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“Comprehensive Research on Local Contexts of Disaster Recovery” Annual Report 2019

The Disaster/Reconstruction Process: a Case Study of Onagawa Town

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Section 1: The Regional Characteristics of Onagawa

Onagawa is a Japanese town located in Oshika District, Miyagi Prefecture. It is characterized by a landform where the coastline is highly indented. Due to this type of landform, there are two distinct environments in Onagawa: a central part and a remote peninsula. Ports and fish markets were developed in the central zone, starting with the construction of Onagawa Port in the 1920s. Fishery processing plants, public facilities, railway stations, and stores began to concentrate in the area, which led to the expansion of certain industries including fishery processing, commerce, and tourism. In contrast, on the remote peninsula, settlements have formed along the coastline since premodern times, and coastal fishing and aquafarming have been conducted using fishing ports created for each community as a base.

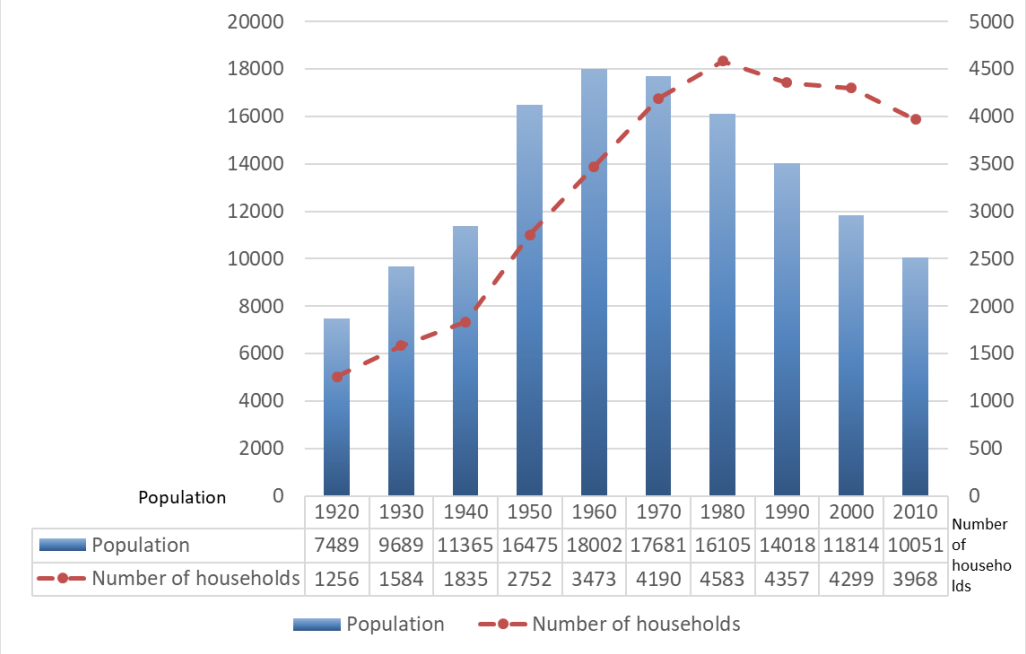
The Onagawa Nuclear Power Plant, managed by Tohoku Electric Power Co., Inc. (hereafter referred to as the Onagawa Nuclear Power Plant) is located in Onagawa, a financially well-off municipality that has benefited from property tax revenues and grants under the Three Laws of Electric Power Generation.

Figure 1. Positional relationships between the central part of Onagawa, the remote peninsula’s settlements (districts), and the location of the Onagawa Nuclear Power Plant

Source: Prepared by the author by referring to the figure depicted in “Reconstruction and Town Development Information Exchange” (http://www.onagawa-info.com/revive/index.html, obtained on May 10, 2015). The position of the Onagawa Nuclear Power Plant is indicated by △.

Part 1: Pre-disaster Population and Industrial Structure of Onagawa

Figure 2 shows the changes in Onagawa's population and number of households before the earthquake. The population and number of households have been declining since the 1970s.



	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
Population	7489	9689	11365	16475	18002	17681	16105	14018	11814	10051
Number of households	1256	1584	1835	2752	3473	4190	4583	4357	4299	3968

Figure 2. Changes in Onagawa's Population and Number of Households Over Time Before the Earthquake (through 2010)
Source: Created by the author based on the Onagawa Town Planning Division (2010, 2014)

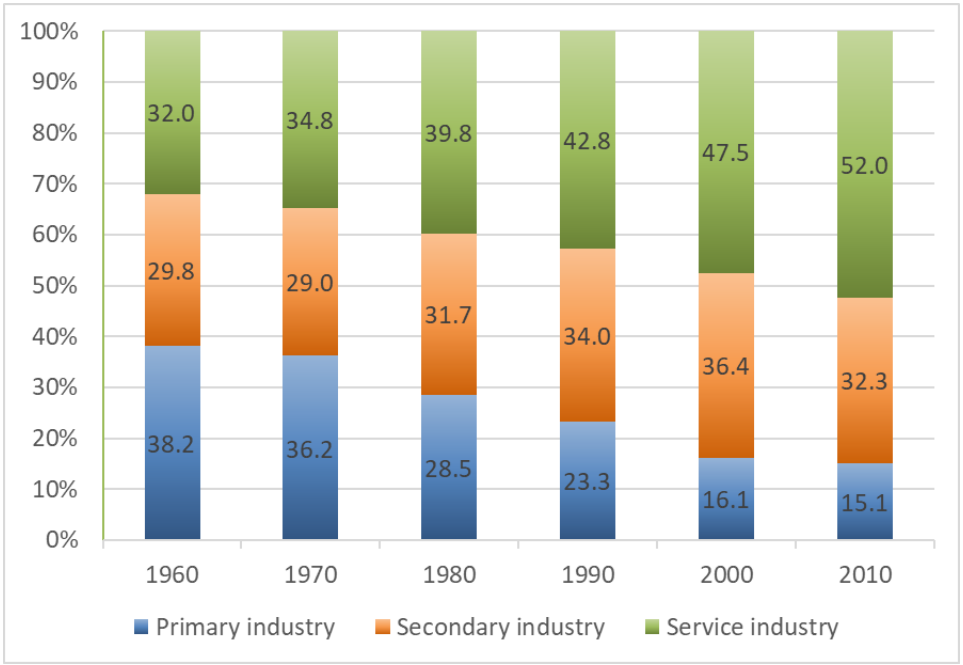


Figure 3. Changes in Employment Ratio by Industry in Onagawa Over Time Before the Earthquake (through 2010)
Source: Created by the author based on the Onagawa Town Planning Division (1991, 2014)

