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Disasters as Enablers of Negotiation for Sustainability Transition: A Case from Odaka, Fukushima

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Abstract: Disaster risk at the community level is likely to increase as climate change worsens. In this study, the author investigated the impact of disasters on negotiation for community development, particularly as a promoter of sustainability negotiation. Studies on agenda setting in policy making and critical moments in negotiation were thoroughly reviewed. Based on the review, the author presents an extraordinary case of the Odaka community from Fukushima Prefecture, Japan. This community experienced a critical moment in the negotiation of its development after the Great East Japan Earthquake of 2011 and a subsequent nuclear disaster. The community also experienced a 5-year-long forced evacuation due to nuclear contamination from the Fukushima Dai-ichi nuclear power station. This case reveals a major shift in four aspects of negotiation—parties, interests, relationship, and legitimacy—and a transition to more sustainable developments. It also demonstrates the possibility that disasters can enable negotiation for more sustainable development patterns by transforming the associated settings.

Keywords: disasters; agenda setting; critical moment; negotiation; recovery; Fukushima



Citation: Matsuura, M. Disasters as Enablers of Negotiation for Sustainability Transition: A Case from Odaka, Fukushima. *Sustainability* **2022**, *14*, 3101. <https://doi.org/10.3390/su14053101>

Academic Editors: Roman Trötschel and Johann M. Majer

Received: 21 January 2022

Accepted: 3 March 2022

Published: 7 March 2022

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1. Introduction

The risk of disasters is likely to increase as climate change worsens [1,2]. For instance, studies published as a supplement to the Bulletin of the American Meteorological Society revealed that 62 out of 77 disaster events that occurred between 2015 and 2017 had significant anthropogenic influence [3]. It is critical for local communities to respond to such climate-induced disasters to maintain and enhance the sustainability of communities, particularly because such disasters tend to impact vulnerable communities disproportionately [4,5]. In addition to conventional responses to anticipated disasters, adaptation—adjustment to actual or expected changes to climate and its effects—has also been vigorously sought at the city and community levels to improve resilience [1,6–8].

Whereas disaster risks need to be minimized as much as possible for the achievement of sustainable development, the risks are unlikely to be completely eliminated due to the complexities of natural systems [9,10]. If human beings cannot eradicate damages from disasters, is there anything they can learn from the associated tragic experience?

For instance, Arun Agrawal suggests “a positive side of disasters” by drawing on a study that assessed the impact of Hurricane Mitch [11,12]. The hurricane, which devastated Honduras in 1998, in fact “reset the social economic, economic, and institutional machinery” of a community and facilitated economic improvements, particularly to formerly poorer segments of its members [11] (p. 291). The hurricane created an extraordinary opportunity for the community in Honduras to disrupt the conventional system of production and consumption and transform into a more sustainable system of land ownership and production.

The study by McSweeney and Coomes [12] in Honduras focuses on the outcomes (i.e., improved economic production and distribution); however, the impacts of a disaster might reside in the procedures of (re)development. One of the possible changes triggered by a disaster is the way in which community members negotiate for its (re)development.

Assuming that planning and development is conducted through multifaceted negotiation and deliberation among various kinds of stakeholders [13–17], a shift in the negotiation settings, which can be triggered by a disaster or, more broadly, a crisis, can result in a different approach to development. While a shift to a constructive negotiation for sustainable development might have to be facilitated by human interventions of mediators and researchers [18,19], a disaster can also trigger such a shift. Can a disaster affect the negotiation settings in a “positive” manner such that the community explores its development in a more sustainable manner?

This article explores the impacts of disasters on the general settings of negotiation for community development, particularly as a facilitator of sustainability negotiation. In the next section, the current theoretical discussions on the role of disasters as well as crises in public policy making are discussed. In Section 3, theories on critical moments in the field of negotiation analysis are reviewed. Following the methodology section, the author presents an analysis of an extraordinary case of the Odaka community in Fukushima, Japan, in Section 5. The community had to face a 5-year-long forced evacuation owing to a triple-disaster: massive earthquake and tsunami, and a subsequent nuclear disaster, in 2011. Following an analysis of the present case in Section 6, the final section discusses how a disaster can break through a locked-in setting and enable a renewed arena of negotiation for sustainable development.

2. Crises and Public Policies

The societal impacts of disasters and other types of crises on public policy making have been widely studied, particularly owing to their scale and uniqueness [20,21]. Generally speaking, crises are analyzed as a focal event that halts incremental policy making, forces a reflection of conventional governance mechanisms, and triggers a systemic institutional change [22,23]. In the field of public policy making, the effects of disasters and crises on policy making, political discourses, and democracy in general have been discussed, particularly in the constructivist tradition of policy analysis [24–26].

Generally speaking, crises facilitate systemic changes. For instance, transition management literature posits economic crises as potential accelerators of sustainability transition [27]. While the regime parties attempt to restabilize historical patterns, transition management researchers depict crises as a manifestation of unsustainable practices and call for a fundamental systemic change. A historical study by Jared Diamond [28] reviewed seven historical cases of responses to crises and suggests that a crisis, including external pressures, might be necessary to trigger selective change in national governance systems.

However, a considerable amount of research on the political implications of disasters and crises discusses their effect on agenda setting and framing. John Kingdon’s agenda setting recognizes problem recognition as one of the enablers for a “policy window” to open [22]. Disasters obviously draw the attention of and garner recognition by the public [29]. Strategic representations are used to manipulate the problem definition of the policy arena [24]. Very few but striking incidents in disaster situations have overly been focused on as a “synecdoche,” which is a representation of the whole of the problem [24] (pp. 145–147). These evoke a sense of urgency and motivate collective actions, which are dubbed as disaster utopia [25,30].

The risks and benefits of deliberately using crisis discourses have already been empirically analyzed in the context of specific areas of public policy making and cases. By empirically analyzing megaprojects in Israel, van Wijk and Fischhendler [31] have discussed the strategic uses of “urgency framing” by regulators to legitimize unorthodox planning practices and preclude alternative solutions. The shock doctrine theory by Naomi Klein has warned against the strategic uses of crises by the global elites for advancing their interests in neoliberal capitalism [32]. Hodder and Martin [33] have warned against the deliberate framing of climate change by climate activists as an emergency by highlighting the discrepancy between the persistence of climate change issues and the short-lived attention drawn by emergency framing. In contrast, della Porta [26] has shed a positive light on crises, such

as the European debt crises that took place in the 2000s; the author has drawn attention to the effects of enlarging political opportunities for civil society organizations to embark on new projects for the purpose of involving a different set of actors in different forms of deliberation, such as the Icelandic National Assembly and the Citizens' Assembly in Ireland. Patterson et al. [23] have argued that "emergency-as-strategy" framing has the potential for mobilizing sustainability action by creating an exception to the norms, encouraging public engagement and empowerment/disempowerment, and reshaping discourses.

