Challenges for Realizing "Communities Where No One Is Left Behind"

Chapter 10

People Affected by Disasters

10-1 How to Prevent People Affected by Disasters from Being Left Behind

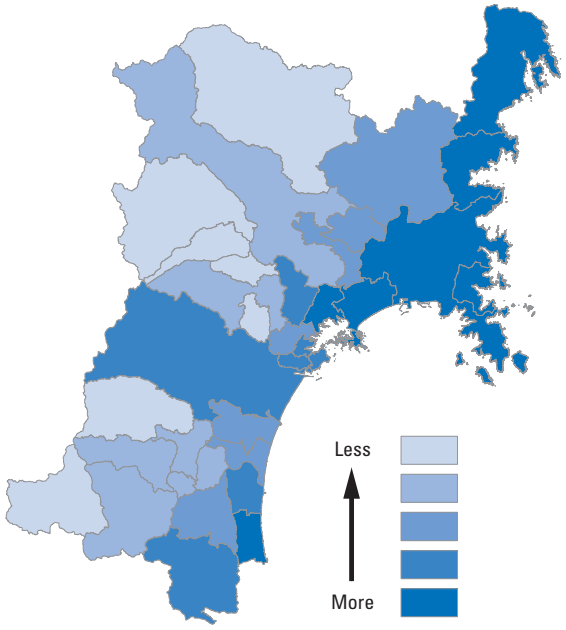
1 Disaster Damage and People Affected by Disasters in Miyagi Prefecture

The term "disaster" refers to the damage done to humans and society by a hazard, such as an earthquake or a fire. Disasters can be broadly divided into two categories according to the nature of the hazard: those caused by natural phenomena and those caused by human activity. Here, those impacted by disasters are referred to as "people affected by disasters," while the damaged areas are called "disaster areas."

In this chapter, two researchers who have been active in the affected areas of Miyagi Prefecture, the author and Dr. Dinil Pushpalal, and Tomoyuki Miura, who himself experienced the 2011 disaster, will explore the themes of natural disasters, the people affected by them, and disaster areas, from their own perspectives (see sections 10-2 and 10-3, respectively). In this section, I will highlight the challenges faced by people in Miyagi Prefecture, while touching upon issues pertaining to labels such as "people affected by disasters" and "disaster area."

Having suffered from numerous disasters throughout its history, Japan is known as one of the world's most disaster-prone countries. According to *SDGs and Japan*, between 1995 and 2016, Miyagi Prefecture had 508 people per 100,000 people killed or missing due to natural disasters, the highest out of all prefectures. Meanwhile, indicator F10,[*1] which measures damage to housing caused by natural disasters (per 1,000 housing units) by municipality from 2008 to 2020, shows that the coastal town of Onagawa had the largest number of damaged houses (1,000.1 houses per 1,000 units), followed by Higashi-Matsushima (724.4 per 1,000 units) and Minami-Sanriku (700.1 per 1,000 units). The town of Shichikashuku in the southern inland part of the prefecture suffered the least damage (1.5 houses per 1,000 units), followed by Kawasaki and Kami in the northern inland part of the prefecture (at 4.6 houses per 1,000 units and 7.6 houses per 1,000 units, respectively). This indicator underscores the fact that coastal areas suffered the most

Figure 10-1: **Damage to housing caused by natural disasters (Indicator F10)**



[*1] The number of housing units used to calculate F10 is the average between 2007 and 2020, which is extremely large for municipalities such as Onagawa because the total number of housing units declined significantly after the disaster while the number of damaged units was high.

damage. While the uneven distribution of damage is largely due to the damage caused by the tsunami following the Great East Japan Earthquake (2011), it is also important to note the damage caused by the Iwate-Miyagi Nairiku Earthquake in 2008 and by Typhoon Hagibis in 2019, mainly in the non-coastal area of Marumori.

Two further offshore earthquakes (2021 and 2022)[*2] occurred while this chapter was being written. However, the discussion in this chapter will focus primarily on the people affected by the Great East Japan Earthquake.

2 Problems with the Term "People Affected by Disasters" (*"Hisaisha"*)

(1) Definition and Diversity of "People Affected by Disasters"

Here, I would like to touch on several problems related to the term "people affected by disasters."

First, the people themselves have expressed unease with this label. The term "people affected by disasters" is used from the perspective of those outside the disaster area, and there is a reluctance among people in a wide range of situations to be lumped together, as this obscures their diversity. In the past, the author conducted a secondary analysis of narratives from victims of the Great East Japan Earthquake to try to capture this diversity and to identify what they saw as differences among them. The analysis revealed that such differences were perceived not only in social attributes such as age and generation, but also by the type and degree of damage suffered, and in terms of their ability to have a say in the recovery process (Maho Yamazaki, "Self-Perception of 'Affected People' in Disaster Recovery," *Disaster Recovery and Revitalization Review*, No. 16).

Furthermore, perceptions of the differences in damage suffered relates to the second problem with this label: the difficulty in answering the question, "Who is a 'person affected by a disaster'?" When discussing the Great East Japan Earthquake, common phrases include "the Tohoku disaster area," "the three disaster-affected prefectures (Iwate, Miyagi, and Fukushima)," "the disaster-hit Miyagi Prefecture," and so on. Although the definition of "disaster areas" and perceptions of these areas are highly variable and context-dependent (for example, the whole of Japan is sometimes viewed as a disaster area from a foreign perspective), the perception of Miyagi Prefecture as a disaster area is common both within and outside the prefecture. On the other hand, who in Miyagi Prefecture should be treated as a "person affected by the disaster," or in other words, who should be the focus of this chapter?

(2) Ambiguity of the Concept of "Being Affected by Disasters"

As can be seen from the variable nature of the term "disaster area," the phenomenon of "being affected by a disaster" can be delineated in countless ways, and cannot be simply viewed as a binary opposition of "yes" or "no." For example, there are various ways to measure this at the individual or household level (such as damage to residential buildings or physical injuries), and at the municipal or regional level (such as the number of dead or missing or the number of houses completely destroyed). Instead, being affected by disasters should be measured in gradations or "degrees" of being affected.

However, to determine the scope of public assistance from government agencies following a disaster, there is a need to clearly delineate the extent of being "affected by disasters." This leads to a variety of problems, as will be discussed below. Furthermore, the extent of damage and the corresponding media coverage, as well as the amount of support, form a "core" that attracts most of the attention and a "periphery" that does not. The images of "people affected by disasters" and "disaster areas" are constructed around this "core"; those who do not fit into this framework are marginalized. In the case of the Great East Japan Earthquake, the "core" includes people who lost their houses to the tsunami, areas that suffered severe damage, areas severely affected by the nuclear disaster, and people who were forced to flee their homes.

It is already known that victims consciously or unconsciously compare the extent of their suffering to others (for example, by thinking "I am still better off"). In addition, it is

[*2] Data on the damage caused by these two earthquakes is not included in the F10 indicator in this book.

not difficult to imagine that people on the "periphery" find it difficult to express their feelings and seek support as "disaster victims," given that most of the focus is on the "core."

In Miyagi Prefecture, where various areas have suffered severe damage in recent disasters, the issues surrounding the diversity of victims and the ambiguity of "being affected by a disaster" underline many of the challenges faced by such people. The discussion in this section is based on these realities, and I would like to consider all people affected in some way by the disaster as "people affected by the disaster." This is because this issue is closely tied to "being left behind," the main theme of this book.