Figure 3 shows changes in the ratios of people working by industry in Onagawa before the earthquake struck. The proportion of people working in primary industries fell gradually from 1960 to 2010.

Looking at the number of people working by industry in detail, together with the 2010 national census (conducted just before the earthquake), revealed that manufacturing accounts for the largest share of employment (23.9%) followed by agriculture, forestry, and fisheries (15.1%), then wholesale and retail businesses (12.3%).

The core of the manufacturing industry is the fishery product processing industry, based in the central part of Onagawa and the vicinity of Onagawa Port. Skipjack tuna fishery and whaling (the town’s main fishery activities) were forced to decline due to restrictions on deep-sea fishing grounds by the establishment of an exclusive economic zone of up to 200 nautical miles in the 1970s and the anti-whaling movement.

Faced with a crisis in the fishing industry, the strategy taken by the town’s administration and interested parties in the fishing industry was to attract fishing vessels that capture widely-caught, popular fish species (such as Pacific saury) and to develop joint ice-making facilities. In addition to inviting fishing vessels to secure fish landing at Onagawa Port, joint ice-making projects enabled fishery processors in the town to procure large amounts of ice needed to maintain the freshness of fish at a low cost. In this way, Onagawa Port became a fishing port with high price formation and wage support power. Especially with respect to Pacific saury, the port grew as one of the largest landing ports in the country. Many of the local fishery processors added fish to their business items and led successful operations.

The heart of fisheries was aquafarming, carried out in each settlements on the remote peninsula. In particular, silver salmon farming spread rapidly among fishermen in town (*Ishinomaki Shimbun*, dated May 16, 1983).

In wholesale and retailing, business establishments were located in the central part of town, where Onagawa Station is located. Starting in the 1980s, an increase in demand was seen in the service industry (such as lodging and retailing) for workers from the electric power company and its affiliated companies.

Part 2: Building the Onagawa Nuclear Power Plant and the Distribution of its Benefits

Starting around when Unit 1 of the Onagawa Nuclear Power Plant (1984) began commercial operations, Onagawa’s property tax revenues—associated with the construction of the nuclear power plant—increased rapidly; the scale of its budget also expanded. This can be explained by the fact that grants under the Three Laws of Electric Power Generation (hereafter referred to as the Three Laws of Electric Power Generation grants)—developed by the government in fiscal year (FY) 1980 to operate smoothly at power source locations—were provided for the first time. When Unit 1 began operating in 1984, property tax on Unit 1 was paid to the town in FY 1985; the total revenue at the end of the fiscal year was 5.44027 billion yen. Onagawa’s financial strength index reached 1.47 in 1985, a significant improvement from 0.58 in the previous fiscal year (Planning Division, Onagawa Town Office 1991: p. 175). After FY 1985, the amount of property tax paid to the town rose due to the construction of Unit 2 in FY 1989 and Unit 3 in FY 1996. The overall revenue at the end of FY 2010, immediately before the earthquake, reached 6.1542 billion yen in the general account (of which property tax accounted for ¥3.68959 billion yen) (Onagawa Town 2014: 102-106).

Following the decision to build and encourage the construction of other nuclear power plants, grants under the Three Laws of Electric Power Generation, as well as cooperation subsidies and donations from Tohoku Electric Power Co., Inc., began to flow into the town’s coffers. The town’s administration carried out the development of

public facilities using revenue resources related to the nuclear power plant (Table 1).

Table 1. Onagawa Facilities Developed by Grants for Measures to Promote the Establishment of Electric Power Facilities before the Earthquake

(Unit: Thousand yen)

Facilities	Fiscal year	Project costs	Amount of subsidies
Lifelong learning center	1980～1982	1,041,847	852,447
General gymnasium	1982～1983	796,459	647,189
Wastewater treatment facility for fish market	1989	307,455	250,000
Waste incineration plant	1990	627,270	498,000
Fisheries tourism facilities	1992～1993	1,831,900	1,390,000
Municipal hospital	1995～1996	3,550,772	1,546,804
Welfare center / Geriatric health services facilities	1997～1998	1,747,900	770,000
Municipal second multipurpose playground	1997～1998	1,045,650	526,250
Final treatment site for general waste	1999～2001	1,012,800	600,000
Town road(Yokoura-Oishiharahama line)	2004～2006	1,627,500	1,109,000
Hot spring facility	2005	309,750	248,152

Source: "Nuclear Power Administration in Onagawa," a document provided by the section in charge of nuclear power measures in the Planning Division of Onagawa: 21-27.

Part 3: Industry Groups Prior to the Disaster in Onagawa

Before the disaster, industry groups had political influence in Onagawa. In particular, those representing the fishery processing industry and commerce repeatedly engaged in cooperation and confrontation over the direction of regional development. The main issue was the distribution of benefits received from the nuclear power plants.

