that they did not want to work in groups “but this is the world it has become so if one does not change one’s thinking [one can not continue].”

3.3. *The Gambaru Noriyoushoku Group Program*

Fishermen and fishing cooperative associations suffered catastrophic losses in 3.11. “After the disaster, we did not think anyone would do *nori* again. Thanks to the recovery funds, we were able to” (Shichigahama, Yogasakihama port *noriyasan*). For the vast majority, their ability to begin *nori* cultivation again is directly related to the recovery programs set up by the national government. Very few resumed their way of life on their own, without using this program. The program was set up based upon specific guidelines as a part of the Third Supplementary Budget Plan submitted to the Japanese Diet in October 2011 (Wilhelm and Delaney 2013).

Table 1 Shichigahama Gambaru *Nori* Cultivation Groups

Name	Number of members	Port of residence(s)	Number and size of Baking machine	Notes
Yogasakihama#1	6	Yogasakihama, Shobutahama, Yogai	1x 10 wide	2 machines planned
Yogasakihama#2	4	Yogasakihama, Sendai, Shiogama	1x 10 wide	
Shobutahama#1	3	Shobutahama	1x 7 wide	
Shobutahama#2	4	Shobutahama	1x 10 wide	1 died suddenly Dec. 2015
Yoshidahama#1	3	Yoshidahama	1x 8 wide	
Yoshidahama#2	3	Yoshidahama	3: 6, 8 & 10 wide	Individuals in practice
Matsugahama	4	Matsugahama, Yogai, Toguhama, Shobutahama	1x 20 wide	
Hanabuchihama	6	Hanabuchihama	2 x 10 wide	2 workshops
Touyoukyou	4	Toguhama, Yogai, Shiogama	1 x 20 wide	Toguhama workshop
Shichigahama#1	4 (3)	Yogai, Toguhama, Matsugahama	3x 7 wide	Individuals in practice

Unfortunately, there is not enough space to go into the minutia of the program in this report, but the program can be briefly summarized as follows: The “Gambaru Noriyoushoku Group” Program ran for three years: from the 1st of November 2012 through the 1st of November 2015. Groups were comprised of a minimum of three members. For each group, the government would pay out three-quarters of their expenses, with the Miyagi prefecture paying a smaller percentage. Unlike what is typically found with enterprise households, group members were provided with salaries as a part of their plan and budgeting. Most groups employed wives or women as part-time workers; one group in Shichigahama gave wives full salaries as equal partners. Some groups also employed salaried helpers (non FCA right holders). If the group ran a loss they would only be required to pay 10% of the expenses back to the government(s) rather

than 50% if they ran a profit.

41 *noriyasan* formed 10 different groups in Shichigahama. Three outsiders from Shiogama and Sendai joined these groups; there were too few remaining *noriyasan* in their own communities after the tsunami to form any groups. Three Shichigahama branch FCA members remained independent and did not join any *nori* group.

With such a large of number of groups, the permutations found in the group details and differences between the groups are numerous.

One of the group members commented about how much things have changed compared to the recent past: “There used to be a lot of conflicts between the [ports], but the young guys don’t care so much these days.” Even so, there are cultural and personality conflicts. One wife described the frustration of her husband who joined a group made up of members of different ports: “They have a different culture you know? One day they said ‘meet at 7:15. So Torau, he arrived at 7.00. That is what we do here; 15 minutes early is enough. But no, they were angry. They said he should have arrived at 6:30. 6.30!? When they said 7.15?” Though a seemingly minor event, multiplied over days, months and situations, the conflicts can be quite frustrating. Indeed, this particular *noriyasan* did not want to talk about his life in the group with me, though we had known each other for over 20 years. He simply did not want to dwell on the negative situation his found himself in.

The three *noriyasan* managed to remain independent and forgo the difficulties of group work. They are spread throughout the town with one each in the Matsugahama, Yogasakihama, and Toguhamma districts.

3.3.1. *Work group experiences*

Forming work groups was not an easy task. There are many considerations to take into account when deciding who to work with, not least of which are location, personality, reputation, and connections. Some groups were formed from men from all over town; others formed groups with only those who resided in the same port district.