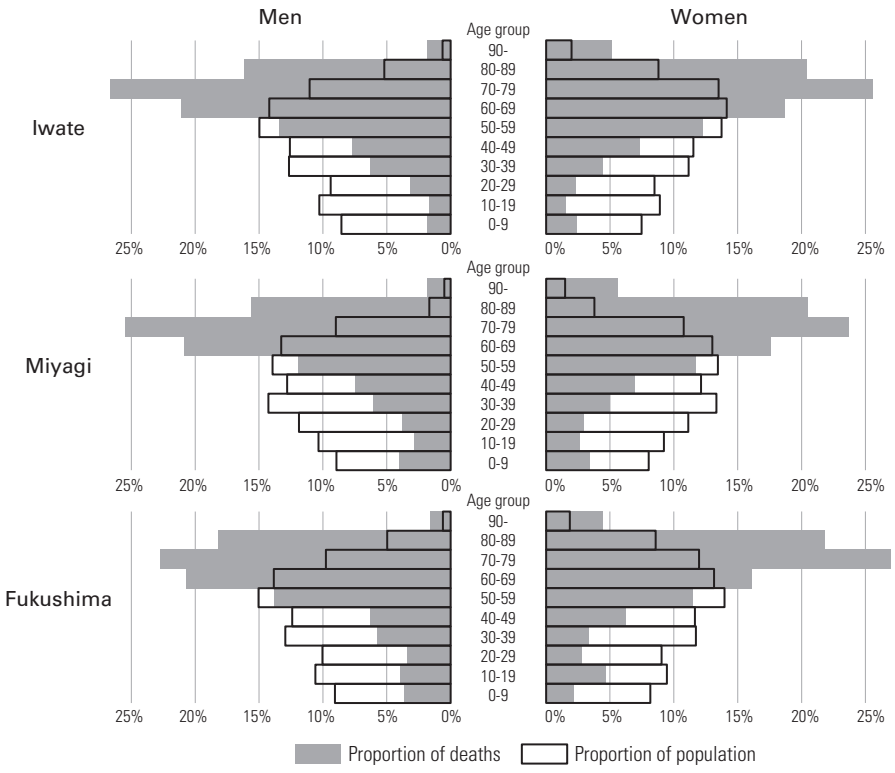
3 Diversity of People Affected by Disasters and the Uneven Distribution of Disaster Damage

(1) Elderly People

Disasters occur where hazards occur, in conjunction with pre-existing vulnerabilities in society. Although anyone can be affected by a disaster, the damage tends to be concentrated among certain social groups, such as the elderly and disabled, or, to put it another way, on the "weaker" parts of society. This trend also holds true for the people affected by the disaster in Miyagi Prefecture.

The Great East Japan Earthquake caused tremendous human suffering to the elderly, who had difficulty evacuating on their own. Figure 10-2 shows the percentage of deaths by age group (gray bars, Ministry of Health, Labour and Welfare, 2012) and the proportion of the population of the same age group (black-outlined bars, 2010 Census) for the three hardest-hit prefectures, Iwate, Miyagi, and Fukushima. For all prefectures, the proportion of deaths is lower than the proportion of the population up to the 50–59 age group, but for the 60–69 age group and above, the proportion of deaths exceeds the proportion of the population. Meanwhile, Table 10-1 shows the ratio of the proportion of deaths (gray bars in Figure 10-2) to the

Figure 10-2: **Population pyramid for the three prefectures and proportion of deaths by gender and age group**



Source: produced by the author based on data from the 2010 National Census and *Deaths due to the Great East Japan Earthquake from the Vital Statistics* by the Ministry of Health, Labour and Welfare.

Table 10-1: **Ratio of the proportion of deaths to the proportion of the population by gender and age group, in Iwate, Miyagi, and Fukushima Prefectures**

Age group	Iwate		Miyagi		Fukushima	
	Men	Women	Men	Women	Men	Women
90-	2.99	2.59	3.79	3.79	2.61	2.38
80-89	3.11	2.32	9.43	5.41	3.66	2.54
70-79	2.41	1.90	2.84	2.20	2.33	2.25
60-69	1.49	1.32	1.57	1.35	1.49	1.22
50-59	0.90	0.89	0.86	0.87	0.92	0.82
40-49	0.62	0.63	0.59	0.57	0.50	0.54
30-39	0.50	0.40	0.42	0.37	0.45	0.29
20-29	0.34	0.27	0.32	0.26	0.34	0.31
10-19	0.16	0.17	0.28	0.29	0.37	0.49
0-9	0.21	0.32	0.45	0.43	0.40	0.26

proportion of the population in 10-year age increments (black-outlined bars in Figure 10-2) by age group, sex, and prefecture (Shigeo Tatsuki, "Elderly and Disabled People and the Great East Japan Earthquake: Actual Conditions and Issues of Evacuation for People in Need of Assistance during Disasters," *Shoubou Kagaku to Jyouhou* (Fire and Emergency Science and Information Technology), No. 111, 2013). The proportion of harm suffered by the elderly was particularly high in Miyagi Prefecture. One reason was that many facilities for the elderly were located along the coast, and another was because the proportion of elderly people living in their own homes was high (Tatsuki, 2013).

The tendency for elderly people to be overrepresented among victims is also thought to hold for Typhoon Hagibis (2019), although the distribution of the dead and missing in the prefecture by gender and age is still unknown at the time of writing this chapter.

(2) People with Disabilities and Women

People with disabilities also suffered disproportionate harm. It has been reported that in the Great East Japan Earthquake, the fatality rate for disabled people (holders of disability passbooks) was nearly twice that of the resident population as a whole. It was reported that 3.5% (1,027) of the disabled population in 13 coastal municipalities of Miyagi Prefecture died, and that the fatality rate was 2.5 times higher than the average for residents. One reason given for this was that Miyagi Prefecture had much higher occupancy rate of facilities for people with disabilities than Fukushima and Iwate prefectures (Tatsuki, 2013). As Miyagi Prefecture accounts for the majority of the population of the three prefectures, as well as the majority of people with disabilities, some think these figures may be overstated. Nonetheless, there was a large difference compared to Iwate and Fukushima prefectures.

Precedents in Japan and overseas have also shown that women are more likely to be victims of disasters, especially earthquakes. Of the total number of people who died in the Great East Japan Earthquake (18,877 people), 10,184 (53.9%) were women and 8,693 (46.1%) were men (Ministry of Health, Labour and Welfare, "Deaths due to the Great East Japan Earthquake from the Vital Statistics," September 6, 2012). In Miyagi Prefecture, 5,667 (54.1%) of the 10,483 deaths were women, while 4,816 (45.9%) were men, though it is also important to take into account the high ratio of women among the elderly population in Japan. Table 10-1 shows that the death rate of older men (as a proportion of the population) was higher than for older women. One reason is that many elderly people in Miyagi Prefecture lived at home, and compared to women, men of advanced age tended to live at home with their wives and families (Tatsuki, 2013).

(3) People in Need of Assistance during Disasters

The *1987 White Paper on Disaster Management* defines "people in need of assistance during disasters" holistically as those people who are vulnerable to becoming victims of disasters (i.e., vulnerable people and people requiring special consideration). In addition to elderly people and people with disabilities, people in need of assistance during disasters include various groups who are vulnerable under normal conditions, such as pregnant and nursing women, infants (and parents with infants), the sick and injured, and the infirm. Moreover, it has recently been pointed out that without proper support, foreign nationals with limited Japanese language skills and tourists with little geographical knowledge are also at high risk of harm during disasters.

People in need of assistance during disasters also face difficult living conditions in evacuation centers after a disaster strikes. The percentage of people whose health

condition worsened during their stay in evacuation centers after the Great East Japan Earthquake was higher among those defined as being in need of assistance during disasters (50%) than among those who were not (25%) (Cabinet Office, *Results of the Survey on the Promotion of Comprehensive Measures for Evacuation, 2013*). The harsh environment of evacuation centers is thought to place a significant strain on those who need assistance during disasters. In particular, the physical environment of the centers, which are often school gymnasiums or classrooms, places a burden on the elderly, as the stress of living in evacuation centers is thought to increase with age. Other reasons include the lack of awareness about the welfare evacuation center system, which provides special accommodation for those in need.

It has also been noted that evacuation centers tend to be run by men, and women feel a greater burden due to difficulties in finding privacy while living in such centers. Furthermore, violence towards women and children during disasters is known to be a global phenomenon. Japan was no exception in this regard, with reports of sexual violence against women at evacuation centers and other facilities in the aftermath of the Great East Japan Earthquake.

4 Being "Left Behind" in the Recovery Process

(1) Viewing Recovery from a Holistic Perspective

The differences in vulnerability are also evident when the long process of recovery gets properly underway, as it reveals who are being left behind in society as it moves ahead in the recovery process. When examining the challenges faced by these people, it is important to view recovery from a holistic perspective.