The Onagawa Fish Market Purchasers Cooperative Association (hereafter referred to as the Purchasers Association) represented the fishery processing industry. The Purchasers Association led the development of the joint ice-making facility and the invitations of fishing vessels. The construction of the Fisheries Regional Distribution Processing Center began in 1980, which cost 280 million yen. Out of that amount, the center received subsidies of approximately 128.65 million yen from the national and prefectural governments, in addition to a grant of 28 million yen from Onagawa. After the construction project was finished, the Purchasers Association submitted a petition related to loan repayment to the town council, which resulted in a payment (reimbursement) of 120 million yen from Onagawa (Onagawa Fish Market Purchasers Cooperative Association 1998: p. 38). Subsequently, the Purchasers Association was able to cover most of the costs for the joint ice-making facility with publicly funded resources. For the joint ice-making facility, the Purchasers Association filed a petition with Tohoku Electric Power Co., Inc. to lower the electricity rate, because electric charges accounted for a large portion of the facility's operating expenses. Tohoku Electric Power Co., Ltd. received the petition from the Purchasers Association and gradually reduced the electricity rate (Onagawa Town 1991:248).

A special fund for industry-related promotion in Onagawa (1979)—which was established with part of Tohoku Electric Power Co., Inc.'s nuclear power plant construction cooperation fund (600 million yen)—was used to

attract fishing vessels (Onagawa Town 1991: 67-68).

Along with the advancement of the fishery processing industry after the Onagawa Nuclear Power Plant was built, nuclear power plant-related financial resources were applied abundantly. Tohoku Electric Power Co., Ltd. also gave direct and indirect support to the local fishery processing industry. The Purchasers Association had built a solid financial foundation right before the Great East Japan Earthquake and became the most powerful industry trade group in town, both in terms of its reputation and accomplishments.

The Commerce and Industry Association represents commerce and industry. Just before the earthquake struck, it had approximately 340 businesses as members,[1] with a focus on drawing tourists from outside the community through events such as *the Pacific Saury Harvesting Festival*. It became the driving force behind Onagawa’s community development.

In addition to being involved in community development by holding events, the Commerce and Industry Association provided opportunities to voluntarily discuss the revitalization of community growth. In June 2010, the Commerce and Industry Association launched *the Onagawa Community Development School* to examine measures for population maintenance and to rejuvenate the town. Along with experts, commercial and industrial merchants who attended *the Onagawa Community Development School* debated the ideal path forward for local community planning and industry.[2]

Nearly all businesses operating in town were members of the Commerce and Industry Association, representing a wide range of talent, ranging from young to elderly people. Of the local community organizations, the Commerce and Industry Association could formulate and implement its own policy ideas for community development while taking an independent stance from the town’s administration.

Part 4: Tsunami Damage of Onagawa

Onagawa has ria landforms where the coastline is complexly indented; as a result, its flatlands are very limited. Due to these geographic features, the town was struck by the tsunami (which exceeded 10m in height) on March 11, 2011. The tsunami traveled upstream in the narrow landforms in the central part of town and on the remote peninsula, causing enormous damage. While Onagawa had a small proportion of the areas inundated by the tsunami in the municipal zone, the tsunami caused a significant number of casualties and enormous damage to houses.

[1] From an interview survey held on November 14, 2014 with the Commercial and Industrial Business Cooperative Association.
[2] From an interview survey held on March 8, 2013 with the Reconstruction Liaison Council.

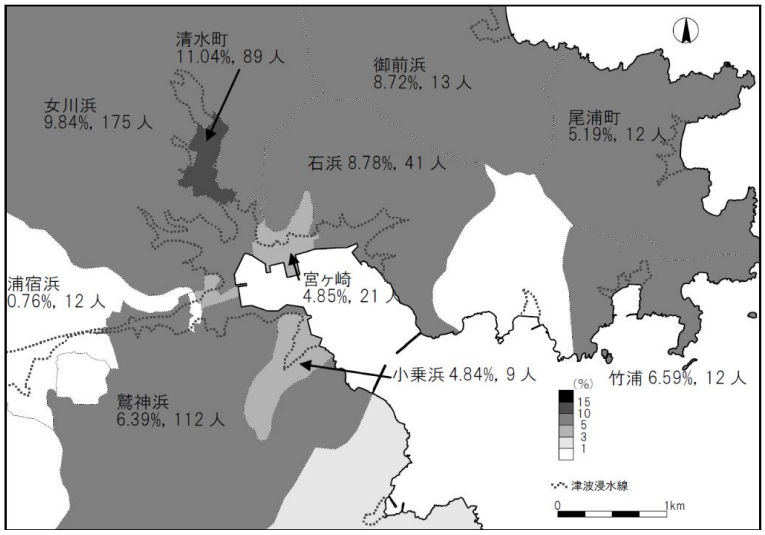


Figure 4. Mortality rates by district in the central part of Onagawa (Tani 2012: p. 12)

There were 827 confirmed and presumed deaths from the tsunami (as of March 1, 2015). Out of 4,411 homes, the overall number of houses damaged was 3,934 (89.2%), 2,924 of which (66.3%) were completely destroyed.[3]

The town's industries also suffered enormous destruction. Commercial and industrial merchants endured ruin from the tsunami and were forced to close their doors. In particular, the havoc wreaked on the fisheries industry (the town's core industry) was serious. The amount of harm done to the fishery industry reached about 37 billion yen, accounting for nearly 50% of the damage suffered by the town.

After the earthquake, a 13-meter tsunami hit the site of the Onagawa Nuclear Power Plant, and three of the five external power systems were cut off. Consequently, the Onagawa Nuclear Power Plant was forced to cool nuclear fuel with only one of the two remaining external power systems (except for one that was under inspection at the time of the tsunami). Fortunately, the Onagawa Nuclear Power Plant avoided serious accidents. Subsequently, all three nuclear reactors (including Unit 2, which was undergoing periodic inspections at the time) were shut down (Shinohara 2012: 101-103).