However, crises do not necessarily automatically lead to resource mobilization and policy changes through agenda setting and framing. Birkland [20] has examined four different categories of disasters—terrorist attacks, aviation security breakdowns, hurricane-related events, and earthquakes—and discovered that broader mobilization of group interest and involvement does not necessarily occur in hurricane and earthquake cases. Boin et al. [21], based on a comparison of 15 cases, have suggested that the effect of crises on agenda setting and systemic change is contingent. They have argued that the effect is not automatic and that there is a frame contest between various actors that engage in crisis exploitation. By comparing the welfare reforms in the Netherlands and Belgium, Kuipers [34] has identified the need for strategic behaviors of change-oriented actors to make a reform successful. Keeler [35] has argued that extraordinary policy making is possible only when a macro-sized policy window is opened by mechanisms, including the severity of crisis. Under authoritarian regimes such as China, the government and the public may respond to an emergency-related agenda differently from those under democratic regimes [36].

In a nutshell, disasters and other types of crises can impact publicly held norms, problem recognitions, and policy-making agendas. These in the end can affect the political opportunity structure for social movements or policy window for agenda setting, such that a new set of public policies or governance mechanisms have a better chance of being introduced and implemented. Different political actors play critical roles in making such changes possible.

3. Critical Moments in Negotiation

In the field of negotiation analysis and public dispute resolution, events and exchanges that are substantially different from the standard practice are broadly categorized as "critical moments" [37]. Through critical moments, negotiating parties understand that the conventional norms and rules are not applicable as such [37]. Conventional framings of dispute and negotiation are coalesced, characters of interaction change, and prior beliefs and commitments become open to reflection [38]. A critical moment enables transformations in the understandings and definitions of the conflict, relationship, and problem between the parties [39].

A strand of critical moment research focuses on developments in the relational aspects of negotiation. Incommensurable belief systems between disputing parties are bridged through critical moments by making them commensurable to each other [40]. Winship [41] has discussed the effects of critical moments on the veneer of consensus, a term coined by Erving Goffman, for acting as a group by suppressing their conflicting interests.

The size and scale of critical moments can vary substantially among studies. At the microscopic level, Kolb [42] has focused on words and reactions by each negotiator and identifies critical moments in their sequence. Restorative and participative turns that speakers take to adjust one's position relative to the other party are considered as contributors to the emergence of critical moments in negotiation.

Critical moments can be triggered at the macroscopic level as well. For instance, Druckman [43,44] has used the term "precipitants" to describe factors that trigger a turning point, which is an abrupt shift in the negotiation processes. Precipitants are basically of three types—procedural, substantive, and external. External precipitants, such as terrorist attacks, are not controllable by the negotiating parties. Other researchers have also regarded

major changes at the organizational and institutional levels, which are considered a type of critical moment, and this has steered negotiation processes [39,45].

Therefore, disasters and crises, which impose sudden and major shifts in the way stakeholders negotiate, can be considered as a trigger of a critical moment. They affect not only the parties and their interests but also the norms and standards they implicitly assume as the backdrop of negotiation [38–40]. Although the existing literature in the field of negotiation examines such external factors as a critical moment, the influence of disasters has not been explored as much as it has drawn attention in the public policy field [20,21,32]. Disasters can be conceived as an extraordinary type of critical moment that imposes a halt on all involved stakeholders and triggers a systemic change in the way they negotiate.

4. Materials and Method

A disaster and its aftermath, a type of crisis, can trigger a critical moment in negotiation, particularly in the context of urban planning and community development [13–17,38]. Even if a disaster imposes losses and emotional burdens to local communities, it can force a halt in a locked-in situation, bring about a moment of reflection for community members, and deliver a fresh setting for negotiation wherein sustainable development options can be explored.

Herein, the author has explored this question by focusing on the Odaka community from Minami-Soma City, Fukushima Prefecture, Japan. The community experienced a 5-year-long forced evacuation after the explosion at the Fukushima Dai-ichi nuclear power plant. It is an extraordinary case for exploring the effect of a disaster on how a community negotiates its development. Theoretically, it is impossible for us to assess the effects of disasters on negotiation settings without a comparison. In contrast, a single case study can be justified on the ground that the case is critical, unique, and revelatory [46] (pp. 47–50).

To enhance our understanding of the effects of disaster on communities, the author conducted an archival search on the history, demography, and development of Odaka. Data on Odaka community's demography and economy were primarily obtained from the Japanese government's official e-Stat database available on the Internet [47]. Additional statistical data are provided by the city government of Minami-Soma. The author relied on multiple publications by the City of Minami-Soma for historical records of the community [48–50]. In addition to such objective data, the author conducted in-depth interviews with 13 community members, ranging from junior ones who have recently immigrated to the community to senior ones who grew up in the community and spent most of their life in the community development at Odaka. The interviews primarily explored the hypothetical effects of disaster and are not intended to support the hypothesis of the effect of disaster on community development. Unless granted by the interviewees, their identities are not disclosed in this article to protect their rights. Details of the interviews are outlined in Appendix A.

The analysis adopts the framework of negotiation analysis. Two different lists of “seven elements of negotiation” are available. One is by Fisher and Ertel [51] and includes (1) interests, (2) options, (3) alternatives, (4) legitimacy, (5) communication, (6) relationship, and (7) commitment. Their framework is developed as a practical guide for each negotiator in preparing a strategy of principled negotiation [52]. Another is by Wheeler [53] and includes (1) BATNAs, (2) parties, (3) interests, (4) value, (5) barriers, (6) power, and (7) ethics. This list was produced as a teaching note to his course at Harvard Business School and a guideline for negotiators and analysis in mapping the negotiation settings. In this article, some of these elements are selectively adopted as the framework for analyzing the case of Odaka to identify the influence of earthquakes as a critical moment. In particular, the author focuses on (1) parties, (2) interests, (3) relationship, and (4) legitimacy.

Parties are the ones who are involved in negotiation. In community settings, it corresponds to the members of the community. While it is technically possible to conduct a thorough and elaborate stakeholder analysis [54,55], the author reviews the demographic features of the community before and after the critical moment because of the data avail-

ability. Interests are what they want to achieve through negotiation, which is distinctively separate from positional statements [52]. The interests of the community members are explored through interviews and archival data regarding how they sought the development. The third element, the relationship, is about how each member regards other members, both substantially and psychologically. The relationship often serves as the foundation of negotiation. The last element, legitimacy, defines what is fair and good.

The framework of the analysis is presented in Figure 1. To be considered a critical moment, a disaster event should transform the four elements of negotiating community development cited above. In other words, the elements must be somewhat different before and after a critical moment. In addition, if the disaster is an enabler of sustainability negotiation, which is the main hypothesis of this article, the four elements after the disaster should draw more attention to the community's sustainability. In the following section, the author discusses the extraordinary case of the development of the Odaka community before and after the crisis to examine the transformation in these four elements.