Although "recovery" is often used without distinguishing it from "restoration," the two are different in the following respects. While "restoration" generally refers to restoring "hard" aspects such as disaster prevention facilities to their original state, "recovery" also covers "soft" aspects and aims to create something better. There are various perspectives from which to view the progress of disaster recovery. Physical recovery, such as infrastructure development and the rebuilding of houses, does not necessarily equate to the "soft" dimensions of recovery involving people and society. For example, after the Great East Japan Earthquake, the completion rate for the construction of public housing for disaster victims (as a percentage of planned housing units) had reached 99% by the end of March 2020, while the completion rate for the construction of land for private housing and other purposes was also 99%, making it seem like the infrastructure and housing recovery stage was coming to an end (Reconstruction Agency, *Progress of Full-Scale Restoration and Reconstruction of Public Infrastructure*). However, when asked about the "degree of recovery" (their impression of the progress of recovery) during the same period, the average score given by disaster victims in the coastal areas of the three affected prefectures was only 62.8% (*Kahoku Shimpo*, March 10, 2020).

A particularly important issue in the recovery of Miyagi Prefecture, where the population is declining and aging, is rebuilding the lives of those affected by the disaster. Specifically, problems such as solitary deaths in temporary and public disaster housing and disparities in the recovery of disaster victims have emerged, which require "soft" recovery support such as assistance in rebuilding communities. These are further described below.

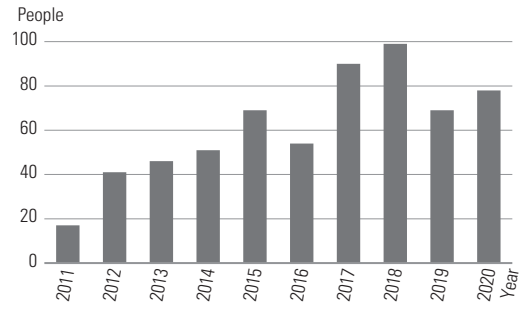
(2) Solitary Deaths

Since the Great Hanshin-Awaji Earthquake, "solitary deaths" in temporary housing and public housing for people affected by the disaster (hereafter referred to as disaster-related public housing) have emerged as a problem. These are most common among low-income individuals who are unemployed or in non-regular employment. It is thought to be caused by being confined to their homes and the breakdown of interpersonal relationships, which in turn can lead to excessive alcohol consumption, inadequate nutrition, and neglect of chronic illnesses. Furthermore, a breakdown of data on solitary deaths following the Great Hanshin-Awaji Earthquake by gender and age showed that they are more common among men, especially those in their 50s to 70s.

Lack of "community" has been identified as a factor behind the high incidence of solitary deaths in temporary housing and disaster-related public housing. In recent years, various measures have been taken to promote the formation of new communities among disaster victims,

Figure 10-3: Number of people who died while living alone in disaster-related public housing

* Deaths reported to the National Police Agency by the Iwate, Miyagi, and Fukushima police. Includes cases where the place of death was outside the home, except traffic accidents.



Source: *Asahi Shimbun*, "614 'Solitary Deaths' in Temporary and Reconstruction Housing: 10 Years in Three Prefectures" (here, "reconstruction housing" refers to disaster-related public housing)

including the introduction of resident selection methods that preserve existing communities (e.g., moving entire settlements together); the installation of shops and meeting spaces within housing complexes; and better monitoring of elderly people by neighborhood associations.

Such measures were also taken with respect to temporary housing in areas affected by the Great East Japan Earthquake. However, many municipalities used a lottery system to decide who would move into disaster-related public housing, resulting in the dismantling of communities that had been formed in the temporary housing complexes. By the end of 2020, 196 people had been reported as having died alone in disaster-related public housing in Miyagi Prefecture (deaths reported to the police). In Iwate, Miyagi, and Fukushima prefectures, 75.4% of the deaths in disaster-related public housing were reported to be among people aged 65 or older. According to a survey by the Miyagi Prefectural Government, as of April 1, 2021, elderly people living alone accounted for 32.4% of all households living in the prefecture's disaster-related public housing, and there is concern that more solitary deaths may occur in the future.

(3) Disparities in Recovery

It has also been noted that the degree of recovery varies according to the social characteristics of the affected population. In terms of the reconstruction of housing for those who lost their homes, those with high household incomes tend to rebuild on their own as soon as possible. Meanwhile the elderly and those with low incomes tend to be left behind, due to factors such as delays in moving out of temporary housing. It has also been noted that in the process of evacuation and reconstruction, such as moving into temporary housing, some households were split up, and the number of households consisting of only a married couple or an elderly person living alone increased. Under the disaster-related public housing system, rent is kept low at the beginning of the tenancy but rises over time and with increases in income. In recent years, rent increases have placed a heavy burden on the victims of the Great East Japan Earthquake, causing them to cut back on living expenses and withdraw money from their savings accounts.

In addition, there are many reports of people who were forced to leave their jobs, were dismissed, or had to take a leave of absence in the aftermath of the disaster. The resulting problems of unemployment and declining income are more severe among those in non-regular employment, especially women.

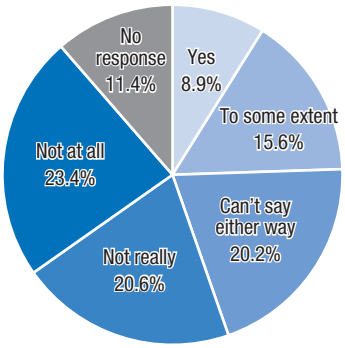
Moreover, with respect to the ambiguity of the term "disaster damage," there are cases of people who fell between the cracks of the public assistance system and were left behind in the reconstruction process. Here, I would like to discuss the case of "at-home victims."

The term "at-home victims" refers to those who were unable to secure a place to stay in evacuation centers, and who were forced to live as evacuees in their own damaged homes. In the Great East Japan Earthquake, a significant number of people continued to live at home, and challenges arose because support activities and information mainly targeted those people staying in evacuation centers and temporary housing. The Ishinomaki Medical District Health and Lifestyle Recovery Council, a private organization that provides support to "at-home victims" in Ishinomaki City, estimated there were 12,000 such households in the city (as of March 2012). It has been reported that many of these people were still living in their damaged homes in 2021, ten years after the disaster, because the level of damage to their properties was not severe enough to be covered by public support systems.

Given these disparities in recovery, some people cannot easily escape from their social position as "people affected by the disaster." A person's awareness of being deemed a

"person affected by a disaster" (or personally identifying as such) is called "disaster victim self-perception." In general, this awareness tends to weaken over time as the recovery process progresses (especially livelihood recovery). However, a survey conducted by NHK (Japan's public broadcaster) on disaster victims in Iwate, Miyagi, Fukushima, and other prefectures just before the 10th anniversary of the disaster found that more than 60% of respondents said they had this "disaster victim self-perception." In particular, those who have yet to experience economic recovery tended to have more difficulty in breaking free from this mindset. When asked whether they could escape from the image of living in a "disaster area" or being a "person affected by a disaster," only one quarter answered that they could (**Figure 10-4**).

Figure 10-4: Have you been able to escape the image of living in a "disaster area" or being a "person affected by a disaster"?



Source: Based on NHK News Web, "Survey of Disaster Victims: What does '10 years' mean?"

5 How to Prevent People Affected by Disasters from Being Left Behind

Disasters have been called x-rays that reveal fractures in society. While people's daily lives after a disaster differ from the norm, they are closely linked to existing weaknesses in society, with damage borne disproportionately by those sections of society that are vulnerable even in normal times. Inequality can grow during disaster recovery, as vulnerable people are more likely to face delays in rebuilding their lives and to be left behind in the recovery process.