Section 2: The Disaster/Reconstruction Process of Onagawa

Part 1: Evacuation and Provisional Life Phase

There were 238 secondary evacuees from Onagawa who were forced to evacuate (Regional Reconstruction Assistance Division, Earthquake Reconstruction Planning Section, Miyagi Prefecture 2011). Following the devastation of the tsunami, the town's administration built 1,285 temporary homes at 30 sites both in and outside Onagawa by November 6, 2011. Due to topographical constraints, part of the temporary housing complex was built outside Onagawa. Since the housing ownership rate had been higher before the earthquake, private businesses had a small number of rental homes available. As a result, temporary housing provided to the victims mostly consisted of complex-type, prefabricated, emergency temporary homes. In Onagawa, the housing

[3] Onagawa Town, "Damage Status in Onagawa Town," Onagawa's website (http://www.town.onagawa.miyagi.jp/ayumi.html, accessed on April 21, 2016).

infrastructure development project was completed in FY 2018, but a certain number of residents were waiting for the progress and completion of the reconstruction project for more than five years while continuing to live in temporary housing (Figure 5).

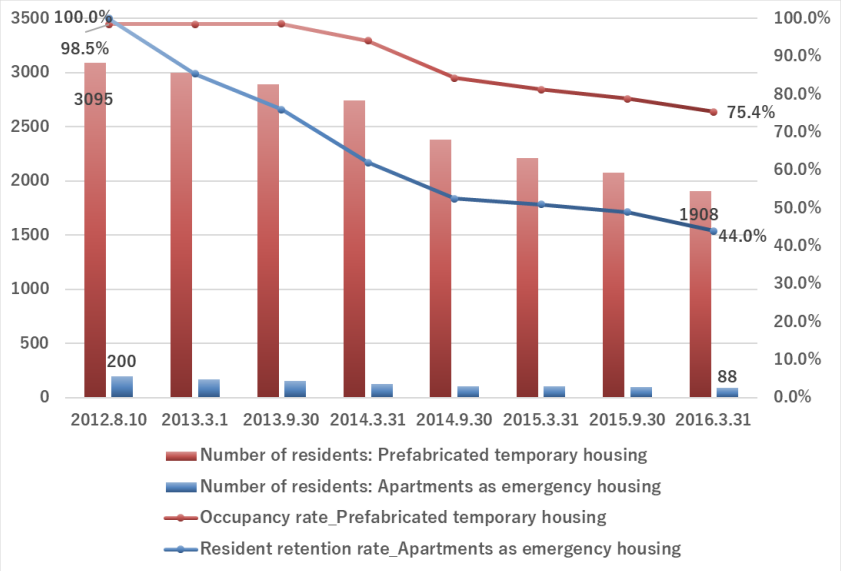


Figure 5. Changes in Trends in Temporary Housing Occupancy in Onagawa Over Time

Source: Created by the author based on the Miyagi Prefecture main website, "Occupancy Status of Emergency Temporary Housing," Earthquake Relief Office, Health and Welfare Section, Miyagi Prefecture (accessed on December 10, 2016, http://www.pref.miyagi.jp/site/ej-earthquake/nyukyo-jokyo.html)

Meanwhile, Onagawa is known where the population thins drastically after earthquakes. According to Nagamatsu's analysis, the population growth rate in Onagawa (March 1, 2012–August 1, 2015) from the second and subsequent years after the earthquake was below -15% (Nagamatsu 2016: p34-35).

Part 2: Recovery Phase

In this paper, the time up until the formulation of the reconstruction plan is viewed as "the recovery phase". Next, the primary events and transitions that took place in Onagawa during this time will be described.

Part 2-1: Overview of the Reconstruction Plan/Project in Onagawa

The reconstruction plan/project in Onagawa is embodied by land readjustment projects with an area of approximately 200 hectares in the town's central zone (Figure 5). Among them, several endeavors—such as a disaster prevention group relocation promotion project and a disaster public housing construction project—are being implemented simultaneously.

The town's administration aims to create a compact urban area that serves as a hub by consolidating administrative, medical, commercial, and other functions (Suda 2015: 74-75). The center is divided into three sectors: housing, commerce, and industry. In the housing zone, disaster public housing was built by developing housing complexes in the hills.

The commercial area was placed around Onagawa Station; tenant-type shopping districts and a regional exchange center were erected. The industrial area was placed behind the fish market, and a fishery processing complex was built.

In 15 settlements on the remote peninsula, a disaster prevention group relocation promotion project, and a fishery community disaster prevention function enhancement project (54 hectares in total)—accompanied by relocation to high ground—are being planned and publicized as reconstruction initiatives.

In contrast to the progress of the land readjustment projects in the central zone, reconstruction planning for the settlements on the remote peninsula, and policy procedures related to the reconstruction projects, were somewhat delayed. The town's administration formulated the plan for relocation to high ground after FY 2013 for each settlement on the remote peninsula.

