

Barriers to Long-Term Return after the Great East Japan Earthquake: Lessons from Hirono Town

Carl Bruch (Corresponding author) International Programs, Environmental Law Institute 1730 M Street NW, Suite 700, Washington, DC 20036 Tel: 1-202-939-3879 E-mail: bruch@eli.org

Syafruddin Karimi Faculty of Economics, Andalas University Kampus Limau Manih, Padang 25163, Indonesia Tel: 62-75171088 E-mail: karimi.syafruddin@gmail.com

Jagath Manatunge Department of Civil Engineering, University of Moratuwa Moratuwa, Sri Lanka Tel: 94-77350 8786 E-mail: manatunge@uom.lk

Mikiyasu Nakayama

Graduate School of Frontier Sciences, The University of Tokyo

5-1-5 Kashiwano-ha, Kashiwa, Chiba 277-8563, Japan

Tel: 81-4-7136-4869 Fax: 81-4-7136-4842 E-mail: nakayama@k.u-tokyo.ac.jp

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Abstract

The Great East Japan Earthquake and the ensuing tsunami and nuclear accident at Fukushima Daiichi displaced more than 340,000 people. Four years later, more than 70,000 people were still living in temporary housing. This article summarizes findings from a series of structured interviews with people from Hirono Town that were still living in temporary housing four and a half years after the triple catastrophe. The interviews sought to understand why people were still in temporary housing, rather than moving back to Hirono Town (as many had) or on to more permanent arrangements in other locations (as some had). Five key factors are identified that contributed to respondents' ongoing decision to stay in the temporary housing: (1) a new sense of community in the temporary housing; (2) convenience of shopping, medical care, and dental care, as well as (to a lesser degree) education and recreational opportunities; (3) a sense of injustice and inequality in the benefits they were receiving; (4) concerns about radioactive contamination; (5) a desire to receive compensation.

Keywords: Great East Japan Earthquake, population displacement, return migration, Fukushima nuclear accident.



1. Introduction

At 2:46 in the afternoon of March 11, 2011, the subduction zone between the Pacific Plate and Eurasian Plate ruptured off the east coast of Japan. The Pacific Plate slid 24 meters to the west. The resulting magnitude 9.1 Great East Japan Earthquake was the fourth most powerful that the world had experienced since 1900 (USGS, 2012). The earthquake sent tsunami waves thousands of miles across the Pacific, and the strongest effects were reserved for the communities along the northeastern coast of Japan nearest the epicenter. Tsunami waves as high as 40 meters hit the Japanese coast, traveling up to 10 km inland (Oskin, 2015). The earthquake and tsunami left 15,893 people dead, 2,572 missing, and 6,152 injured (Yamano, 2015). More than one million buildings were collapsed, partially collapsed, or otherwise damaged (Ranghiere & Ishiwatari, 2014).

The disaster was not over. About 75 kilometers to the southwest of the epicenter, on the coast lay the Fukushima Daiichi Nuclear Power Station (IAEA, 2011). The earthquake knocked down the power line that fed the cooling facilities. The tsunami swamped the backup generator. Without cooling, the power station experienced a level 7 "severe accident" on April 12, 2011—only the second level 7 nuclear accident in world history (the other one being the accident at Chernobyl) (UNSCEAR, 2013). The accident released a cloud of radioactive gas and particles that blew northwest of the power station.

The government ordered the evacuation of nearby communities, and established an exclusion zone of 20 km (OCHA, 2011). More than 340,000 people were displaced by the treble set of disasters. The World Bank estimated damage at US\$235 billion, making it the costliest natural disaster in history (Ranghiere & Ishiwatari, 2014).

As of March 2015—four years after the Great East Japan Earthquake—more than 228,000 people were living away from their home (IDMC, 2015). Some had moved away permanently. More than 76,000 people, though, were living in temporary housing (Gudjonsson, 2016).

To better understand why people were living in temporary housing years later, a research partnership led by the University of Tokyo commenced a research project. The research program focused on residents from Hirono Town who were still living in temporary housing. On June 14-15, 2014, the authors conducted initial group consultations in three temporary housing camps around Iwaki City—Onigoe, Chuodai Takaku, and Kogyo Danchi—and undertook selected one-on-one interviews. These consultations and interviews suggested a willingness, and even eagerness, on the part of evacuees to talk about their experiences with foreign researchers.

Hirono Town was established in 1940, and before the earthquake it had a population of approximately 5,500. It is located outside the 20 km exclusion zone, but within the emergency evacuation preparation zone. Most residents evacuated on March 11, 12, or 13 —within 48 hours of the tsunami. Many residents were keen to return quickly. The central government also wanted residents to return, indicating it was safe to return in September 2011 (Hongo, 2012). Once the electricity, water, and other infrastructure was restored, people

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started to come back. On March 1, 2012, 600 people returned; and on March 30, 2012, the town government called on residents to return (Ranghiere & Ishiwatari, 2014). By September 2015, though, about half of the residents had returned.