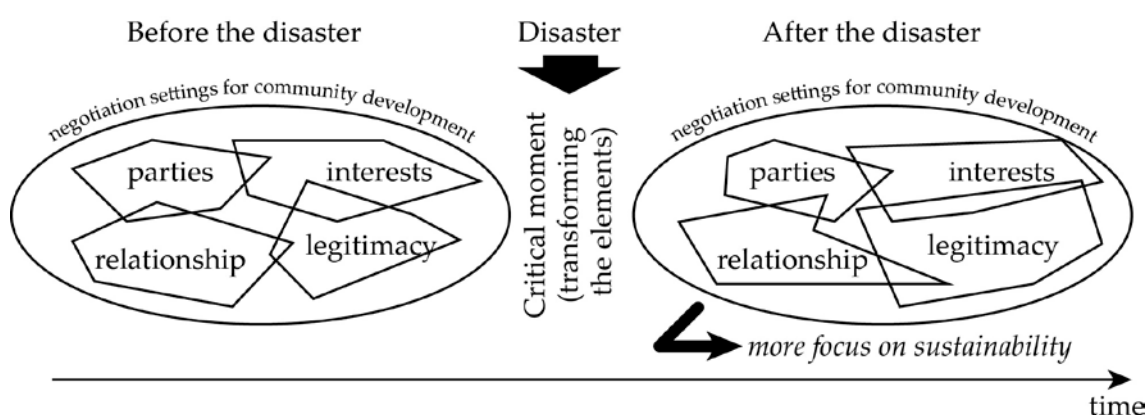


Figure 1. Effect of a disaster as a critical moment on the four elements of negotiation for community development.

5. The Case of Odaka

5.1. Introduction to Odaka

Odaka is one of the three districts of the City of Minami-Soma (Figure 2). Odaka used to be an independent municipality until 2005 and merged with two adjacent towns, Haramachi and Kashima, to form a new municipality called Minami-Soma. The community is located approximately 240 km northeast of Tokyo and is located in Fukushima Prefecture. Odaka faces the Pacific Ocean, and its population was 3629 in 2020 [56]. It is served by the Joban Highway and Joban Line (rail), which connect the community to Tokyo along the coastline.

Odaka was severely affected by the Great East Japan Earthquake on 11 March 2011. Communities in Minami-Soma along the Pacific Ocean were hit by a 9.3 m high tsunami, which resulted in 1156 deaths in the entire city [57]. Odaka's eastern side of the railway, mostly used as rice paddy fields, was completely damaged by the tsunami [58] (p. 16). The central area of Odaka lies on the western side of the railway and was not affected by the tsunami.

However, due to the explosion of the reactors at the Fukushima Dai-ichi nuclear power plant on subsequent days, the community had to be evacuated without considering its recovery from the initial earthquake and tsunami on 11 March 2011. Two other districts of Minami-Soma to the north, slightly distant from the plant, were not severely affected by the radiation; however, almost all of Odaka was within a 20 km radius of the nuclear plant, and this was designated by the national government as an evacuation zone for 5 years because of the heightened radiation level [57] (p. 8). Only in July 2016 were the residents allowed to return home. Impacts on the Odaka community were substantially aggravated by the so-called Natech accident, the technological accident at the nuclear power plant triggered by the natural event [59,60].

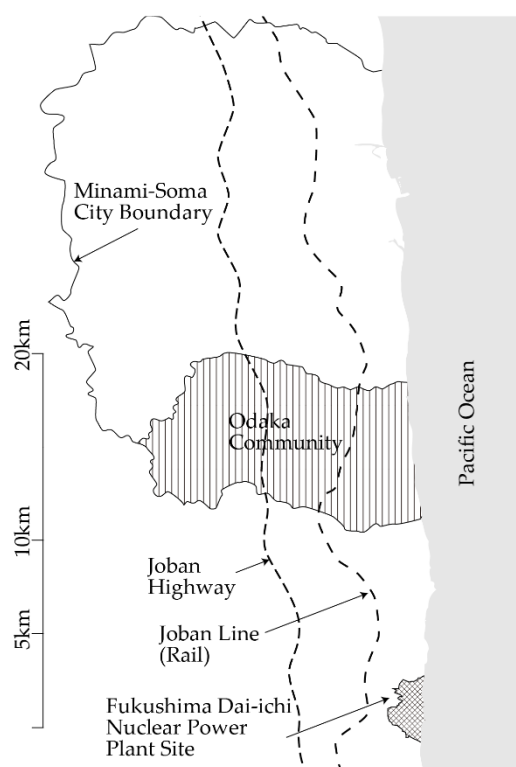


Figure 2. Location of Odaka.

The Odaka community endured extraordinary disruptions during the 5 years of forced evacuation after the reactor explosion. In 2010 before the earthquake, its population was 12,546 [56]; however, its current population size is only a quarter of what it used to be. Many buildings along the town's main streets are still vacant. A majority of the former residents found new housing as well as employment outside of the community during the long evacuation period.

Odaka is now regarded as one of the few communities in Japan that thrives by incubating innovative businesses of young entrepreneurs [61–63]. Most rural communities in Japan are suffering from population declines and ageing, as Odaka used to before the earthquake, but Odaka has been successful in bringing back the younger population after the evacuation period. The 5-year-long evacuation after the earthquake and nuclear disaster was a horrendous experience for the community, but it produced an opportunity for experimenting with new businesses and eventually attracting a younger population.

In this section, the earthquake and nuclear disaster are discussed as a case of a critical moment that enabled a renewed negotiation for transitioning to a more sustainable development of the community. Using the framework discussed in the previous section, the differences in the settings for negotiating community development were analyzed. This demonstrates how cleavage by the forced evacuation in fact enabled a new space of negotiation.

5.2. Before the Earthquake

5.2.1. Industrialization of Odaka

Before the rapid industrialization period of the 1960s, Odaka prospered by producing silk and exploiting its silica reserve [48]. Silk production was in fact the first wave of industrial transition of the community in the 19th century. Seiju Hangai, a local entrepreneur, purchased 60 weaving machines in 1887 and distributed them to the local families so that the community as a whole would develop the silk weaving industry [48] (pp. 70–71). On

the other hand, both silk and silica mining industries gradually declined owing to the declining demand and international competition in the mid-20th century.

Since the 1960s, the town has sought its economic growth and employment opportunities by attracting manufacturing firms. In the 1980s, the town's government developed multiple industrial parks for hosting new manufacturing factories [49] (pp. 58–61). The number of manufacturing factories increased particularly in the 1970s and contributed to the town's economic growth.