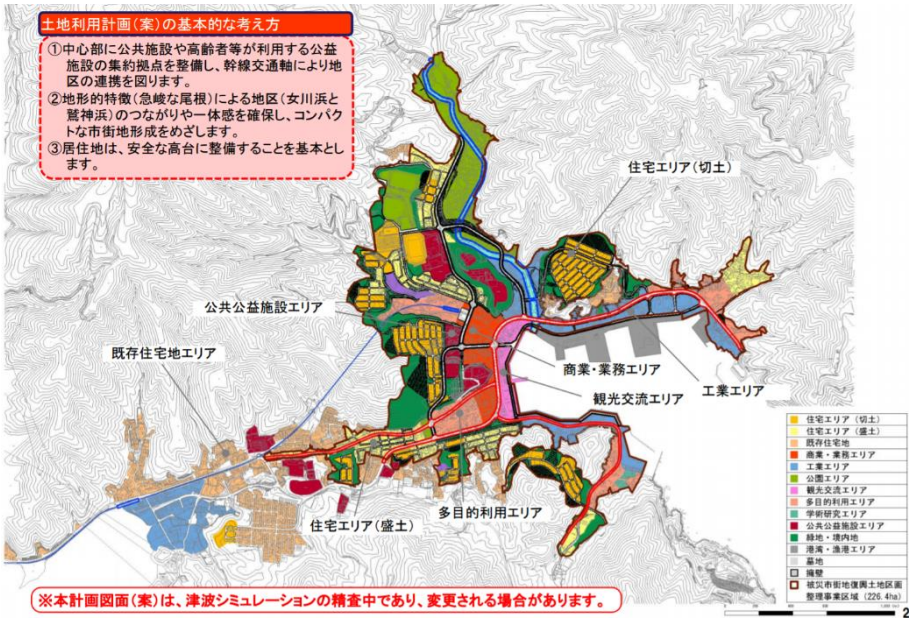


Figure 6**.** Outline of the Land Use Plan in the Central Part of Onagawa

Source: The 2nd Onagawa Town Reconstruction and Development Briefing Document (the central part of the town, conducted from June–July 2012)

Part 2-2: Formulating the Reconstruction Plan

On May 1, 2011, the town's administration launched the Reconstruction Promotion Headquarters, led by the town's mayor, to oversee reconstruction-related efforts. At the same time, the town's administration founded the Committee on Reconstruction Planning, and proceeded to handle issues and arrange for consultations with the aim of creating reconstruction plans. The committee consisted of 12 members, plus 2 advisors (academic experts) and 5 secretariats (town staff). Of the 12 members, 6 were university professors, experts, and people involved in Miyagi Prefecture's affairs, while the other 6 were involved in Onagawa's affairs. One representative each from the Fish Market Purchasers Cooperative Association, the Commerce and Industry Association, the Tourism Association, Miyagi Prefecture Fisheries Cooperative Association (Onagawa Branch), the District Leader

Association, and the Town Women's Association were jointly appointed as a committee.[4]

In the process of devising the reconstruction plan, the town's administration held public hearings to encourage residents' participation. To do so, the town's administration coordinated four events by district, and then organized a separate meeting for the Reconstruction Liaison Council (to be discussed later). The mayor and members of the reconstruction planning committee attended the public hearings and proposed a tentative zoning plan in the central area, as well as potential sites for relocation to higher ground based on the three pillars of the reconstruction policy ("the creation of a safe and secure port town," "the revitalization and development of port town industries," and the "development of a comfortable port town for living"). They also exchanged opinions with residents (Onagawa Town 2011b).

There was a misunderstanding between the administration and residents regarding the reconstruction plan on the remote peninsula. At the first public hearing, the committee presented a plan to carry out high-ground relocation on the remote peninsula to the residents. This proposal did not intend to carry out the project for all 17 settlements on the peninsula. Instead, it was meant to be executed after consolidating the settlements at four sites. At the hearing, the residents expressed opinions against such consolidation; the administration ended up removing the description of it from the reconstruction plan in response to the residents' requests at the second public hearing.

Part 2-3: Creation of Reconstruction Town Development Organizations by the Federation of Industry Groups

On April 19, 2011, Onagawa established *the Reconstruction Liaison Council* (hereafter referred to as FRK), a federation of industry groups. Representatives of major industry groups (such as the Purchasers' Association, the Commerce and Industry Association, the Fish Market Purchasers Cooperative Association, and the Tourism Association) were appointed as FRK directors. Prior to the formulation of the reconstruction plan, the FRK held consultations with the town's administration and the town's council, and urged them to reflect the voices of industry groups and workers in the reconstruction plan. After its was founded, the FRK held consultations on a committee-by-committee basis (such as fisheries and commerce). The results of the consultations were reflected in the draft disaster reconstruction plan compiled by the FRK, which placed particular emphasis on economic reconstruction.

> *The fishing industry, as well as related commerce and other sectors, built the economic foundation of Onagawa. The Onagawa Bay and the Sanriku Sea—which extends over the entire region—are called the major fishing grounds of the world; they are indispensable assets for Onagawa. <u>The economic reconstruction of Onagawa would be impossible without the reconstruction of the fishing industry,</u> which can utilize these assets and advantages of the town's location.*[5]
>
> (Reconstruction Liaison Council Document, "Basic Concept of Onagawa Town Reconstruction Plan," p. 7)

[4] Report on Reconstruction Planning Committee Activity · The 1st Committee (May 1, 2011) · Document 1, "List of Members of the Onagawa Town Reconstruction Planning Committee," Onagawa Town website (http://www.town.onagawa.miyagi.jp/hukkou/pdf/iinkai/01_meeting/01_meeting_appendix1.pdf, accessed on August 2, 2017).

[5] The underlined area was emphasized in red in the document.

For the FRK, economic reconstruction was meant to occur within the medium to long term by creating added value and ripple effects via collaboration between the fishing industry and commerce.

The town's administration and council gave consideration to the FRK's proposal of the reconstruction plan. At the time, the proposed plan that the town's administration had considered was centered on tangible projects, such as disaster prevention and infrastructure development; the perspective on economic rebuilding was limited. FRK's proposal would supplement the viewpoints lacking in the administration's reconstruction plan; the administration perceived it as intriguing.[6] Thus, FRK's proposal was mostly reflected in the town's reconstruction plan.

Part 3: Reconstruction Phase

In this paper, the period from the formulation of the reconstruction plan to the present is defined as "the reconstruction phase." The main events in Onagawa during this phase, as well as the transitions, will be described.