This article summarizes original research that seeks to understand the reasons that people were still living in temporary housing more than four years after the accident. What are the incentives to stay in temporary housing? What are the disincentives to return to Hirono Town or to move to another permanent situation? Section 2 presents the basic research, describing the methodology and describing the interviewees, and then summarizing the results of the interviews. Section 3 explores four commonly stated reasons for not returning (community, convenience, a sense of injustice, and contamination), and briefly considers a fifth reason (compensation) that was mentioned by some and may play a more substantial role than stated. Section 4 provides a brief conclusion, touching on the potential implications of those reasons.

2. The Research

On September 15-19, 2015, three of the authors of this article (Bruch, Karimi, and Manatunge) conducted one-on-one structured interviews with evacuees from Hirono Town. The interviews followed a standard set of 31 questions, including nine that solicited basic demographic information (including, for example, age, marriage status, children, profession, years in Hirono Town). The next four questions tracked their movement from Hirono Town to temporary housing. Eleven questions explored the evacuee's experience in temporary housing, and compared life in temporary housing with life in Hirono Town. These questions sought to tease out aspects of convenience that may be influencing respondents' decision to stay in temporary housing. The final seven questions explored the evacuee's plans for life after they leave temporary housing would close on March 31, 2017.] While respondents often provided quantifiable responses, they supplemented those responses with extended narratives that contextualized those responses and gave further insight into their decisionmaking. The interviews typically took 40-60 minutes to complete, using interpreters.

These interviews were supplemented by interviews with five staff members of the temporary housing at Onigoe, and by discussions with residents and others at an International Forum on "Thinking from the Perspective of Hirono in the Disaster Affected Region – From 'Early Return' to 'Happy Return'", held in Hirono Town on September 14-20, 2015. They were further supplemented by public meetings in Hirono Town and at Onigoe Temporary Housing on March 3, 2016, and in Tokyo on March 4, 2016. These additional interviews and public discussions provided the researchers with an opportunity to vet the research findings and place them in the broader social and policy context.

2.1 Respondents

The researchers interviewed 32 persons who had been living in temporary housing for between one and four years at the time of the interviews. All of the respondents had lived in Hirono Town at the time of the earthquake, tsunami, and nuclear accident. At the time of the interviews, most of the respondents lived in the Onigoe Temporary Housing, with some also



living in temporary housing in Kogyo Danchi and Chuodai Takaku. All three sets of temporary housing were located in Iwaki City, a designated core city in Fukushima Prefecture with more than 300,000 residents. Each temporary housing settlement had residents only from Hirono Town, so that people displaced from the same town would be able to continue living within their community's social network.

The respondents were 53% female and 47% male. The average (mean) age of respondents at the time of the interviews was 66.3 years, with all but 6 respondents over 50 years of age. This was likely a reflection of a priority on providing temporary housing first to elderly residents, then residents with young children, and then to all other residents. Only two of the respondents were single. They reflected a diversity of professions, from blue collar to white collar to retired, and a number of housewives. Most people had substantial roots in the community: more than two-thirds of the respondents owned houses in Hirono Town, although the respondents reported that only about half of the houses were habitable. While most people had lived in Hirono Town for many years (some more than 80 years), some had moved to Hirono Town after marrying people from the town and had lived in the town for only a few years (and in two cases, less than a year) before having to evacuate. Some (9.4%) respondents reported that they were mobility impaired, having difficulty walking or driving.

Onigoe and the other temporary housing units were not built for several months (the temporary housing at Onigoe started accepting residents in October 2011). As a result, the respondents all reported living in multiple locations before coming to the temporary housing. In most cases, the first place they stayed was for a few nights (often at a hotel or with relatives in other cities), then for a couple weeks, and continuing to move with decreasing frequency. This pattern reflected substantial uncertainty regarding the severity of the accident and, by extension, when they might be able to return. Respondents had stayed in a mean of 4.3 places before settling in to the temporary housing.

The temporary housing units are relatively modest in size—with a standard unit being 29.7 square meters (Cabinet Office, n.d.). As a result, most units had one or two adults; in a few instances, young children were also living in the same space. Grown children of the respondents, though, tended to find housing elsewhere.

2.2 Findings

Most respondents plan to return to Hirono Town. Approximately 69% expressed an intention to return, 22% indicated they would not return, and 9% were uncertain. Table 1 shows the intention to return to Hirono Town by gender. The number of male respondents is larger than female, but the proportion of women planning to return to Hirono Town is modestly higher than the proportion of men. On the contrary, the no-return respondents are higher in proportion for men than for women.

The interviews highlighted a few gender-based considerations influencing return. Generally, women worked in the rice fields, and their families did not need to buy rice. Some women were seemingly motivated to return home to reopen their agriculture activities. At the same time, one respondent indicated that she detested working in the rice paddies and accordingly



did not wish to return. A few women indicated that in Hirono Town they lived in comparatively large houses with their mothers-in-law, that they did not like living with their mothers-in-law, and accordingly did not intend to return to Hirono Town—instead they intended to live in a small apartment in a city where there was not space for more than the nuclear family.