As mentioned several times in this book, the world was ravaged by the COVID-19 pandemic from the beginning of 2020. The pandemic has had a major impact on those affected by the disasters in Miyagi Prefecture, especially those who have been "at risk of being left behind" in the recovery process. When taken together with the Great East Japan Earthquake and Typhoon Hagibis, it can be seen as a kind of "double (or triple) disaster." Its effects on employment have been greater for those in non-regular employment, particularly women. Moreover, by preventing people from meeting each other, the pandemic severely restricted interactions among residents of disaster-related public housing, as well as the monitoring activities of the people supporting them. Cases of solitary deaths also occurred, posing a new type of risk arising from isolation.

So, what efforts are needed to prevent victims from being "left behind" in this way? Activities to prevent disasters or limit the spread of damage are not enough. Rather, what is required is to reduce disparities, inequalities, and vulnerabilities in society during normal times, and to build a society of coexistence that is comfortable for everyone to live in.

Written by Maho Yamazaki

10-2 Resilience to Natural Disasters

1 Resilience and the SDGs

"Resilience" and its related terms have become buzzwords in recent literature dealing with disaster risk reduction. For example, the term resilience was used four times in the short 434-word message from Margareta Wahlström, former Special Representative of the UN Secretary-General for Disaster Risk Reduction, to the 3rd UN World Conference on Disaster Reduction held in Sendai in 2015. As such, interest is now focused on making things "resilient" rather than "strong." This is a positive step toward the realization of a sustainable world.

The SDGs were adopted by the UN General Assembly in 2015. Goal 11 of the SDGs aims to "make cities and human settlements inclusive, safe, resilient and sustainable." Target 11.b states that "By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels."

2 How Can Resilience Be Precisely Defined?

In elasticity theory, the term "resilience" is strongly related to elasticity, proportionality, and limiting properties. Looking at elasticity and proportionality from the perspective of disasters, the stresses caused by disasters on the one hand, and the social, economic, and physical tensions caused by disasters on the other, show a substantial correlation. Resilience in elasticity theory has a maximum value. Applying this to disasters, the severity of a disaster must be within the ability of a place or society to cope with that disaster.

In the literature on this topic, many authors provide definitions of resilience, but these definitions vary according to their areas of expertise and interest. Following an extensive review of many sources, the United Nations Office for Disaster Risk Reduction (UNDRR)[*3] defined resilience as "the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate, and recover from the adverse effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions."

The relationship between vulnerability and resilience has also been discussed by many authors. The main questions in these discussions are: whether resilience is the opposite of vulnerability; whether resilience is a factor in vulnerability, or vice versa; whether vulnerability takes into account coping capacity and resilience; or whether vulnerability and resilience are distinct characteristics that counteract each other.

Whatever the topic in question, the definition of resilience includes some notion of mechanics. In the theory of elasticity, fragility (i.e., vulnerability) and resilience are completely different properties. As in the case of weaker materials such as rubber, resilience refers to the property of maintaining functional strength in a given event and returning to its original state after stress is released. This property is similar to that of strong, ductile materials such as certain types of steel. In light of this, I propose to define resilience to disasters by incorporating methods from the theory of elasticity. Resilience as applied to disasters can be simply defined as "the ability of a system, community, or society damaged by a disaster to return to its original state immediately and efficiently." The following discussion will proceed using this provisional definition.

> What is resilience as applied to disasters?
> The ability of a system, community, or society damaged by a disaster to return to its original state immediately and efficiently.

[*3] The United Nations International Strategy for Disaster Reduction was renamed the United Nations Office for Disaster Risk Reduction (UNDRR) on May 1, 2019.

3 The Etymology of Resilience and the Theory of Elasticity

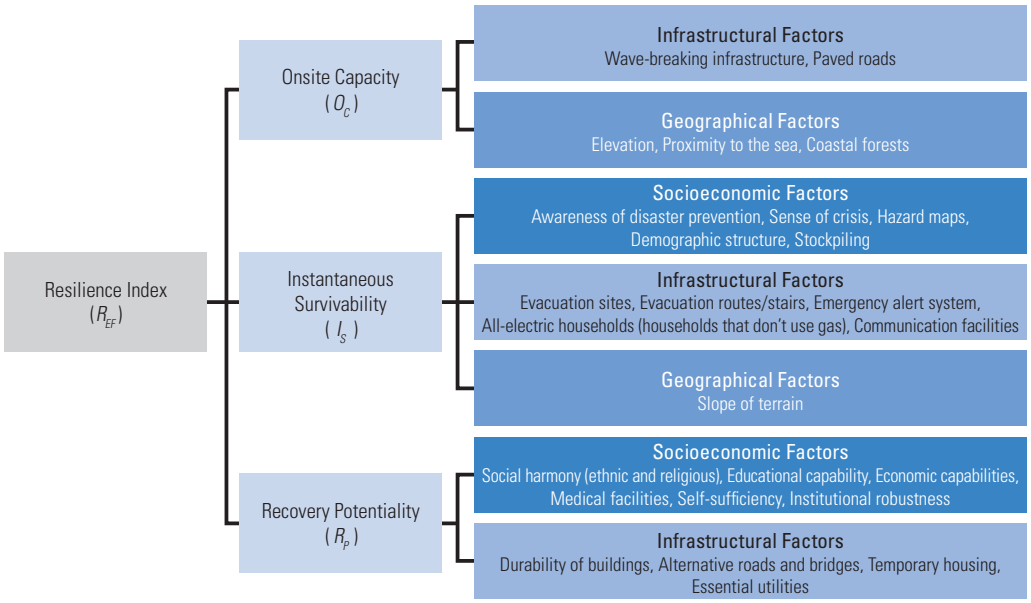
While many use "resilience" without considering its original meaning, some researchers have examined the history and usage of the term. D.E. Alexander, for example, conducted research on how the term resilience developed through history, providing insights into the historical depths and continuity of its modern usage ("Resilience and disaster risk reduction: an etymological journey," *Nat. Hazards Earth Syst. Sci.* 2013, 2707-2716). He suggests that the first significant use of the term "resilience" in mechanics can be found in 1858, when William J. M. Rankine (1820–1872), a prominent Scottish engineer, used it to describe the strength and ductility of steel beams. As resilience is the foundation of the theory of elasticity, pioneering experts in this field have explored the legacy of this word. According to Isaac Todhunter (1820–1884), an English mathematician who conducted historical research on the theory of elasticity, Thomas Young (1773–1829) first brought the term resilience into English. His general theorem states that the "resilience of a prismatic beam resisting a transverse impulse is simply proportional to the bulk or weight of the beam." Young's Theorem 337 mentions that "the resilience of prismatic beams simply depends on their bulk." Furthermore, the theorem describes resilience as a joint ratio of the length, breadth and depth (for more details, see the author's paper, "A New Methodology for Measuring Tsunami Resilience Using the Theory of Springs," *Geosciences* 2020, 10, 469).

4 A Practical Conceptual Framework and Mathematical Model for Measuring Resilience

Many studies have attempted to assess resilience in disaster-prone areas by establishing frameworks, weighting techniques, and even indices. However, these studies don't take into account resilience's background in mechanics. Moreover, while some effective factors are aggregated by addition or division, rational explanations for them are rarely provided. In view of the lack of established theories on the calculation and evaluation of resilience, the author proposes a practical conceptual framework (**Figure 10-5**) and a mathematical model based on spring theory (**Figure 10-6**).

The framework proposes a Resilience Index that is valid for a particular region and breaks this index down into three variables (requisites), defined as Onsite Capacity (O_C), Instantaneous Survivability (I_S), and Recovery Potentiality (R_P), respectively. It assumes that the capacity for each phase depends on the socioeconomic, infrastructural, and geographical factors of the area in question.

Figure 10-5: Conceptual Framework of the Resilience Index



Each phase of the framework depends on two or three factors, which can be measured by different indicators.

The proposed framework assumes that an "ideal resilient region" should fulfill all three requisites. Although the framework can be applied to any water hazard, we will limit our discussion to tsunamis for the sake of simplicity.

In the case of tsunamis, Onsite Capacity is the ability of a given place to withstand a tsunami even before it occurs. Instantaneous Survivability is the ability to survive extreme situations during a disaster. Recovery Potentiality is the ability to recover soon after a disaster, even though the region has been destroyed by a tsunami.