Part 3-1: The Reconstruction Town Development Promotion Council and Related Consultative Bodies

In Onagawa, after the reconstruction plan was created in September 2011, a reconstruction system that integrates the policy areas of housing and industry was developed. In November 2011, the town's administration founded *the Onagawa Town Development Promotion Council* (hereafter referred to as the Promotion Council) to promote the plan, to manage its progress, and to help various organizations in town cooperate with one another. The Promotion Council consisted of 11 members. Five of them were town office employees; the other six were representatives from the Purchasers Association, the Commerce and Industry Association, the Tourism Association, the Fish Market Purchasers Cooperative Association, the District Leaders Association, and the Women's Association. They served as members of the reconstruction plan committee. Three working subcommittees (the port town development subcommittee, the health town development subcommittee, and the spiritually rich human development subcommittee) were established within the Promotion Council. The Reconstruction Promotion Headquarters reviewed the residents' opinions (summarized by the working subcommittees) and reflected them in the policies and content of the town's reconstruction plan and projects.

In FY 2012, the town office established *the Town Development Working Group* (hereafter referred to as the WG) in June. Members of the WG needed to be registered and were selected at the recommendation of the Promotion Council and the public recruitment process. Approximately 60 people took part in the WG, consisting of a group of related parties diverse in gender, generation, and the organizations to which they belong, including industry trade groups, such as the Youth Division of Commerce and Industry Association, and the Tourism Association, as well as experts.[7] The background of this outcome is based on recognition of the need for gathering residents' opinions extensively in order for the town's administration to examine the arrangement of public facilities toward formulating the reconstruction project implementation plan. The members of the Promotion Council consisted of representatives from local organizations, but the members of the WG were not

[6] From an interview survey held on March 28, 2017 at the Public-Private Partnership Office of the town's Industrial Promotion Division.

[7] 1st Edition of the "Onagawa Town Development Working Group Magazine" (published on July 9, 2012), an interview survey with the Reconstruction Promotion Division held on March 8, 2013, and an interview survey with representatives from the Commerce and Industry Association, held on March 28, 2017. As the activity began, the number of core members with high participation rates became around 20-30. According to the testimony of the representatives from the Commerce and Industry Association, about half of the WG's members were also members of the FRK.

limited to representatives from local organizations. After the WG was created, the Reconstruction Promotion Headquarters and the Promotion Council became responsible for managing the reconstruction plan's progress, while the WG was in charge of providing information to—and gathering opinions from—the residents on the project.

The Reconstruction Town Development Design Conference (hereafter referred to as the Design Conference) was launched on September 11, 2013 as a consultative body to collect the opinions of residents gathered by the WG. At the conference, a review committee was founded for housing complexes in the central area and on the remote peninsula, including commercial zones located in front of the station. The review committee discussed townscape planning in each district. Except for academic experts, the participants mainly consisted of the mayor, three members of the committee, representatives from each section of town, and reconstruction and construction businesses (Shiigai & Shimoda, 2016: 36-37). Residents were able to participate. Young people (from high school students to people in their 40s) took part as well (Iwamoto 2015). The Design Conference was a consultative body established on the premise of collaboration with the WG, and the WG's members participated as observers. The content of the discussion by the WG's review committee was reflected in the discourse of the Design Conference.[8] The results were summarized in the Outline of the Onagawa Town Development Design."

The reconstruction consultative organization, operated by the town, was rearranged starting in FY 2014. The town's administration designed the role of the reconstruction consultation organization based on residents' participation regarding ① the place of participation and opinions reflected, and ② the field of learning and practice. For the former, the "town resident workshop" and "public facility town residents' council" were created. These consultative organizations included those recommended by town entities and the section in charge of the town office, as well as those registered in the WG.[9] Anyone could take part in the latter, and various events called Town Activities (lecture meetings, town walks, workshops, etc.) were implemented.

Thus, at the reconstruction consultation forum during the second half of the reconstruction period, a variety of issues related to the town's development were examined based on the broad participation of the general public.

Part 3-2: Developing the Commercial Zone in Front of Onagawa Station and its Promotion System

After the earthquake, the commercial area in front of Onagawa Station was mentioned as a symbol of the town's reconstruction. The JR Senseki Line, which had been washed away by the tsunami, resumed full operations on March 21, 2015 due to operations between Watanoha Station and Onagawa Station. The Onagawa Station Building opened on March 21, 2015 to correspond with the reopening of the Senseki Line. Subsequently, on December 23, 2015, *Seapal-Pier Onagawa*, a tenant shopping center in front of the station, opened.

[8] "Onagawa Town Development Working Group Final Report Meeting Letter" (Onagawa Town Website, "FY 2013 Onagawa Town Development Working Group Regular Meeting Letter,"
http://www.town.onagawa.miyagi.jp/hukkou/pdf/working/h25/h25_teirei03.pdf, acquired on August 7, 2017).
[9] "FY 2015 Onagawa Town Development Working Group 3rd Regular Meeting Letter" (from FY 2013 Onagawa Town Development Working Group Regular Meeting Letter, accessed on August 3, 2017) and from participant observation and field notes on the "FY 2013 Onagawa Town Development Working Group Activity Performance Report Meeting" held on March 26, 2014.