The annual production of manufactured goods increased from JPY 3.8 billion in 1975 to JPY 34.9 billion in 2000 [49] (p. 61). This also provided employment opportunities to the community members (Figure 3). On the other hand, the reliance on manufacturing resulted in a downfall around the turn of the century. Due to the competition with manufacturers in East and Southeast Asian nations as well as the automation of production, the number of persons employed in these factories and the production dwindled substantially after 1990 (Figure 3). The total sales of manufactured goods also reduced (note: the production statistics for Odaka are not available after the merger into Minami-Soma City in 2006). Although these factories continued to provide employment for the community residents until the earthquake, the sustainability of relying on the manufacturing industry was becoming questionable.

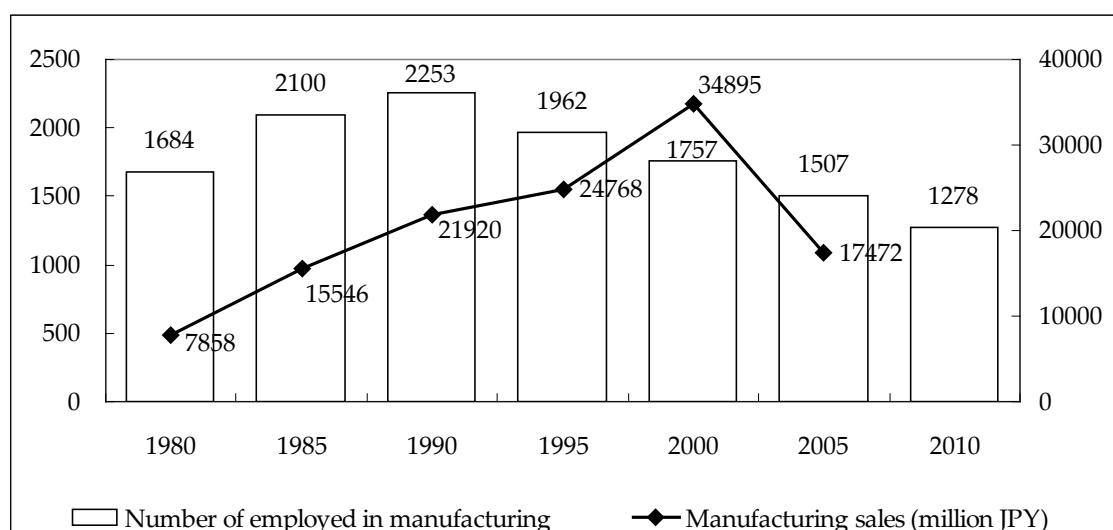


Figure 3. Manufacturing industry of Odaka [64,65].

5.2.2. Dependence on Nuclear Power

Meanwhile, a number of Odaka residents also relied on the electric power industry. In neighboring communities, two nuclear power plants were opened by the Tokyo Electric Power Corporation, namely Fukushima Dai-ichi in 1971 and Fukushima Dai-ni in 1982. They offered employment and business opportunities, both directly from the utility and indirectly from its subcontractors to the community members.

The Odaka community in fact sought its economic development by hosting a nuclear power plant. Such plants were attractive to struggling rural communities because, in addition to its effects on local employment and the economy, the Japanese government provides hosting municipalities large funding to alleviate the not-in-my-backyard problem [66]. In 1968, Tohoku Electric Power Corporation announced its intent of developing a nuclear plant on the border between Odaka and Namie, an adjacent municipality located to the south [49] (p. 24). While opposing groups concerned about safety emerged in the community, the town council of Odaka made a formal resolution for inviting the company to build the plant in 1973 [49] (p. 24). The municipality in fact benefited from a special subsidy from the national government for accepting to host the nuclear plant in 1986 [67]. While the actual development of the plant was slow and prolonged, the utility company

started purchasing the land in 1997. According to meeting minutes of the Minami-Soma city council on 10 March 2011 (i.e., the day before the earthquake), the municipal government reiterated its intent of promoting the siting of the nuclear plant, and the plant was slated to start its operations in 2022 [68].

5.2.3. Agricultural Sector

Another area to look at is agricultural production. The agriculture in Odaka was primarily operated by farming families at a small scale. The majority of farmers were operating on a part-time basis, with another job for household sustenance. The number of farmers and their production continued to decline throughout the last decades (Figure 4).

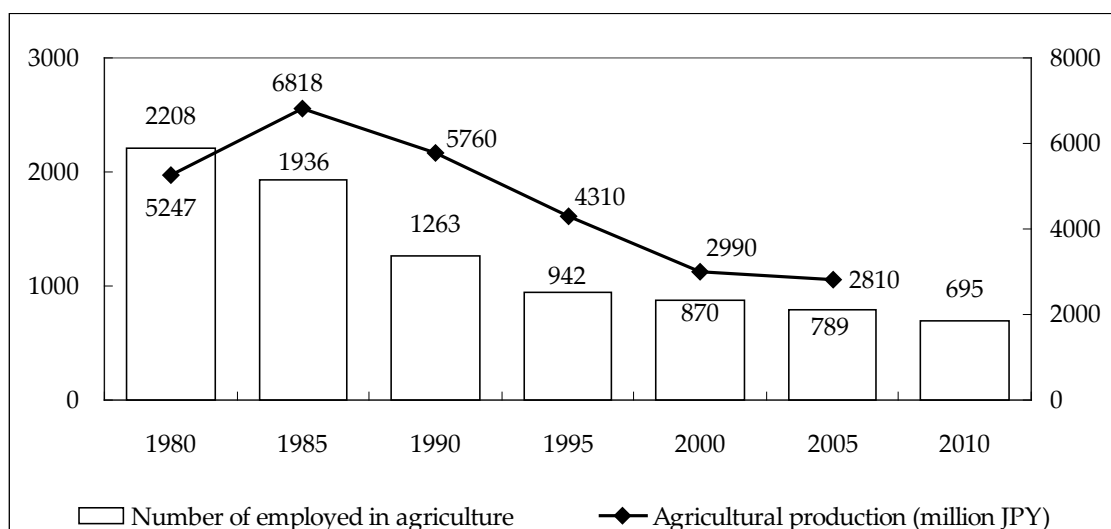


Figure 4. Agricultural sector of Odaka [64,65].

Before the earthquake, the community government initiated multiple land adjustment programs to reshape the farmlands (in rectangular forms) for increased productivity. The land adjustment would encourage more efficient operations with larger equipment that took advantage of the reshaped land. On the other hand, some part-time farmers who inherited their farmlands from their ancestors preferred to maintain ownership and small-scale cultivation. According to the National Agricultural Census in 2005, only 80 out of 1018 farming operators in Odaka were full-time farmers who did not engage in other businesses [69]. As many as 814 operators, however, were category-2 part-time farmers who had another occupation as their primary source of income [69]. In addition, the Agriculture Land Act also hindered large-scale operations by prohibiting the lease of farmlands to corporate entities until 2009. Thus, even though the land adjustment would enable a transition to more competitive agriculture in Odaka, the challenge of consensus building with a number of landowners slowed down the progress.