Figure 10-6 illustrates a composite spring composed of series springs and parallel springs, which is analogous to each phase of the conceptual framework and the mathematical model. In this model, the Onsite Capacity (O_C), Instantaneous Survivability (I_S), and Recovery Potentiality (R_P) of a given town are treated as equal to the constants of the spring. A normalized spring consisting of a parallel spring with a spring constant equal to 1, and a series spring with a spring constant equal to $\alpha O_C\,(I_S + R_P + 1)$, are introduced in order to normalize the resilience index (R_{EF}). Onsite Capacity O_C has been considered indispensable for the prevention of a tsunami disaster. Normalization gives O_C this indispensability and avoids division by zero, even in the worst case. The constant α controls the value of R_{EF}. If $O_C = I_S = R_P = 1$, then α must be 4/9 to keep $R_{EF} = 1$. Table 10-2 shows the final properties of the proposed model.

Figure 10-6: **Composite spring consisting of parallel springs and series springs and the mathematical model**

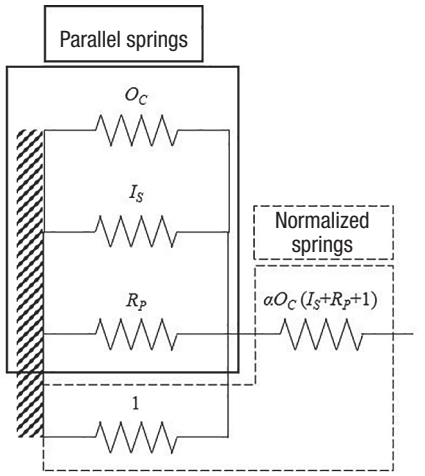


Table 10-2: **Final properties of the proposed model**

Case	O_c	I_S	R_P	R_{EF}	Notes
1	1.00	1.00	1.00	1.00	Optimal conditions in all phases
2	0.00	1.00	1.00	0.00	No Onsite Capacity, optimal conditions in other phases
3	1.00	0.00	1.00	0.69	No Instantaneous Survivability, optimal conditions in other phases
4	1.00	1.00	0.00	0.69	No Recovery Potentiality, optimal conditions in other phases
5	1.00	0.00	0.00	0.36	Optimal Onsite Capacity, worst conditions in other phases
6	0.00	0.00	0.00	0.00	Worst conditions in all phases

5 What Kind of Mathematical Model Indicates a Resilient City?

In the proposed mathematical model, tsunami resilience is largely dependent on the Onsite Capacity (O_C) of a particular location. In other words, no place can survive if it does not have Onsite Capacity (O_C). I_S and R_P are employed as necessary conditions but are not sufficient. However, the mathematical model shows that an area that scores the maximum for all three factors is the ideal, leading to the maximum in the resilience index. Therefore, no place can be resilient if there are no human activities, because Instantaneous Survivability and Recovery Potentiality are only valid if there is human life. In other words, a town with the ideal Onsite Capacity can be strong in facing a tsunami, but weak in resilience if it lacks Recovery Potentiality. Constructing seawalls and raising the height of land would greatly improve resilience. However, the proposed mathematical model acknowledges that resilience is, in part, a socially constructed capability. The third priority for action in the Sendai Framework for Disaster Risk Reduction recommends increasing social resilience through

investments in disaster risk reduction and taking a broader, more people-centered, preventive approach to disaster risk.

6 Is Minami-Sanriku a Resilient Town?

Finally, I would like to discuss Minami-Sanriku as an example of a model resilient town and explain why I consider it to be so. Minami-Sanriku is a small coastal town located in northeastern Miyagi Prefecture. On March 11, 2011, the town was hit by a magnitude 9.0 earthquake, accompanied by a tsunami that claimed 620 lives out of a population of 17,666, with 211 people still missing. It is estimated that 58.6% of the town's buildings were completely destroyed. By moving residences to higher ground, building seawalls, relocating fishing infrastructure, and providing other socioeconomic initiatives, the town became a benchmark for resilient urban development (**Table 10-3**). Following the theory described here, Onsite Capacity is the ability of a given place to withstand a tsunami even before it comes. Onsite Capacity can be assessed by the elevation of a location, its proximity to the sea, the presence of seawalls, and the condition of roads. Minami-Sanriku's heavy civil engineering structures have contributed to its recognition as a strong and resilient town (**Figures 10-7** to **10-10**).

Construction of the new Minami-Sanriku town began in February 2013. One reason for Minami-Sanriku's decision to undertake mass relocation to higher ground is that the town has experienced several major tsunamis in the past, including the 1960 Valdivia earthquake and tsunami. For centuries, residents have been taught to run when a tsunami comes. However, Mayor Jin Sato sought

Figure 10-7: **Minami-Sanriku's Shizugawa District, where the land has been elevated (August 2021)**

Figure 10-8: **Disaster victims relocated as communities, with homes rebuilt on higher ground (Shizugawa-Higashi District, Minami-Sanriku, October 2020) (courtesy of Minami-Sanriku Town)**

Figure 10-9: **Breakwater and emergency evacuation stairs in Minami-Sanriku's Shizugawa District (August 2021)**

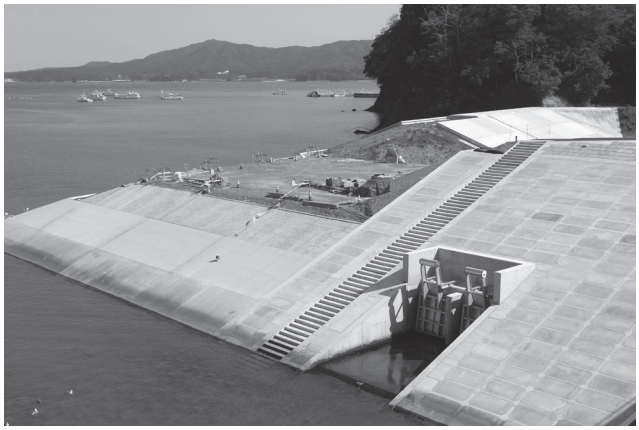


Figure 10-10: **Minami-Sanriku's Shizugawa District, where the fishing industry has been located (August 2021)**

Table 10-3: Measures taken by Minam-Sanriku to build a resilient town

Necessary conditions	Factors	Indicators: Measures
Onsite Capacity (O_C)	Infrastructural Factors	**Seawall:** Tokyo Peil (TP)[*4] + 8.7 m in Shizugawa Bay (assuming an offshore earthquake in Miyagi Prefecture) **Paved roads:** Arterial and other roads have been realigned and improved. Readjustment has been done for non-residential land dedicated to commercial, industrial, and business activities. This has allowed the construction of roads with easy connections to major roads (National Routes 45 and 398). The construction of a hub access road connecting housing developments on higher ground and an evacuation road has also made it possible to evacuate to higher ground more quickly.
	Geographical Factors	**Elevation:** The level of the town has been raised substantially.
Instantaneous Survivability (I_S)	Socioeconomic Factors	**Disaster prevention awareness:** On the first Sunday after November 5 (Tsunami Disaster Prevention Day), a comprehensive disaster drill is held every year for town residents, in cooperation with disaster prevention agencies, simulating earthquakes, tsunamis, landslides, and other disasters. **Hazard maps:** Posted on the town's official website. Printed copies are distributed to all households in the town. **Stockpiling:** Food, blankets, and other supplies for the number of people to be accommodated are stockpiled at designated evacuation centers in public facilities (16 locations). At the district's designated emergency evacuation site, the town subsidizes part or all of the cost of food and other items stockpiled by each district's voluntary disaster prevention organization.
	Infrastructural Factors	**Evacuation sites:** 16 designated evacuation centers, 52 designated emergency evacuation sites. **Evacuation routes/stairs:** Emergency evacuation routes and stairs have been constructed. The construction of an evacuation road to higher ground has also made it possible to evacuate more quickly. **Residential development:** Residences and public facilities are located on higher ground or other safe locations (TP + 20.0 m or higher) in accordance with the basic land-use principle of "locate homes on high ground, even if daily activities take place in varied locations." **Industrial sites:** Safe evacuation sites and evacuation routes have been provided near areas of daily activity near the coast. **Emergency alert system:** Using disaster information obtained through the J-Alert receiver located in the town hall building, the information is automatically broadcast over the municipal disaster prevention radio using an automatic activation device for the broadcast system, or automatically sent via the town's registered email system using an automatic email activation device. Evacuation guide vehicles are run to facilitate evacuation.
Recovery Potentiality (R_P)	Socioeconomic Factors	**Medical facilities:** 16 medical facilities have been designated as Miyagi Prefecture Disaster Medical Assistance Team (Miyagi DMAT) facilities, and agreements have been concluded for dispatching medical personnel. **Revitalization of local communities:** Because residential and commercial areas are now located far away from each other, the town improved its public transportation network, including by operating a town bus service. **Institutional robustness:** Disaster support agreements with seven municipalities located far away from each other (and therefore less likely to be affected by the same disaster).
	Infrastructural Factors	**Alternative roads and bridges:** Four bridges are being built to connect the coastline. A reconstruction hub access road has been provided to connect residences located on high ground. **Essential utilities:** Based on the results of estimates for major wind and flood damage, various measures are being implemented to mitigate damage from a major disaster, including flood prevention measures to minimize damage to facilities, dispersion of operating sites, securing alternative facilities, proper maintenance and management of facilities, establishment of disaster recovery systems, stockpiling and securing materials and equipment, and promotion of redundancy in systems.