Photo 1. People gathering at a town opening event in front of Onagawa Station and Onagawa Station Building
Source: Photo taken by the author (March 21, 2015)

Regarding the tenant shopping center in the commercial zone in front of the station, 27 stores (including restaurants and merchandise stores) had already moved in as of December 23, 2015 at the time of the commemorative opening event (*Ishinomaki Kahoku*, December 23, 2015). For development, the town used a tsunami and nuclear power plant location subsidy provided by the Ministry of Economy, Trade and Industry, and appropriated the subsidy to cover 70% of the project’s cost. For commercial and industrial businesses, joining the tenant shopping center gave them an advantage in restarting their operations while keeping down initial investment and maintenance costs. Characteristics of the development of commercial and industrial areas and the associated promotion system included the launch of a town development company (TMO) that conducts area management of the central zone. In May 2013, the town’s administration presented a proposal to commercial and industrial businesses to establish a consultative organization to develop commercial areas in the central zone.[10] Following this proposal, *the Central Urban Commercial Area Reconstruction Council* (hereafter referred to as the Commercial Area Reconstruction Council) was founded in June 2015. Twenty-one people, mainly members of the Commerce and Industry Association and the FRK, were appointed to the board of the Commercial Area Reconstruction Council. The council focused on who would take initiative in developing the central commercial zone, which held the key to economic reconstruction. As of FY 2013, the town’s administration was unable to allocate manpower for the growth of commercial locales in the central part of the city, as it promoted the expansion of public housing for disasters. Industrial trade groups, such as the Commerce and Industry Association, also needed to focus on supporting individual businesses restarting operations, which made it difficult to devote manpower to the growth of commercial zones in the central part of town, as the town’s administration did. Therefore, the Commerce and Industry Association planned to launch a TMO. The proposal to establish a TMO was being considered by members of the Commerce and Industry Association, who gathered at the FRK prior to

[10] In April 2013, a preparatory committee was founded in response to a request from the Town Industry Promotion Division (from an interview survey held on March 28, 2017 with the person in charge of the Commerce and Industry Association).

the earthquake. The purpose of founding a TMO was to clarify the entities responsible for the development of commercial zones.[11]

In June 2014, *Onagawa Future Creation Co., Ltd.* (hereafter referred to as Future Creation), a TMO, was created. As the members of the board, the chairman of the Town Tourism Association was appointed president, while the chairman of the Commerce and Industry Association was appointed the director and senior advisor, and six people were appointed as executives. Future Creation applied for a tsunami and nuclear power plant location subsidy, and the Community Rebuilding Plan was approved, to be implemented by the government in December 2014.

Prior to the establishment of Future Creation, in April 2014, the town administration opened the Public-Private Partnership Office within the Industrial Promotion Division, appointed three staff members, and created a system to support a TMO within the town office (*Ishinomaki Kahoku*, March 28, 2014). The work of the Public-Private Partnership Office was to aid the management and activities of Future Creation by coordinating use and rights in the project areas in the central commercial zone, coordinating with the country on various types of subsidy applications, and supporting the initiation of project schemes such as the Community Rebuilding Plan. In this way, various stakeholders who participated in the Commercial Area Reconstruction Council (such as the Commerce and Industry Association and the Public-Private Partnership Office) became involved in the development of commercial sites in front of Onagawa Station, as well as in the management of Future Creation.

The following figures shows the recovery phase and reconstruction system during the reconstruction phase. The reconstruction system was created when several industrial trade groups based in the central part of town—which had emerged after nuclear power plants were drawn to the area and began to operate—strengthened their sense of solidarity in the face of the emergency situation involving rebuilding after the disaster.

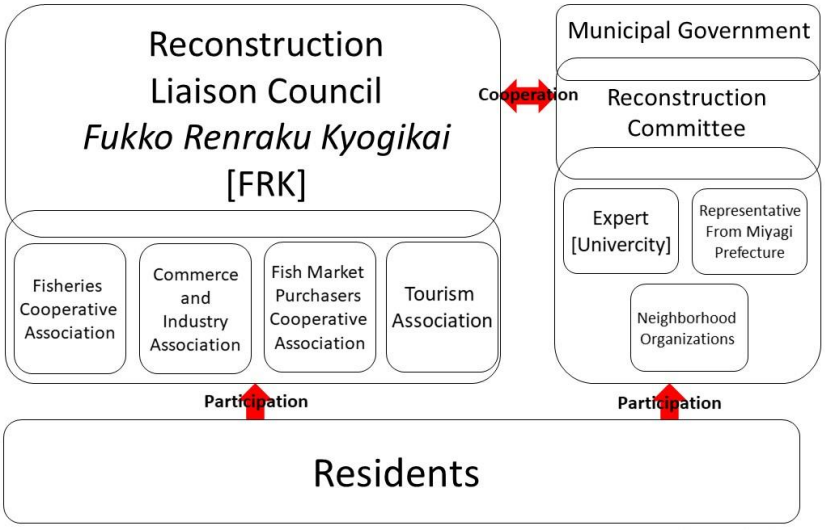


Figure 7. The Reconstruction System in Onagawa (Recovery Phase)

[11] From an interview survey held on March 28, 2017 with the person in charge of the Commerce and Industry Association.

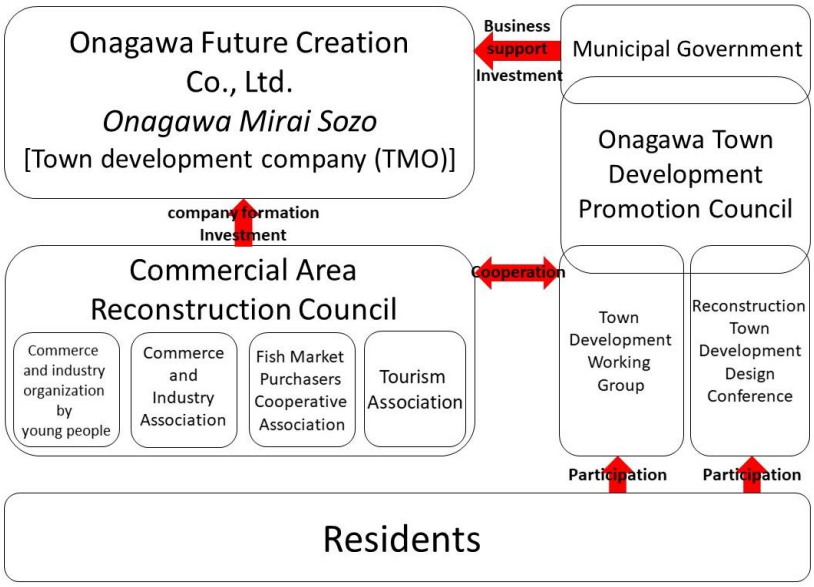


Figure 8. The Reconstruction System in Onagawa (Reconstruction Phase)