5.2.4. Declining Population

The total population of Odaka has been continuously decreasing since 1985 (Figure 5). The ratio of those over 65 years old, who are considered as senior citizens as per Japanese standards, jumped up from 13% in 1980 to 29% in 2010 [56]. While the number of senior citizens continued to increase, the number of younger generations decreased.

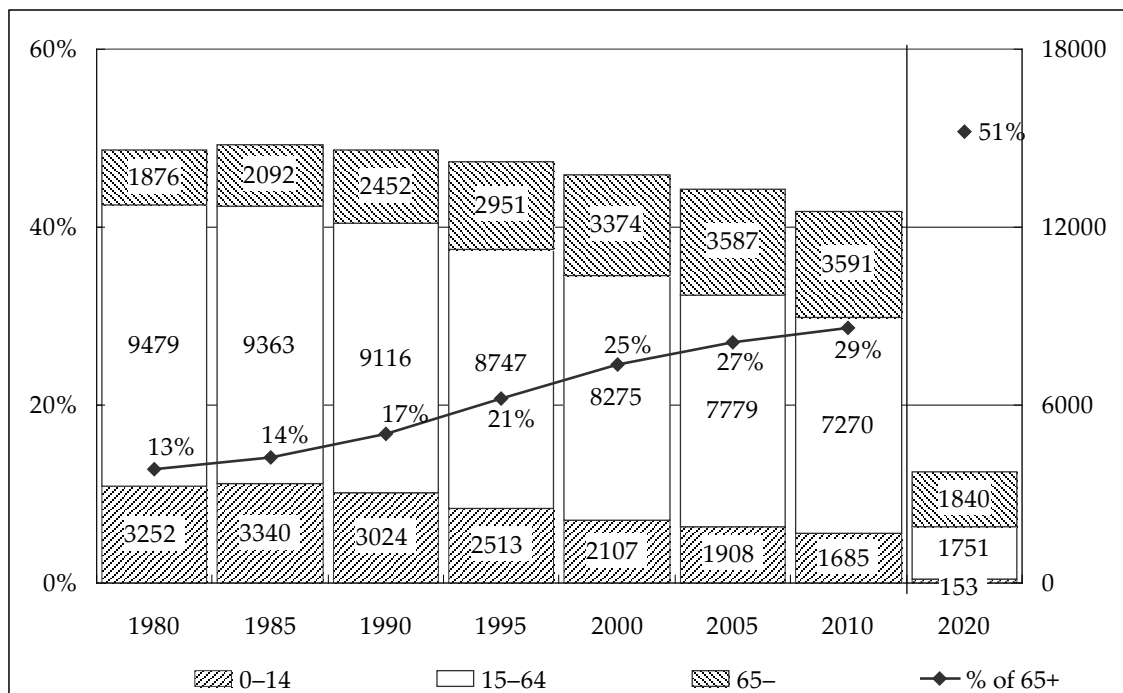


Figure 5. Population of the Odaka Community [56].

A brief analysis of population changes revealed a migration trend that caused this population to decline and age. Figure 6 summarizes the 5-year changes in the size of each age group (cohort). For instance, the population of those aged 20–24 years in 2010 was –39% of that of those aged 15–19 years in 2005. This implies that at least 39% of those who grew up in Odaka left the community between 2005 and 2010. A similar trend of population reduction can be observed in the transition from age 10–14 to age 15–19, during which most students go to colleges (note: no college exists in Odaka). In total, approximately 50% of the children who grew up in Odaka left the community before they turned 25.

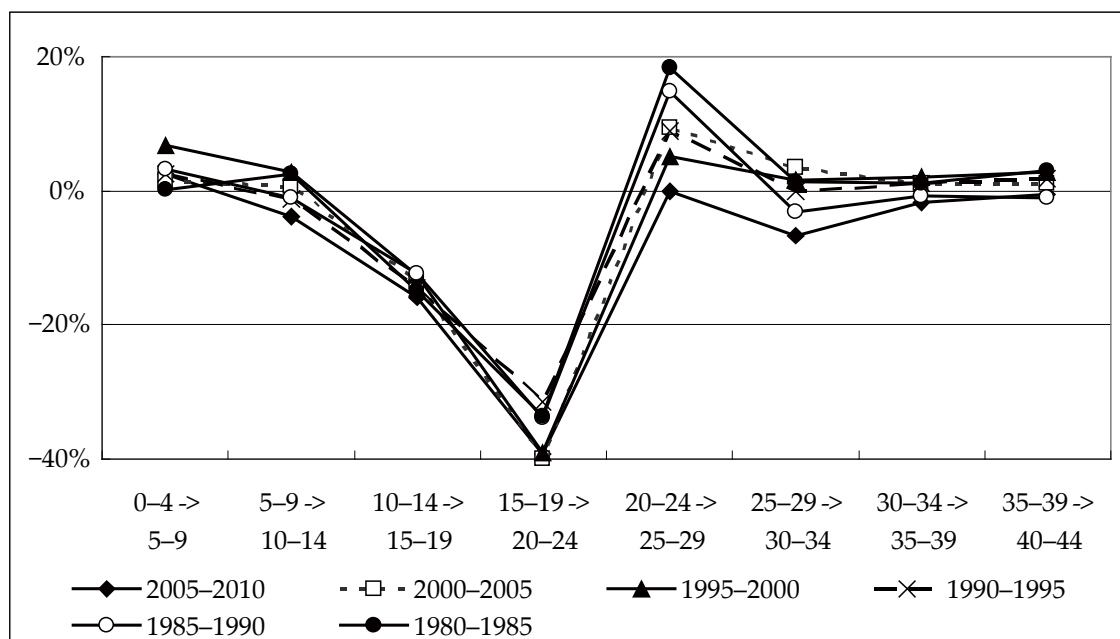


Figure 6. Five-year changes in cohort size in Odaka [56].

In the 1980s, the community's population was somewhat maintained by the migration of those in their 20s into the community. An 18% increase in the size of the 25–29 cohort was observed between 1980 and 1985. A certain number of those who left the community for higher education returned to the community, and some of those who found a job in Odaka migrated back. However, this type of migration continued to decline over time, and between 2005 and 2010, the percentage fell to negative values. Thus, the community suffered from the loss of younger generations.

This trend is echoed by the memories of those who lived in the community around that time. A resident who was in his 30s at the time of the earthquake recalls the pre-earthquake days as follows:

“Yeah, as far as I remember, I think 90 percent of my classmates left the town. . . . They come back here only in the summer or new year vacation (to meet their parents). We drink together as a reunion then, but the locals were only one or two out of ten (participants) [70].”

5.3. *During and after the Mandatory Evacuation*

5.3.1. Demise of Large-Scale Projects for Development

After the nuclear incident, the municipal government of Minami-Soma City, which Odaka is part of, changed its approach to the nuclear power. In August 2011, the government decided not to receive the national government grant for hosting the future nuclear power plant. In December, the city council, which formerly advocated for the development of a plant in Odaka, unanimously adopted a statement calling for the cancellation of the project [71]. In March 2013, Tohoku Electric Power Company announced its official intent of cancelling the project altogether [72]. Odaka's ambition of revitalizing the community through nuclear power was finally terminated.