Reference: *Building a Miyagi Model for Disaster-Resilient Community Development, March 2017; Reconstruction after the Great East Japan Earthquake: Progress in Minami-Sanriku Town*, February 2021.

to build a new town where the next generation of residents could sleep in peace. Under the assumption that another tsunami would come again, it was decided to build housing and public facilities on higher ground, consolidating public facilities in one place to create a "compact city."

As a resident of Miyagi Prefecture, I would like to take this opportunity to express my sincere gratitude to all those involved in sharing the lessons they have learned about building a resilient city with the world. I am confident that the resilience built by the people living in the Tohoku region will prevent the destruction of the region in the event of another major tsunami.

Acknowledgments: I would like to thank Mr. Taiga Sugawara, Head of the Policy Coordination Section and Administrative Reform Promotion Section, Planning Division, Minami-Sanriku Town, Miyagi Prefecture, for providing materials for this section on Minami-Sanriku.

Written by Dinil Pushpalal

[*4] The mean sea level of Tokyo Bay is called the Tokyo Peil and is used as a reference for measuring elevations in Japan.

10-3 Reconstruction and Resident Participation: A Case Study of the Kesennuma Seawall

1 Disasters and Seawalls

Kesennuma City in Miyagi Prefecture, where I live, is a town that developed from the rich fishing grounds off of the ria coastline of Sanriku. It is a town which existed in harmony with the sea.

Then, on March 11, 2011, the Great East Japan Earthquake struck. I lost both my home and my mother. Many people shook in fear of the tsunami, wept over the death of their loved ones, and grieved the destruction of the city. Ten years have passed since that day, and much has changed in the affected areas. The elevation of land for rebuilding homes and the provision of public disaster housing have been completed, and the fish processing plants and shopping streets that were swept away by the tsunami have now reopened. Most of the infrastructure such as damaged roads and public facilities have been restored. As part of national government policy, the Sanriku Jukan Road has been reconstructed, and "reconstruction plazas" have been established in each municipality. Meanwhile, along the coast, huge seawalls are being constructed. With a maximum height of about 15 m, they extend from Iwate to Fukushima for a total of about 400 km. When the plan was presented, many beaches were the subject of fierce disputes between residents and the government, or among residents themselves, regarding issues such as landscapes, the environment, disaster prevention, and more (Figure 10-11).

Figure 10-11: **Seawall built after the disaster**

However, in the Oya area, the community came together as one without conflict until the very end, and by collaborating with various government agencies, they were able to make major changes to the original seawall plan and succeeded in protecting the sandy beach of the Oya coast, which represents the community's identity. In addition, the "Seawall Study Group," organized by volunteers from among Kesennuma citizens, had a significant social impact on the seawall issue by improving citizen literacy. I have been involved in the seawall issue as an affected disaster victim and as a local resident. Here, I would like to outline some of the activities that have taken place so far.

2 Resident Petitions and the Disaster Recovery Plan

The population of Oya District, Kesennuma City, is 3,700. The district is home to several small fishing ports and farming areas, with mountains and forests directly behind it. Oya's coastline includes a 1 km stretch of sandy shore, and before the disaster, it was a much-loved swimming beach that served as a symbol of the local community. However, most of it was lost due to the tsunami and land subsidence. Then, as part of the recovery plan, the construction of a 9.8-meter-high seawall was proposed on what little of the beach remained (Figure 10-12).

In July 2012, public information sessions on the seawall began, and the venues were filled with angry criticisms of the plan. Having learned of the seawall project early on, I had been interviewing various people in the community to sign a petition in opposition. As a result, I learned that there was more than just opposition to the seawall in the community. I worked to strike a balance in the content of the petition to get more people on board. In this way, it underwent a natural change from an expression of opposition to a request for the project to be temporarily suspended and for residents' views to be taken into account — what you might call a "participatory petition campaign."

The petition was discussed at a meeting of the "Oya Residents Association Liaison Council," a federation of neighborhood associations in the district. Given that the content was fairly neutral, the associations unanimously decided that the liaison council would sponsor the petition campaign. The petition was then distributed to all households in Oya District and collected at the community center via the head of each neighborhood association (i.e., at the neighborhood level). If the petition had been about rejecting the project outright, there would have been an inevitable divide in the community between those against and those in favor. It was important for this kind of confrontation to be avoided. A total of 1,324 signatures were collected and submitted to the Mayor of Kesennuma in November of the same year.

Figure 10-12: **Original seawall plan for the Oya coast (July 2012)**

At the same time, the Motoyoshi Earthquake Reconstruction Plan was being prepared in the former Motoyoshi Town, a part of Kesennuma that includes the Oya District. At the time, I was working for an NGO that had moved into the area after the disaster to provide assistance, and I was assigned to support the development of this plan. In Oya District, a representative meeting was held to discuss issues affecting the district as a whole and to allow the individual district neighborhood associations to coordinate their plans with each other. This process led to the common understanding that Oya coast's sandy beach was an asset for the whole district, and a proposal was incorporated into the district-wide plan to the effect that, instead of building a seawall on the beach, National Route 45, which runs along the coast, should be raised to provide a view of the ocean. From there, the Oya coastal seawall issue gradually turned into a movement to protect the beach. The common desire of Oya's residents was to protect the district's sandy beach, and this came to be the overarching theme of community development.

Initially, however, it was said that it would be impossible to raise the national route. One reason is because the sources of public finance differed from the start. The seawall would come from the coastal budget and the national highway would come from the road budget. Oya District did not include any projects that involved directly raising the land, such as land readjustment projects or tsunami disaster prevention center projects. On the contrary, for the Forestry Agency-governed beaches which cover most of the Oya coast, it was not even possible to set the seawall back due to an institutional requirement that prevented coastal structures from being brought closer to the mountains within the protection forest area. Discussions with the government went nowhere.

3 The Seawall Study Group

While the petition drive and development of the reconstruction plan were underway in Oya District, public information sessions on seawalls were also being held at various locations in Kesennuma City. In August 2012, as the debate over seawalls intensified, a "Seawall Study Group" was launched in Kesennuma by citizen volunteers. The goal was to help citizens study and understand various aspects of the plan from a neutral perspective

throughout the city. Various speakers were invited to each session, including the respective government agencies with jurisdiction over seawalls, various experts, members of the national, prefectural, and municipal assemblies, and representatives of Kesennuma residents, to study seawalls from all angles. Thirteen study sessions were held in two and a half months for the entire Kesennuma City area, involving a total of 2,500 participants. Many of the founder members were representatives of Kesennuma companies — people who had been leading the city in the private sector. Having been involved in Oya District's petition drive, I was also approached to help launch the project.