As one Shiogama *noriyasan* noted when speaking about group formation, “if you are good [skilled], they ask for you; that is the way it is.” He later added, on the flip-side, “you cannot do anything bad as everyone knows.” Another commented that “some people formed groups because it could not be helped; they had no one else to join.” He felt that the branch fisheries cooperative should have helped. “They could have said ‘oh these two do not get along, they should be in a different group’ for example. But it is difficult because no one wants to work with some individuals.” Also, “there are few young people [in Shichigahama] so in time they may [reduce] to fewer groups.”



Photo 3 Ōmagarihama noriyasan, unloading nets. Ōmagarihama, Yamoto-cho. Source: Alyne Delaney

During the summer of 2014, the Miyagi Prefecture Fisheries Cooperative (JF Miyagi) held their annual Women and Young Persons Convention in Shichigahama. The timing during fieldwork was fortuitous as it enabled me to not only see their presentations, but I was also able to speak informally with a number of attendees. The next day, I met a few groups who were visiting Shichigahama *nori* seeding facilities in one of the ports. As we were discussing the workgroups, which had only been running for one and a half years at that point in time, one *noriyasan* (20s) had an interesting observation, “you must have a clear leader to do well. The problem with some groups is there is no leader.” Following up on this observation in later interviews, Shichigahama *noriyasan* seemed to agree, “some [people] formed groups with their friends, who they knew ... they did not think about doing the work.” Another (aged 32) noted, “Until now, everyone was their own boss, so it is difficult ... plus everyone is about the same age [in my group].” He later added, “everyone has their own ideas what to do, where to go ... when it is work, you can not do it well when all are close to the same age. You need a leader. I have learned that.”

Such sentiments were echoed in Yamoto: “When there is no leader, there will be a lot of arguments ... in Kyushu they work in groups and there needs to be a strong leader in the group.”

In addition to finding the people to form the group, there were also the technical details necessary in making the plan, including finding a place to set up the new workshops. One group described in detail how they took out a map and searched for a suitable location. Finding one was not easy given their needs for water, sewer, electricity, enough work and parking space, etc. “We had difficulty finding land for the workspace... before, we each had workshops at our homes, but now we needed a new, larger location and many neighbors were against it [due to noise]... approval really depended on our leader [due to his connections with the branch fisheries cooperative].”

As one of the wives commented “it was really down to the wire. We went back and forth over whether we could do it alone [and not join a group].”

The official program ran for three years, officially ending November 1, 2015. In Shichigahama, at the end of the program all work groups remained operating, though some individuals continued to voice an interest in being independent if they could. Members said for now, they would remain. In contrast, in Yamoto, three of the four groups disbanded. As of the 2015–16 winter season, nine *noriyasan* began operating independently, as was the norm prior to 3.11. The interesting question is what sets these groups and individuals apart from Shichigahama? Why are they willing - or able- to go back to working as independent enterprise households, but those in Shichigahama are not?

As they describe it themselves, independent *noriyasan* admit it is not easy to work in groups. Given the initial group set-up, they must continue to share equipment and thus set up a works schedule for when they can each use the baking machinery. An occurrence very similar to the 1950s with farmers sharing harvesting equipment. Some of the most frustrating difficulties cited in the experiences of work groups, are the reasons provided for now working independently. Most importantly is the desire to make decisions oneself. *Nori* cultivation, as any occupation based on natural resources, is a challenging occupation with many difficulties faced while working towards the end-goal of a good harvest. From the timing of the seeding and transplant, to the water temperature and conditions, to the decisions of when and where to cut the nori, poor decisions and bad luck have substantial impacts upon the harvest. Outside factors, as well, whether it be damage by rumors (*fugyou higai*) or the environmental conditions of one’s competitors, for example, in the Ariake Sea region of western Japan, will have an impact upon income. Given the variety of potential negatives and uncertainty, *noriyasan* want to have as much control as possible. As they view it, if you do have control, any failure is due to your own failure (e.g. on deciding when to move nets), or conditions out of one’s control (e.g. water temperature); what they do not want is a failure based on being limited by someone else’s decisions.

A year and a half before the groups disbanded, one of the younger *noriyasan* commented “since everyone operated independently before, as you might expect, there are a variety of problems.”

Despite the difficulties found with the group requirements being imposed upon the *noriyasan* from outside, most take a pragmatic and practical view of the situation. Though they would almost all prefer to work as individuals, many acknowledged if not for the program providing recovery funds, they would not be working today.