Since the restriction was lifted in 2016, the industrial developments of the past have revived only slightly. Two large manufacturing factories resumed their operations at the previous locations [73]. Other manufacturers moved their operations to other distant areas. Five years was too long for the corporations, particularly those operating nationwide, to retain an incentive to return to the original location. In addition, the working-age population of Odaka has shrunk so much that adequate workforce cannot be found in the community, which is discussed in the following section.

5.3.2. Burgeoning Entrepreneurship in the Vacant Town

In 2012, the national government that restricted access to Odaka designated it as the “area to which evacuation orders are ready to be lifted.” After this designation, the community members of Odaka could return home temporarily during the daytime, primarily for clearing the debris and running other minor errands. A few local residents initiated programs for revitalizing the community even if the activities were limited to the day time. One of the entrepreneurs was Tomoyuki Wada, who used to operate a remote office in Odaka, before the earthquake, for an information technology business that he had started in Tokyo. By collaborating with a handful of neighbors, he set up a new corporation called Odaka Worker's Base (OWB) and started some community-focused businesses, such as a restaurant (serving lunch only) and a mini grocery store, in the still-restricted city center. He openly admits that Odaka was full of opportunities to start new businesses in the deserted community [74].

Once the restriction was lifted, the OWB started to collaborate with the city government in 2017. The new collaboration, called Next Commons Lab (NCL), would use a program from the national government that provided financial support to rural municipalities for inviting young professionals. These professionals would help the ageing communities and experiment with new businesses in these rural areas. The OWB would be the hosting institution for these young professionals. So far, 10 members have moved to Odaka as members of the NCL and are starting to launch new businesses.

For example, Shinya Tsukamoto, who has some experience in ICT businesses in Asia, has started a new company in Odaka for providing remote consulting and programming services for international clients [62]. Taisuke Sato and his colleagues have started a unique brewery called “haccoba” that uses local ingredients and traditional recipes. He recalls, “We moved to Odaka because our open-minded brewing practice fits with the community where its life and culture were being rebuilt. The fact that we started the business here will contribute to our brand” [75].

In addition to the NCL program, the Minami-Soma city government has expanded its operation of attracting young entrepreneurs to the city by establishing a special division with some staff members for promoting the immigration. The OWB is also hosting other young professionals and students as “interns”. According to the OWB, at least 67 individuals migrated to Odaka in order to participate in the organization’s programs [76]. The effect of these efforts is in fact apparent in the demographic data, which is discussed in Section 5.3.4.

5.3.3. Consolidating Agricultural Production for Efficiency

Transitions have also been observed in the agricultural sector. Because many of the part-time farmers who used to cultivate in Odaka did not return to the community, a smaller number of farmers, who were more committed to reviving the agricultural production in Odaka, consolidated the operations and produced more efficiently using larger equipment. According to Ryoichi Sato, who established the Ko-bai-yume Farm Corporation after the earthquake for revitalizing Odaka’s agriculture, as many as 85% of farmland owners in Odaka had no intention of cultivating the land by themselves and wanted to lease their land to operators after the end of the evacuation period [77,78].

The revival of agriculture in Odaka was a grueling task. Those who restarted the operation had to clean up the debris first, as well as the radioactivity, from their farmlands and re-cultivate the soil. On the other hand, land adjustment programs, renewed after the earthquake, moved forward rapidly because the overwhelming majority of the landowners had lost their interest in agriculture. The committed operators, much fewer in number but each cultivating several hundred hectares, can take advantage of the reshaped land. For instance, Ko-bai-yume Farm now recruits young professional farmers and uses drones and other advanced equipment to enable efficient agriculture [77]. In the end, the total number of certified farming operators in Odaka was reduced from 98 in 2000 to 45 in 2020; in contrast, the number of agricultural corporations increased from 7 to 13 [79]. According to a former town officer who managed the land adjustment program, “The transition from individual farming to corporate-based farming was made possible by the 3.11 (earthquake). Otherwise it won’t move forward that quickly” [80].

5.3.4. Demographic Impacts

In 2016, the restrictions were lifted, and the former residents were encouraged to return to the community. Only a quarter of the former residents, however, returned to the community. In 5 years, the majority of residents already found new jobs and settled in other areas. In particular, two other districts of Minami-Soma City were not affected by the restrictions and became popular locations for resettlement.

Those who returned to the community were mostly senior citizens. Figure 5 indicates that between 2010 and 2020 the population size of those aged >65 years declined by 50%, whereas the population of those aged 15–64 and <14 years reduced by 76% and 91%, respectively. In the end, the ratio of senior citizens in Odaka rose from 29 to 51%.

However, a detailed analysis by the city government revealed that as of October 2021, as many as 756 individuals were newcomers who did not live in Odaka before the earthquake [81]. These newcomers comprise approximately 20% of the whole population. The ratio of newcomers shows striking differences among the age groups (Figure 7). Approximately one third of Odaka’s current residents aged 20–49 are newcomers.

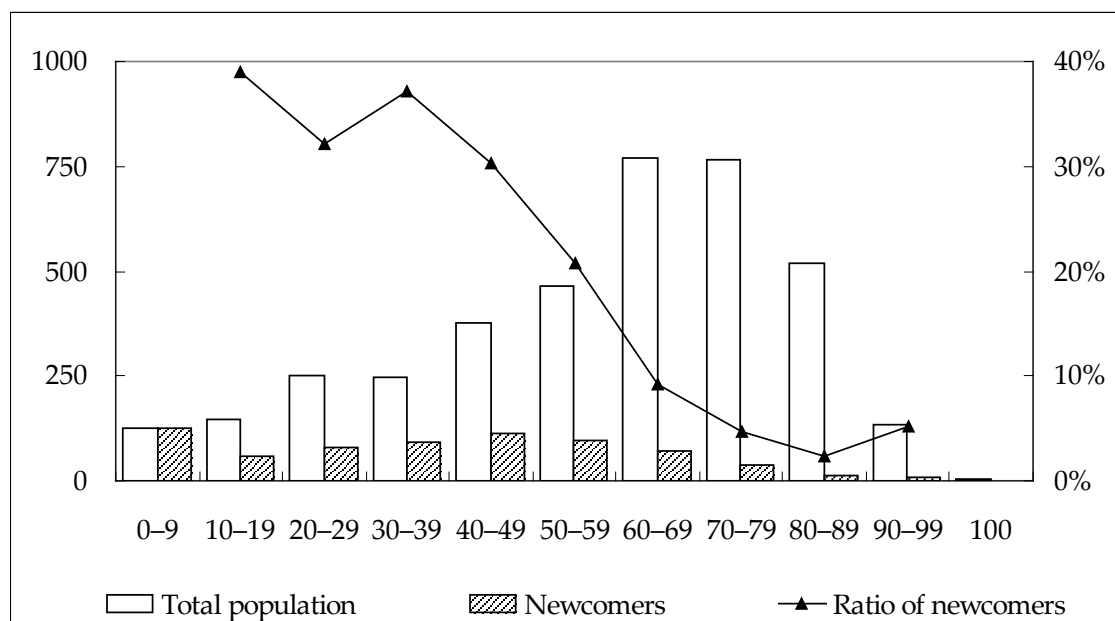


Figure 7. Odaka's newcomers in each age group (October 2021) [81].