Part 3-3: The Relationship between Reconstruction and Nuclear Power Plants

In Onagawa, issues concerning the nuclear power plant never become a topic of discussion during the formulation of reconstruction plans and the operation of reconstruction projects. At the meeting where the WG's results were reported, the materials distributed did not mention the Onagawa Nuclear Power Plant, and the WG's members did not refer to it.[12]

In the first place, FRK's proposal for reconstruction, and the reconstruction plan compiled by the town's administration, did not have any specific details on the Onagawa Nuclear Power Plant. In this regard, elected officials who were anti-nuclear power advocates raised an objection, claiming that safety measures to be taken in the event of a nuclear accident must be mentioned (*Kahoku Shimpo*, September 14, 2014). Moreover, at public hearings on the reconstruction plan, the participating residents expressed that it would be essential to clarify how the Onagawa Nuclear Power Plant was viewed within the reconstruction plan. In response to the opinions of the residents and the town council's members, the town's administration asserted its stance that "businesses will be asked to continue keeping safety in mind while taking part in projects. The reconstruction plan will be limited to items related to the livelihood of the residents, and coexistence with the power station will be considered separately."[13] Social issues related to the Onagawa Nuclear Power Plant (including relaunching the plan) should not have been discussed actively in the process of rebuilding from the perspective of the industry trade groups and town's administration, which had been leading the town's reconstruction process.

> *[As of FY 2012] We are not at the stage of discussing the appropriateness of restarting nuclear power plant operations right now. We will aim for community development centered on the fishing tourism industries for self-sustaining development.*

[12]Participant observation and field notes on the 2013 Onagawa Town Development Working Group Activity Results Reporting Meeting held on March 26, 2014.
[13]The Onagawa Town Reconstruction Planning Committee Activity Report · 3rd Committee (June 10, 2011) · Document 1, "Content of Reflections in the Onagawa Town Reconstruction Policy and Plan Based on the Results of Public Hearings," Onagawa's website (http://www.town.onagawa.miyagi.jp/hukkou/iinkai_00.html, accessed on August 9, 2017)

(Mayor of Onagawa, *Kahoku Shimpo*, December 22, 2012)

> *Since reconstruction is our top priority, we want to avoid confusion. Honestly, I feel relieved that the reopening of the nuclear power plan has been delayed until after FY 2016.*
>
> (Onagawa Town Staff Member, *Kahoku Shimpo*, June 13, 2013)

In FY 2018, the decommissioning of Unit 1 of the Onagawa Nuclear Power Plant was decided; a political decision on restarting Unit 2 is now approaching. Therefore, the situation surrounding the Onagawa Nuclear Power Plant began to change rapidly outside the town.

Previous studies point out that the political leaders and residents of Onagawa exercise limited influence over restarting the Onagawa Nuclear Power Plant (Kuroda and Tsuji 2019). Nevertheless, the decommissioning and restarting of the nuclear power plant—which had benefited the town's financial and industrial development before the earthquake—will have a significant impact on Onagawa's reconstruction process, even after FY 2020.

Section 3: Hypotheses for the "Regional Optimal Solution of Reconstruction"

1) Factors Considered Important in Creating Regional Types

It is the industrial structure before the disaster. The reconstruction of Onagawa meant economic rebuilding by giving top priority to revitalizing the fishing industry and commerce, which had been slowly reviving before the disaster. Additionally, industry trade groups (fishing, commercial, and industrial organizations) played a central role in the reconstruction system. The pre-disaster industrial structure will prescribe the direction of industrial revitalization in affected areas and specify the composition of reconstruction actors.

2) Elements that Constitute the Reconstruction Evaluation Criteria

The focus should be on the extent to which social relations, damaged by the disaster, are being restored. Jun Oyane discusses the definition of reconstruction, as follows:

> Reconstruction does not definitively refer to the "re-development" of hard urban infrastructure, but it is just one possible means. Its original focus is probably the process of reconstructing damaged social relations. (Oyane 2012: p. 101).

In the questionnaire survey held in areas affected by the Great East Japan Earthquake, analyses were conducted using "(changes in) human relationships" as explanatory variables (Uchida 2015, Tsuji 2016). However, only a limited number of studies have identified human relationships as a basis for reconstruction evaluation and clarified the state of recovery.

3) Questions that Should Be Asked on a Questionnaire Survey

- If "the extent to which the social relations damaged by the disaster are being restored" is the element that constitutes the evaluation criterion for reconstruction, how to measure pre-disaster and post-disaster social relations should be considered. The authors believe that social relations can be clarified based on both objective indicators (such as the rates at which activities resume and at which residents join organizations) and subjective indicators based on the awareness of residents and local leaders.

- Indicators on regional governance capabilities (governability) are required. The extent to which local communities can take care of occupations, communities, and industries in the process of reconstruction depends on local governability, even on the assumption that the government pursues a uniformed reconstruction system. Indicators for measuring governance conditions and performances in affected areas (in particular, governance organizations and resident participations) should be considered. For example, Aldrich (2019) argues that due to multiple regression analyses using "municipal reconstruction speed" based on official statistics as a dependent variable, the number of dominant politicians (the number of powerful politicians) as a political variable (political factors) showed a positive effect, while the Liberal Party's support percentage (percentage supporting the Liberal Democratic Party [LDP]) represented a negative effect (Aldrich 2019: 72-101).

Note

This paper is a reconstruction of Kuroda and Tsuji (2019) and Tsuji (2019), with some additions and corrections.

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