4. Innovation

Innovation is a means, not an end in-and-of-itself. Innovation is desirable only to the extent that it improves human well-being and contributes to environmental, social, and economic sustainability.

Innovation includes not only technological innovation, but also non-technological, social, institutional, organisational and behavioural innovation. In Shichigahama two modern innovations included using raft technology to grow seaweed and also using women as partners at sea. The floating raft technology was invented by *noriyasan* in the Yogasakihama port (Delaney 2003) to enable *nori* to be grown in deeper areas of the coast. This innovation spread throughout Japan by their participating in national exhibitions and competitions. The innovation of women going out with their husbands on the boats to seed and harvest *nori* began in the 1970s and continues to this day. Though an innovation, one could also perhaps argue their labor at sea is also an adaptation to a changing environment where sons began to attend high school and have additional employment opportunities open up to them. The importance of women's labor is readily apparent as households where women were either unwilling or physically unable to continue the work quit the occupation (Delaney 2007).

For the *noriyasan*, there is also ideological innovation going on. *Nori* is judged and graded for sale in a strict system with more than 200 levels (Delaney 2003). The attributes are based more upon external looks, however, than actual quality of taste. Those who are innovating are also pushing to change what they sell; they want to sell good tasting *nori*. In order to do this, they must expand their networks out of the traditionally judging and selling to large wholesalers. Consequently, social media becomes an important way to find new connections and avenues for sales.

For this research the use of social media as a technological and behavioural innovation was investigated. Much of the research on social media and disasters specifically focused on social media in risk reduction as well as during the disaster itself. My interest, however, is in how media can be used in the recovery process. Given that I was based outside of Japan, I believe I was particularly sensitive to how, and what type of, information was being transmitted via social media.

For the study, I focused on two related types of social media innovations: social media for spreading the word and gaining support of traditional groups; and social media as a way to increase sales of value added activities. In addition to being open to the possibility of the use of social media there seem to be two important criteria for success, at least in this area: connections to the right people with skills; and women.

4.1. *Social Media - the case of Ōmagarihama noriyasan and the Internet*

Social media can be a powerful force. The use of one site, for example, can quickly gain attention on another as information is shared and passed around. This can be seen with the Ōmagarihama *noriyasan* group where I found connections and links via multiple other sites such as *Yahoo!Japan*, *Fisherman Japan*, other Facebook pages, and community organisations' sites such as "Taberu Tsuushin" (Eat Communication, a website and food magazine).

In my on-going search for news of *noriyasan* in the initial post-tsunami period one of the first groups I found was the Ōmagarihama Support Group. Within six months of the tsunami, this group set up its own

homepage⁶ and a Facebook page.⁷ The very first link to them came through a posting on a Shichigahama blog site.

The website also received a great deal of attention. The site has a blog and news section, provides photos so you can see the on-going activities, and has a members' section which shows how donations are being utilized in the recovery process. By the end of the three-year period, the group had raised more than 2 million yen and had almost 250 outside supporters.

The websites put in place also serve to bridge the divide between groups. As a Yamoto fisher noted, “we did not have “port” exchanges up until now [after the disaster]. The different groups [e.g., *noriyasan* and oyster farmers] were rivals; they did not connect.” The first time I made contact with Yamoto FCA members they were in Shichigahama on a study tour to the local ports.



Photo 4 The women of Norikoubou Yamoto. Yamoto-cho. Source: Norikoubou.

As one Yamoto *noriyasan* noted, “Young people want to provide a quality product,” something they believe they could not necessarily do in the traditional system. For example, excellent tasting sheets of *nori* which have small holes or small specks of foreign objects would receive a much lower price. In order to sell such “inferior” products for a good price, one has to work on direct sales, such as can be done through the internet, rather than going selling to large wholesalers. This is one reason websites have been set up by the local *noriyasan*.