This indicates success in terms of community development after the evacuation period. The community is attracting younger generations, especially from outside the community. Without the efforts by the OWB, the city government, and the other community members, the community would have had a population one-third lower of individuals between 20–49 years and suffered much worse population ageing.

5.4. Applying Negotiation Analysis Perspectives

5.4.1. The Contrast between before and after the Earthquake

The development strategy of Odaka has substantially changed due to cleavage caused by the initial earthquake and the subsequent evacuation period due to the nuclear power plant explosion. Before the earthquake, the community relied on attracting large-scale capital investments of external parties, such as manufacturing plants as well as a nuclear power plant. Hosting a nuclear power plant would have provided employment opportunities as well as massive subsidies from the national government [66]. Dependence on investments from external parties turned out to be unsustainable. The community members, unfortunately, physically experienced the sustainability risk of relying on nuclear power through the explosion of a nuclear power plant in a nearby community.

After the evacuation, the community adopted a completely different approach to the development; this approach focused on entrepreneurship and social innovations at a relatively small scale. These projects are autonomous and self-reliant, with a focus on younger generations, which embraces the goals of sustainable development. They do not depend on large-scale investments by external parties. The agricultural sector has also experienced a transition from inefficient part-time family-based operations to more productive and professional corporate-based operations.

This transition was triggered by the cleavage created by the 2011 earthquake. To understand the shift in more detail, however, the author adopted a well-established framework for analyzing the negotiations explained in the Method section. The differences in (1) parties, (2) interests, (3) relationship, and (4) legitimacy before and after the disaster illustrate how the cleavage enabled a different arena of negotiation for a more sustainable development.

5.4.2. Parties

Before the earthquake, Odaka was suffering from the emigration of younger generations (Figure 6). Those who remained in town were literally stuck in the community for their survival. Manufacturing factories that provided employment opportunities were facing a downturn in the face of international competition. The planned nuclear power plant was one of the hopes for the community's sustenance. Meanwhile, population ageing was a serious issue for the community. A long-time resident of Odaka recalls no young newcomers to the community before the earthquake [82].

After the evacuation, the population size declined by as much as 75%. The size of the community was too small to re-establish the businesses to what they used to be before the earthquake. The situation in 2016 was a kind of an institutional void [83] in which no established processes and parties existed. Therefore, entrepreneurs such as Tomoyuki Wada, who had an intention of redeveloping the community from scratch, could take the lead and bring young entrepreneurial professionals to the community and revitalize its development. While the ratio of senior citizens has jumped up to a staggering 51%, one-third of the young citizens includes newcomers, which changes the picture of parties negotiating the development in Odaka.

5.4.3. Interests

Before the earthquake, development was primarily focused on economic growth and employment opportunities. Encouraging the development of the factories of large manufacturing firms, although their headquarters were not in Odaka, provided quick employment opportunities and economic benefits to the community. The nuclear power plant project would also bring new job opportunities as well as subsidies from the national government to the municipality.

On the other hand, after the earthquake, the entrepreneurs in Odaka seemed to be much less interested in expanding employment opportunities and the scale of its economy. First of all, the working-age population has declined considerably, such that job security is no longer a major concern. Entrepreneurs, particularly the newcomers who are attracted to the location, are more interested in experimenting with new business models that integrate the unique features of Odaka. Instead of the growth, they are more interested in the sustainable management of resources available in the community and its geographical features.

5.4.4. Relationship

The relationship among the community members before the earthquake was nothing special. While a substantial proportion of younger individuals left the community for better education and employment, those who remained in the community remained the same. In describing human interaction in the past, one of the interviewees said, "Our life had no excitement. No ups and downs. Well, there is the Soma-Nomaoi festival which is a festive day, but just that. We were doing the same thing every year. Just processing these same things in a routine [70]". They maintained the rituals and the status quo, which also remained the same over time.

According to multiple interviewees, however, many residents developed a sense of "being a stranger" and "being helped" during the 5 years in exile [70,80,82]. By reflecting on their experience of exile, the community members, especially the elderly ones, are open to newcomers.

Those who returned to the community after 5 years had to redevelop the relationships with their former neighbors, although there were much fewer of them, as well as the young newcomers who were interested in re-establishing the community from scratch. The lack of a densely knit community in fact allows the newcomers to be trusted, or not distrusted, to be part of the community. On the other hand, this looseness can cut both ways. Because the members do not know each other well, their relationship needs to be continuously cultivated and renegotiated through conflicts, reflection, and sometimes departures.

5.4.5. Legitimacy

The legitimacy of nuclear options has substantially changed after experiencing the nuclear disaster. Even though it was sought by the municipality until the day before the earthquake [68], the option was dismissed almost immediately after the nuclear disaster. As economic development and employment were the main interests of the parties, the development options sought before the earthquake focused on large-scale capital-intensive investments. They required commitments to the investment, which led to a sociotechnical lock-in in the political and economic spheres [84].

On the other hand, the entrepreneurial ventures emerging in Odaka after the earthquake were inevitably small in scale. Newcomers were moving to Odaka as individuals, not as corporations, and experimenting with new business models with a limited number of staff members or even by themselves. Sustainability is a crucial part of the current development, partly because newcomers are attracted by Odaka's rural features. For those who evacuated from the community, a real experience of a nuclear disaster has forced them to reflect on the sustainability risks of large-scale industrial developments. In addition, due to the small scale of entrepreneurial activities, their actions require much less commitment compared to the large-scale industrial development that often leads to sociotechnical lock-in. Instead, agility is becoming a norm in the development.

6. Discussion

Table 1 summarizes the negotiation settings for community development before and after the disaster in the Odaka community, which are analyzed in the previous section. The comparison shows how different the settings (i.e., the four elements of negotiation) are for negotiating development at the community level. In a nutshell, the community was locked-in to large-scale industrial development discourses before the disaster. While continuously losing its younger generations to the urban areas, the community was struggling to maintain the status quo by attracting investments from the outside. The uniqueness of Odaka was not incorporated in the community's strategy for industrial development. Before the disaster, their focus was on manufacturing goods and electricity, which are anonymously traded at the national level or even in the global market.

Table 1. Comparison of negotiation settings for community development before and after the disaster.