The strength of the Seawall Study Group was that it was neutral, not taking a position for or against the seawall itself. This approach was maintained throughout the thirteen study sessions. Another excellent feature was that the minutes, documents, and key points of each meeting were promptly uploaded to the website, allowing the participants to intensively acquire knowledge in a short period of time. The neutral stance of the movement, which neither opposed nor supported seawalls, attracted widespread attention, and the discussion of the seawall became a social issue.

Then, drawing on the findings of the Study Group, we requested improvements to the systems governing the seawall project and the way it was being carried out. This took the form of a written request to the Governor of Miyagi Prefecture and various related organizations. In particular, we urged that the construction of seawalls take into account the diversity of the region and be tailored to local conditions, and that the opinions of local residents be reflected and their consensus respected. At that time, in accordance with the "National Government Defrayment Act for the Reconstruction of Disaster Stricken Public Facilities," the rule was that disaster restoration and reconstruction projects had to be completed within three years. This short timeframe intensified conflicts in the local area. After that, however, the deadline for the reconstruction budget was repeatedly extended.

The activities of the Seawall Study Group yielded a certain amount of success. First, the initial goal of improving the literacy of citizens was met to some extent, creating a large number of citizens who were familiar with the systems involved. Furthermore, the Study Group's work attracted a great deal of attention, bringing public scrutiny to the seawall issue and creating a situation in which it was not possible to proceed without the residents' consent. These factors helped to put citizens on a roughly equal footing in discussions with the government. However, despite some improvements in the process and a little more flexibility, the seawall plan proceeded unchanged. Discussions on seawalls were left to local discussions for each individual beach.

4 Oya Community Development Committee

The Seawall Study Group ran from August 2012 to April 2014. During this time, a second movement was underway in the Oya District: the participation of the younger generation in community development. A group of people in their 20s and 30s in the Oya District who were involved in the petition drive and disaster recovery plan formed the "Study Group on Oya Local Development." Study meetings were held based on the disaster recovery plan prepared by the neighborhood associations, and recommendations were made to the respective associations regarding the new Oya coast. They also built trust with the community through social activities such as beach clean-ups and helping out at local festivals. Eventually, together with youth group leaders in their 40s, they formed the Oya Community Development Committee, a community development council for the Oya District. The Oya Residents Association Liaison Council then entrusted them to further develop the specifics of the development plan for the Oya coast, allowing the younger generation to participate in the community's decision-making process. I was appointed the executive secretary of this organization.

The Development Committee spent a year working with the Liaison Council to finalize a detailed vision for the community, which was submitted to the Mayor of Kesennuma along with a written request. During this period, experts were not directly involved in the discussions (other than as facilitators), which were essentially conducted solely among residents. After submitting the written request, discussions focused on exchanging opinions with various government agencies, and experts from various fields were invited to participate in the discussions regarding the specific design of the seawall, as needed.

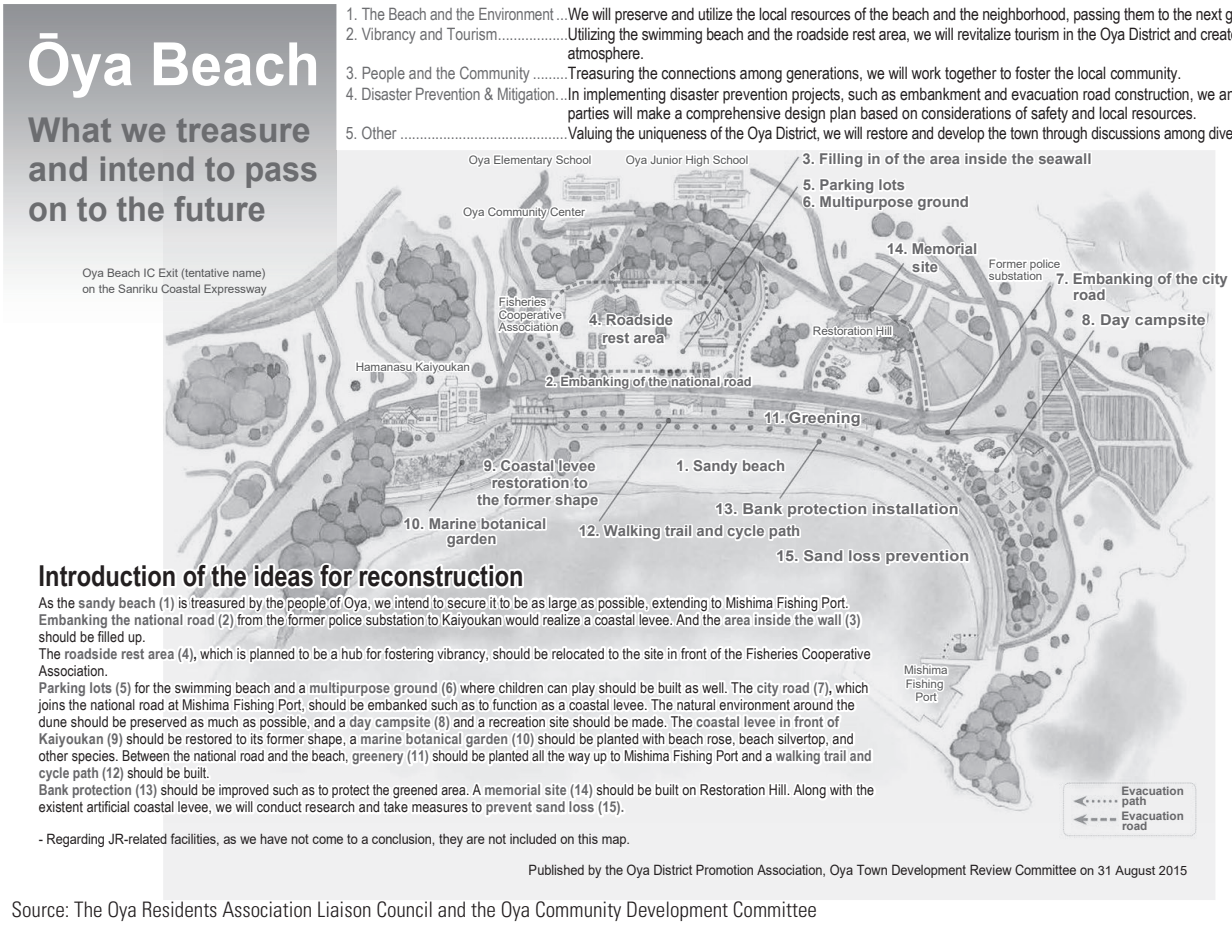
Eventually, a meeting of relevant officials was formed within the national government with a view to raising the national route along the Oya coast. One year after the submission of the request, the possibility of raising the national route was first presented at an information session for residents in July 2016. The issue regarding the seawall, which previously could not even be set back from the coast, was overcome by a partial change of jurisdiction over the beach. Meanwhile, the restoration of the JR Kesennuma line, which ran between the national route and the beach, was abandoned, making it easier to push the seawall back further toward the mountains. Ultimately, the project succeeded in creating an argument for raising the national route and the land behind it to restore the beach to its previous size, despite being in a location where no land-raising project had been planned. The government also worked hard to accommodate the residents' wishes.

A year later, the final government plan was completed. Instead of building the seawall on top of the beach, National Route 45 would be raised to serve as a seawall, allowing for a view of the ocean while ensuring the beach would return to its pre-disaster size (**Figure 10-13**). The land behind the national route was also raised, and the Oya-Kaigan Roadside Service Station, which had been located on the ocean side of the route, was relocated. In this way, the project represented an integrated development of the Oya coast, including the beach, the seawall, the national route, and the roadside service station. By then, five years had already passed since the 2012 briefing.

5 Separation of Community, Society and Activities

The issue of seawalls is a problem for society as a whole. However, this does not hold true in local decision-making. What communities are aiming for is not to solve the overall problem of the seawall project, but to find the best possible compromise for each region. In dealing with the

Figure 10-13: Vision for the Development of the Oya Coast, produced by the local community (August 2015)



Source: The Oya Residents Association Liaison Council and the Oya Community Development Committee

seawall project, I had to address both the local and social aspects of the problem. I therefore established a general incorporated association with friends in June 2014 as a catch-all for activities broadly related to recovery, including seawalls. The activities of this new organization served to detach me from the community. While building consensus in the community, we worked as a group on the seawall issue as a whole, working with various colleagues on a case-by-case basis.