Additionally, fishing families have a long history of using extended family members in related businesses, not only in Japan, but throughout the world. In Shichigahama, for example, not everyone could become the successor to the fishing occupation, thus siblings might go off-shore fishing, sell products in the fish market, run family inns serving seafood products, etc. Consequently, harvesting, processing and

selling value-added products, is natural. For this area of Japan, *noriyasan* commented it is the women who enable it to happen. If not for the women's willingness to continue working, you can not continue cultivation (Delaney 2003, 2007). For the value added activities, "it is the wives, the daughters, the aunts ... things can be done only with their strength and motivation" (Shichigahama independent *noriyasan*) One example can be seen with the business *Nori Koubou*, founded in Yamoto in 2010, and run by a woman with only other women⁸ as employees. This business currently has more than twenty separate products ranging from sheets of high quality *nori* to dressings, ice cream and *furikake* (*nori* flakes). To provide for connections with the consumers, the website also details their struggles since the tsunami with a history and blog page and provides recipes. The business has a new shop and of course operates direct sales through the internet. Other businesses in the area also sell speciality products such as *nori-soba* and usually connect the producers with outside groups such as school groups and citizens visiting festivals and food fairs.

Such independent, value-added businesses are more common in Yamoto than in Shichigahama. Additional research, and analysis of data, is needed to tease out greater details on why Yamoto has more value-added activities than Shichigahama, despite the population difference (41 people versus 12).

Prior to beginning the research, I hypothesized that the extent of destruction impacted the number of people volunteering in each area, which in turn increased the pool of available people (e.g., the volunteers) who had certain skills which could be drawn upon for an increased social media presence. The destruction in Shichigahama, though severe in certain ports, was not as extensive as in Yamoto and consequently, the numbers of volunteers were fewer in this area and more in Yamoto. Initial evidence points to this hypothesis possibly holding true: the current man operating the local food magazine, for example, was a volunteer from the Tokyo area. He came to the area to help with the clean-up and then chose to stay permanently. As he became better acquainted with the *nori* group members, he began to film and photograph them, using the images on Facebook and other social media sites. This work continues, but he also began designing and publishing websites for individual *noriyasan* and groups.

Shichigahama *noriyasan* do have a history of innovating with new technology and adapting to changing circumstances. They formed work groups as necessary, but are not currently involved in value-added businesses as seen in Yamoto. Unfortunately, precisely why the Yamoto *noriyasan* are active in innovating with value added activities and not Shichigahama can not be definitively stated at this time. There is not enough data to support the hypothesis that this has to do with access (e.g., of volunteers with certain skill sets) or age (Yamoto *noriyasan* are much younger on average). Research and data analysis will continue on this topic.

Conclusion

This report has presented case studies comparing the lives of *noriyasan* in two Miyagi coastal communities in the post-3.11 era. The impacts of the 2011 Great East Japan Earthquake and tsunami are deep and widespread. Given the extensive damage, the question of in what way do cultures innovate and adapt to new conditions and requirements was investigated. The Miyagi *noriyasan* are a group extensively researched with a significant amount of ethnographic data from life prior to the disaster available which made them ideal for a case study investigating changes resulting from the disasters of 3.11.

Initial research uncovered adaptations to life post-3.11 with a variety of innovations. Adaptation and innovation, of course, often go hand-in-hand; some come about as spontaneous responses to events, others are imposed from outside. Consequently, this research report focused on both type of events: spontaneous innovation seen through increased presence on social media and adaptations to external requirements imposed by the national government through its recovery policies. Specifically, the policy requiring that *noriyasan* form new workgroups was investigated because members of this subgroup are known for their independence and desire for personal autonomy (Delaney 2003). In both communities, *noriyasan* spoke at length about the difficulties they faced in working as group members and how they preferred to remain independent. And, indeed, at the end of the mandatory work-grouping, 75% of the Yamoto *noriyasan* did disband and begin working on their own. Since doing so also involved great complications as their equipment remains shared, their willingness to live with these difficulties showed how important their independence is to them.

Shichigahama *noriyasan* continue to work in groups. Nevertheless, the fact that the majority of members in Yamato were able to quit group work after the three-year recovery program ended and those in Shichigahama did not, does not indicate a success or failure of the government's program. The goal of the program was to get the *nori* industry up and running again and so in this sense, the program was a success.

In another sense, however, the initial results indicate a failure of the program to take local cultural considerations into account when formulating policy. Though analysis continues, initial results highlighted the stress and added difficulties faced by the *noriyasan* as a result of the government's policy requirements. And though many *noriyasan* are thankful for the program which enabled them to continue working and their way of life, albeit in a changed way, the number of *noriyasan* who are returning to their previous work practices shows their underlying cultural preferences and traits remain unchanged: Miyagi *noriyasan* hold a preference for personal autonomy in their worklife.