	Before	After
Parties	- Young generations continuously leaving the community - No newcomers	- Downsized population - Newcomers (young professionals)
Interests	- Economic growth - Employment	- Unique features of Odaka
Relationship	- Stabilized - Routine	- Institutional void - Emerging, in-the-making
Legitimacy	- Commitment to large-scale investments, leading to sociotechnical lock-in (e.g., nuclear power plant)	- Nuclear option delegitimized - Small scale; agility - Sustainability

The earthquake almost completely transformed the setting for negotiating community development. In referring to the aftermath of the earthquake, an interviewee said, "It was a Gala-gala-pon!" [82]. Gala-gala-pon is a Japanese onomatopoeia representing a ball coming out of a bingo machine. In other words, the interviewee was explaining how everything had changed and become unpredictable after the earthquake.

The post-disaster settings for negotiating community development are substantially different from the previous ones. The earthquake forced the community members to reflect on the risks of nuclear power. The shock enabled the members to free themselves from the

locked-in commitment to large-scale economic development projects. In terms of the sociotechnical transition, the incumbent regimes suddenly collapsed due to external pressure of the disaster, and the community experienced a disruptive pattern of transition [85,86].

The renewed settings at the structural level of the community, listed in the right side of Table 1, guide its members to envision and explore different pathways of development. Due to major shifts in the size and proportion of its population, the community members were more inclined to small-scale and sustainable projects that they could manage. In other words, each community member had to take responsibility for and worry about its sustainability because of the downsized population. It also created an institutional void [83] for the newcomers to fill. The newcomers, who had many other options for migration but chose this particular community, were interested in preserving and utilizing the unique environment of Odaka. They introduced new perspectives (i.e., legitimacy) with regard to community development.

The dynamics described in the previous paragraph demonstrate that the four elements of negotiating—parties, interests, relationship, and legitimacy—are not independent; they affect each other and guide the community members to select certain developmental pathways. In Odaka, the reduced population size (parties) triggered shifts in the three other elements. Meanwhile, the delegitimization of nuclear power (legitimacy) also affected the other elements. The instability of the elements, which was triggered by the 5-year-long evacuation, in fact represents a critical moment. The disaster enabled a transition to a renewed setting, by imposing a critical moment, which facilitated negotiations for more sustainable development in the community.

7. Conclusions

This article explores the role of disasters as an enabler of negotiation for sustainability, particularly at the community level. This study assessed this by empirically examining the shifts in negotiation settings in a Japanese community stricken by a triple-disaster: an earthquake, a tsunami, and a nuclear power plant explosion. The single-case study demonstrates the effect of the disaster as an enabler of negotiation for sustainability at the community level. The paper sheds a positive light on the effect of disaster at the community level, whose risks are likely to increase as climate change worsens in the future.

At the national level, the efforts of political actors who manipulate the agenda and frame policy changes have been well documented in the public policy literature [20–24,31–36]. This article, instead, is unique in that it focuses on the impacts at the community level, envisages a disaster as a critical moment in negotiation, and applies a framework of negotiation analysis.

Unlike at the national level at which existing political actors utilize emergency framings to advance their interests [31–36], a community is likely to experience a major shift in the composition of its members after a disaster. Many leave for safer locations, and others who are attracted for some reasons migrate to the community. By experiencing a disaster, the remaining members are forced to reflect on their past developments, particularly in the context of interpersonal relationships and nature. These effects of a disaster on community members fit with the issues elaborated by critical moment research in negotiation [37–45]. The novelty of this study lies in the framing of disasters as critical moments in negotiations at the community level that could introduce a new perspective for analyzing post-disaster recovery options.

The limitations of the present study lie in the scope and scale of the case study. The case of the Odaka community is somewhat exceptional in the size of its impact. Other communities toward the north of Odaka without severe nuclear contamination could engage in recoveries soon after the earthquake. Generally speaking, the scale and characteristics of impacts from disasters such as typhoons and earthquake vary substantially, and the lessons from Odaka might not be generalizable for all types of disasters. In fact, the Odaka case is different from climate-induced disasters in that the former was triggered by geophysical and Natech hazards, not by atmospheric ones induced by worsening climate

change. In particular, the Natech accident [59,60] at the nuclear power plant imposed a five-year suspension of recovery activities; otherwise, Odaka could have initiated its recovery promptly. The present case, however, is worth investigating because the associated experience is extraordinary and reveals the possibilities of disasters that accelerate a transition to improved sustainability by triggering a critical moment in negotiation [46]. Conversely, the author's argument can be reinforced by future studies that compare the experiences of multiple communities that experienced different types and scales of disasters with an international scope. In particular, the specific types of structural changes that lead to improved sustainability must be identified.

Disasters obviously impose emotional burdens on the stricken communities. Traumatic memories of the disaster cannot be removed from the victims. After reflecting on his experience of losing his grandfather due to the lack of sufficient medical care immediately after the earthquake, an interviewee in Odaka said, "I don't talk about this (tragic story) often, but everyone in this community has something similar in their heart [87]". By facilitating an understanding that a different and more sustainable community development is possible through a critical moment, this article attempts to suggest a positive perspective for disaster recovery. As climate change is likely to degenerate, communities in different parts of the world will suffer from climate disasters more frequently. The encouraging story of Odaka informs those sufferers about the possibilities of transitioning to a sustainable community through recovery.

Funding: This work was supported by JSPS KAKENHI Grant Number 21K12354.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Acknowledgments: I am grateful to Kensuke Tadano for providing initial access to community members in Odaka as well as government officials of Minami-Soma City.

Conflicts of Interest: The author declares no conflict of interest.

Appendix A

Interviews were conducted with 13 individuals in Minami-Soma City to explore the effect of disaster (earthquake, tsunami, and nuclear power plant accident) on the development of the city and the Odaka community in particular. Interviews were conducted in-person at their offices excluding two interviews that had to be conducted online. Interviews were loosely structured, with the following three questions as the guideline:

- (1) How was the life in the community of Odaka before the disaster?;
- (2) What are the differences that you perceive in the community after the disaster?;
- (3) What were the motives to start new businesses in Odaka? (to entrepreneurs);
- (4) How do you work with other key stakeholders?

Interviewees were identified by reviewing newspaper articles and government documents about the community, as well as snowball sampling. Interviewees were: Kensuke Tadano (former city councilperson); Tomoyuki Wada (entrepreneur, Odaka Worker's Base); Taisuke Sato (newcomer/entrepreneur, haccoba, Inc.); a councilperson for former Odaka Town and Minami-Soma City; two senior officials of Minami-Soma City government; an official of Minami-Soma City government; a former official of Odaka Town and Minami-Soma City government; two officers at an incubation facility in Minami-Soma; an entrepreneur in Minami-Soma City; a newcomer/entrepreneur in Odaka; and a newcomer/employee at the Odaka Worker's Base.

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