First, we studied examples of seawall construction and the process of consensus building at major beaches in Iwate and Miyagi prefectures. We also read through the minutes and documents of various meetings regarding the systems governing seawalls, such as the Central Disaster Management Council and its expert study groups. Whenever possible, we attended symposiums and other events in which key experts who sat on relevant national committees spoke, and we made contact with them to learn what they thought. We also learned as much as possible about past cases of problems involving seawalls and other social issues that might be relevant by visiting the sites ourselves. These visits included Okushiri Island, where a seawall up to 11 meters high was constructed after the 1993 Okushiri Earthquake; Isahaya Bay, where a large-scale land reclamation project had split the local community into opposing camps; the site of Arase Dam, the only case in Japan of a successful dam removal; Yubari City, where the municipal government declared bankruptcy; and Fukushima, which has undergone repeated struggles regarding decontamination efforts and policies on the return of displaced residents. Using the knowledge gained through these efforts, we conducted outreach efforts regarding the seawall issue and made policy proposals to the government on various occasions.

It is very difficult to strike a balance between building consensus in the community and raising social awareness of the issues. We always chose our words with the utmost care when engaging in any activities that involved communication. It is difficult to know to what extent these activities had an impact on society. However, as we continued our activities, the voices supporting the protection of the sandy beach on the Oya coast gradually grew louder and louder. Then, meetings were held by the various government agencies involved regarding the raising of the national route. In Oya District, this resulted in achieving

Figure 10-14: **Opening of Oya Swimming Beach after 11 years (July 2021)**

respect for the residents' consensus and consideration for the diversity of the region, both of which we had been calling for from the outset.

Construction work on the Oya coast began in January 2018 and finished in July 2021, finally bringing back the district's sandy beach. The beach re-opened after 11 years, and the new roadside service station built behind the raised national route now offers a panoramic view of the ocean. It has already seen many visitors who come to experience Oya's sea for themselves.

6 Challenges of Social Consensus Building and Overcoming Conflict

If the seawall issue is viewed as a matter of social consensus building, the case of Oya District can be regarded as a successful model. The greatest barrier to social consensus building is emotional conflict. Ultimately, people will always be emotional beings. They are also influenced by group psychology. For example, they will be more generous in their assessments of members of groups to which they belong, and more critical in their assessments of members of groups to which they do not. In the case of seawalls, those in favor of their construction and those opposed to them tended to form pro- and anti-seawall camps, judging each other harshly and only accepting arguments convenient for their own group. The same is true for residents versus government and between various government agencies. In any case, dialogue in the true

sense of the word cannot be established without working to avoid antagonistic structures and building up relationships of trust.

In addition, "environment/landscape" and "disaster prevention/mitigation" often come into conflict when discussing seawalls. Because seawalls are massive structures, they have a significant impact on the landscape. Because of their size, their purpose of stopping waves, and the fact that they are located between land and sea, they cut off or make irreversible the flow of organisms and materials. At the same time, however, the new national policy on disaster prevention has the stated objective of preventing damage from L1 tsunamis and mitigating damage from L2 tsunamis[*5] through the use of seawalls and similar structures. Physical protection is not necessarily the only way to prevent or mitigate disasters, but there is a sense of justice that prevails in the discussion of seawalls. Whether it is the environment or disaster prevention, if feelings of righteousness are too strong, it creates antagonism. That is, if you emphasize justice, the other side's sense of justice will also assert itself. Meanwhile, in situations of emotional conflict, many people keep their voices low and disappear from the consensus-building process. Consequently, only those people who feel a sense of righteousness remain, and conflict ensues.

However, the reality is that without loud voices, society will not be aware of the issues at hand. This was overcome to some extent by the Seawall Study Group. In this respect, neutrality is one tip. Even during the consensus-building process, I ran the project by keeping my own personal feelings out of it and ensuring as much neutrality as possible. If I had attempted to run it while guiding the outcome, I would have lost the trust of the community. And, although it may be obvious, the problems that seawalls entail are not limited to social consensus-building alone. Challenges remain on a variety of fronts, including environmental and landscape issues, the ideal form of disaster prevention and mitigation, and the reconstruction of tsunami-affected areas.

In the discussions on seawalls in Kesennuma, citizens who had acquired a wide variety of knowledge and ideas began to mediate between the community and the government as local coordinators. Moreover, the self-governance capabilities and community power that the local residents built up over the years came together at the consensus-building stage, creating a powerful tool to influence the national government and administrative agencies. In terms of collaboration with the government, relationships of trust were built up through the division of roles and joint work between residents and the government, and the groundwork was laid for dialogue. The same was true among residents from different generations with different ideas and perspectives. This foundation was more important than anything else in the consensus-building process. Then, in situations where expertise was required, we sought the help of specialists, leading to the final planning process.

Of course, not all districts followed the same path. Ten years after the earthquake, the coastal landscape of Sanriku has been drastically changed by the seawalls. Although they have faded over time, the conflicts that arose regarding seawalls in some areas remain in their communities today. However, there are also several examples where communities overcame the stumbling blocks in social consensus building that created polarization. The traces of the battles waged by citizens, government officials, and experts against seawall projects, which were driven forward for the sake of the projects themselves, can be seen everywhere along the Sanriku coastline. Even though the landscape itself has changed, it still reflects the thoughts and feelings of the people who sought to keep themselves close to the sea.

7 Beyond Recovery

What was the recovery that we sought? On that day, 20,000 people lost their lives, creating tremendous sadness, anxiety, and an anger that had nowhere to go. However, family, friends, and community members shared the pain, people around the world became aware

[*5] L1 and L2 tsunamis (L stands for "Level") are tsunami levels representing "tsunamis with a relatively high frequency of occurrence" (with a frequency of roughly 20 to 200 years) and "tsunamis of the largest class," which occur very infrequently, respectively. Taking into consideration the tsunami damage caused by the Great East Japan Earthquake, these levels are used to design tsunami countermeasures, as set by the expert study group of the Cabinet Office's Central Disaster Management Council.

Figure 10-15: **Floral tribute platform on the Oya coast**

of the grief, and numerous people made their way to the Tohoku region. We were in pain, but at the same time, we were also enveloped in a warm sense of togetherness. Despite the unbearable pain, there was a sense that Japan as a whole would change for the better, a sense of possibilities for society and for people.

However, the reconstruction projects handed down by the government since then have been subject to many restrictions, and we have had to contend with yet another set of difficulties. Initially, in many instances, we were faced with the binary choice of whether or not to get on board with the projects. However, local communities are not that simple. It is necessary to build towns that reflect the existing lifestyles and aspirations of residents, tailored to the terrain and climate of the area. This is a process that creates a third choice, which lies outside of that binary. That is why we have kept up our activities to this day. Our activities to protect the beach that belongs to the residents of Oya District were activities to recover the hometown we lost in the earthquake. In that process, what we are calling "recovery" may, in fact, be the image of the hometown we want to reclaim.

Right now, huge seawalls are already standing along the Tohoku coast. The current state of reconstruction may represent a different future from what was envisioned in the aftermath of the disaster. Some frustration is mounting with respect to living in harmony with nature. However, at least in the affected areas, a wealth of community development and civic activities has been built up over the past 10 years. I have made connections with many people who visited the affected areas since the disaster. The horror of the disaster and people's desire to rebuild their hometowns have helped the people of the affected areas to grow (**Figure 10-15**).

We were not able to change the systems governing the seawalls themselves. However, I believe that the activities of the Seawall Study Group demonstrated to society the potential of citizen activism, and the activities of the Oya District's residents demonstrated one way of solving problems in the community. Our achievements may have been small, but it is my hope that they will give courage to those who will face similar problems in the future, and to those who are already under pressure to deal with them now. Tomorrow's society will surely see different landscapes emerging. It is with this belief that I continue my work.

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