In terms of the innovations taking place in these two communities, though Shichigahama *noriyasan* do have a history of innovation and adaptation, Yamato can be said to be the community with residents currently most innovative due to their value-added and increased social media activities. Precisely why this is the case remains to be seen as data analysis and research continues.

注

- (1) Ōmagarihama Support Group
- (2) 2011, 2013, 2014, 2015-2016.
- (3) The *nori* cultivator stated "number one" in Japanese English, meaning "look after oneself as the most important"
- (4) Comparative work has not been undertaken in areas of Western Japan such as Kyushu, though it would be particularly interesting to understand the differences as to why most *nori* cultivators in most of the prefectures in western Japan work in groups while those in Miyagi do not. Information from western Japan comes from the *noriyasan* directly as well as from published texts from the association Zenkoku *Nori* Kairui Gyogyou Kyodou Kumiai Rengoai, such as their 1998 text "*Nori to Tomo ni: Shashin to Gurafu de Miru Gyokai no Yakushin*."
- (5) This was seen historically, for example, during the 2000-2001 season when there was an almost complete crop failure in the Ariake Sea due to a land reclamation project
- (6) <http://Ōmagarihama.jimdo.com/>
- (7) <https://www.facebook.com/yamoto.nori/>
- (8) If space allowed, *Nori* Koubou would be expanded to have its own section.

Reference List

- Acheson, J.M.
1981 "Anthropology of fishing." *Annual review of anthropology*, pp.275-316.
- Adger, W. N.
2000 Social and ecological resilience: Are they related? *Progress in Human Geography*, 24(3), 347-364. doi: 10.1191/030913200701540465
- Adger, W.N. & Kelly, P.M.
1999 Mitigation and Adaptation Strategies for Global Change. v4 : 253. doi:10.1023/A:1009601904210
- Aldrich, Daniel P., and Yasuyuki Sawada.
2015 "The physical and social determinants of mortality in the 3.11 tsunami." *Social Science & Medicine* 124 : 66-75.
- Barret, G. and Okudaira, T.
1995 "The limits of fishery cooperatives? community development and rural depopulation in Hokkaido, Japan." *Economic and Industrial Democracy*, 16(2), pp.201-232.
- Berkes, F.
2001 Managing small-scale fisheries: alternative directions and methods. IDRC.
- Chuenpagdee, R.
2011 World small-scale fisheries: contemporary visions. Eburon Academic Publishers.
- Crate, Susan A., and Mark Nuttall.
2009 *Anthropology and climate change: from encounters to actions*. pp.416 Left Coast Press: Walnut Creek, CA.
- Delaney, A. E.
2003 *Setting nets on troubled waters: Environment, economics, and autonomy among nori cultivating households in a Japanese fishing cooperative*. Doctoral thesis. Department of Anthropology, University of Pittsburgh, USA.
- Delaney, Alyne E.
2015a "Japanese Fishing Cooperative Associations: Governance in an era Consolidation." pp.263-280 in Jentoft, S. and R. Chuenpagdee (eds.) *Interactive Governance for Small Scale Fisheries: Global Reflections*. MARE Publication Series, Vol. 13. pp.800 Springer Press.
- Delaney, A.E.,
2015b Social sustainability in post-3.11 coastal Japan. *Sustainability in Contemporary Rural Japan: Challenges and Opportunities*, pp.3-17. Routledge Press. 256 pages. (16 December 2015)
- Delaney, Alyne E.
2015c Taking the High Ground: The Impact of Public Policy on Rebuilding Neighborhoods in Coastal Japan after the 2011 Great East Japan Earthquake and Tsunami. *Disasters' Impact on Livelihood and Cultural Survival: Losses, Opportunities, and Mitigation*. Boca Raton, FL: CRC Press, Taylor and Francis.

Delaney, Alyne.

- 2011 "Transition in *nori* cultivation: evolution of household contribution and gendered division of labor." [in Japan] *CBM - Cahiers de Biologie Marine* (2011) 52 : 527-533.

Delaney, Alyne E.

- 2007 "The *Noriya-san* of Japan: An Enduring Coastal Cultural Group." *Asian Anthropology*, Volume 6 (2007).

Ingold, T.

- 1997 Eight themes in the anthropology of technology. *Social Analysis: The International Journal of Social and Cultural Practice*, 41(1), pp.106-138.

Macken-Walsh, Á.

- 2012 "Operationalising Contemporary Rural Development: Socio-Cultural Determinants Arising from a Strong Local Fishing Culture" *Human Ecology* 40 (2) : 199-211. doi:10.1007/s10745-012-9477-4

Makino, M.

- 2011 "Fisheries management in Japan: Its institutional features and case studies." (Fish and Fisheries series 34). London: Springer.

Makino, M., & Matsuda, H.

- 2005 Co-management in Japanese coastal fisheries: Institutional features and transaction costs. *Marine Policy*, 29, 441-450.

McCay, Bonnie J.

- 1978 Systems ecology, people ecology, and the anthropology of fishing communities. *Human ecology*, 6(4), pp.397-422.

Menzies, C.R.,

- 1993 "All that holds us together: kinship and resource pooling in a fishing co-operative." *MAST. Maritime anthropological studies*, 6(1-2), pp.157-179.

Miyagi Prefecture (ed.)

- 2011 *Miyagi-ken suisan fukkou puran* [Reconstruction Plan for the fisheries of Miyagi Prefecture]. <http://www.pref.miyagi.jp/uploaded/attachments/68807.pdf>. First downloaded 9 June 2013.

Miyagi Prefecture Government (MPG)

- 2014 Miyagi Prefecture's restoration and reconstruction efforts. Miyagi Prefectural Government, <http://www.pref.miyagi.jp/uploaded/attachment/243322.pdf> (first accessed February 20, 2014).

National Federation of *Nori* Growing Fisheries Cooperative Associations (NFNGNFCA).

- 1998 *Noritotomoni: Shashin to gurafu de miru gyosenoron*. [Nori: Through Pictures and Graphs: 50th Anniversary of the *Nori* Growers Federation.] General division, publications.

Oliver-Smith, Anthony

- 1996 "Anthropological Research on Hazards and Disasters" *Annual Review of Anthropology*, v25, pp 303-328.

Pauly, D., R. Watson, and J. Alder.

- 2005 Global trends in world fisheries: impacts on marine ecosystems and food security. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 360(1453) : 5-12.

Rausch, A.

- 2012 "A framework for Japan's new municipal reality: assessing the Heisei *gappei* mergers." *Japan Forum*, 24(2) : 185-204.

Rausch, A.S.

- 2015 "The Heisei Municipal Mergers." In S.Assmann (ed) *Sustainability in Contemporary Rural Japan: Challenges and Opportunities*, p.35-48. Routledge.

Ruddle, K.

- 1987 *Administration and conflict management in Japanese coastal fisheries* (No. 273). Food & Agriculture Organization.

Smit, B., Burton, I. and Klein, R. J. T.

- 1998 The Science of Adaptation: A Framework for Assessment. Paper presented at Intergovernmental Panel on Climate Change Workshop, 'Adaptation to Climate Variability and Change', San José, Costa Rica, 29 March - 1 April 1998.

Smit, B. and J. Wandel

- 2006 "Adaptation, adaptive capacity and vulnerability" *Global Environmental Change* v 16, pp 282-292.

Symes, D. and Frangoudes, K.

- 2001 The social organisation and reproduction of inshore fishing. In *Inshore fisheries management* (pp.159-175). Springer Netherlands.

Van Ginkel, Rob.

- 2001 "Inshore fishermen: cultural dimensions of a maritime occupation." *Inshore fisheries management*, pp.177-193. Springer Netherlands.

Wilhelm, J. and A.E. Delaney.

- 2013 "No homes, no boats, no rafts: Miyagi coastal people in the aftermath of disaster." Book chapter in T. Gill, B. Steger and D. Slater (eds.) *Japan Copes with Calamity: Ethnographies from the Tsunami, Earthquake, and Nuclear Disasters*. Peter Lang Publishing.

Nobuyuki Yagi, Akira Takagi, Yukiko Takada and Hisashi Kurokura.

- 2010 Marine protected areas in Japan: Institutional background and management framework. *Marine Policy*. 34 : 1300-1306.