Table 1.	Intent to	Return	by	Gender
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Will you return to Hirong Town?	Gender	Gender		
Will you return to Hirono Town?	Female	Male	— Total	
Yes	12	10	22	
No	3	4	7	
Unsure	0	3	3	
	15	17	32	
Total	46.9%	53.1%	100.0%	

The willingness to return home seems to be related to the length of stay at the temporary housing. Almost 97% of respondents had been staying at the temporary housing for three or four years. As evident from Table 2, the proportion of respondents intending to return is predominantly coming from those who had stayed in the temporary housing for 4 years. Moreover, the researchers observed that the tenor of the intent to return had changed substantially from the initial visit in June 2014, when many of the residents of the temporary housing units had expressed apprehension about returning and were uncertain where they would go.

Table 2. Intent to Return	to Hirono T	Town by Length	of Stay in Tem	porary Housing
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Do you plan to return to Hirono Town?	Length of Stay (Year)			Tatal
Do you plan to return to Hirono Town?	1	3	4	— Total
Yes	0	3	19	22
	0.0%	13.6%	86.4%	100.0%
No	1	1	5	7
	14.3%	14.3%	71.4%	100.0%
Unsure	0	0	3	3
	0.0%	0.0%	100.0%	100.0%
T-4-1	1	4	27	32
Total	3.1%	12.5%	84.4%	100.0%

Older people tended to be more likely to return than young people, as presented in Table 3. 69% of respondents indicated that they planned to return home to Hirono Town. The proportion is following the age composition and rises with higher age. Only one of the six respondents younger than 50 (17%) expressed an intent to return to Hirono Town. In contrast,



81% of respondents older than 50 expressed an intent to return. In the interviews, the younger people expressed a desire for better educational opportunities for their children, better amenities, and jobs.

This is consistent with other analyses in the literature that younger people are more likely to relocate after a disaster, while older people are more likely to return (Groen and Polivka, 2010; IDMC, 2015). Older populations were reflected as more resilient to post-disaster life challenges, better capable of accepting and adjusting to loss, and able to integrate their positions of respect to maintain community functionality (Adams et al., 2011; WHO, 2008). Younger generations burdened with multiple tasks of finding permanent employment and rebuilding—while facing concurrent bureaucratic and insurance challenges—and often charged with care-giving of children and parents, do not have the same impetus to return as older generations (Adams et al., 2011). Moreover, in a risk-averse culture, parents may move their young families to prevent their children from being raised in an area that was seen as contaminated by radiation and thus stigmatized, potentially affecting future marriage prospects of their children.

A ap Distribution (Voor)	Will you retu	rn to Hirono Town?	Total	
Age Distribution (Year)	Yes	No	Unsure	—— Total
<50	3.1%	12.5%	3.1%	18.8%
50-60	6.3%	0%	0%	6.3%
60-70	15.6%	6.3%	3.1%	25.0%
70-80	25.0%	3.1%	3.1%	31.3%
>80	18.8%	0%	0%	18.8%
Total	68.8%	21.9%	9.4%	100.0%

Having a house that is in a livable condition has an effect on intent to return, but not as strong as might be expected. 75% of respondents had a livable house in Hirono Town. This is slightly higher than the proportion of respondents intending to return -69%. However, not all respondents intending to return home have a livable house. At the same time, not all respondents having a livable house intend to return to it. The proportion of respondents having a livable house and at the same time intending to return account only for 50% all respondents. About 19% of respondents intending to return do not have a livable house, and 25% of respondents having a livable house exceeds the number intending to return home. The number of respondents having a livable house exceeds the number intending to return home, but they do not belong to the same cluster. It should be noted that a number of the respondents with houses that are not livable reported that they are in the process of repairing their homes so that they can return in due course.



Do you ha	we a livable house in Hirono	Will you ret	urn to Hirono Towr	Tatal	
Town?		Yes	No	Unsure	— Total
	Yes	50.0%	15.6%	9.4%	75.0%
	No	18.8%	6.3%	0%	25.0%
Total		68.8%	21.9%	9.4%	100.0%

Table 4. Intent to Return to Hirono Town by House Condition

As may be expected, owning a house in livable condition encourages people to visit Hirono Town. Table 5 shows that all of the 75% of respondents with a house in livable condition visit Hirono Town either very often (2/3) or once in a while (1/3). This contrasts with those respondents who do not have a livable house, who still tend to visit (88% visit very often or once in a while), but tend to do so less frequently (3/8 visit very often and 1/2 visit once in a while).

Table 5. Visiting Hirono Town by House Condition

De com crisit Hinene Terrer?	Do you have a l	Do you have a livable house in Hirono?		
Do you visit Hirono Town?	Yes	No	– Total	
Yes, very often	50.0%	9.4%	59.4%	
Yes, once in a while	25.0%	12.5%	37.5%	
Not at all	0%	3.1%	3.1%	
Total	75.0%	25.0%	100.0%	

The frequency of visiting Hirono Town seems to be related to the intent to return to Hirono Town. Table 6 shows that 79% (15/19) of the respondents that visit Hirono Town very often intend to return, compared with 58% (7/12) of the respondents that visit once in a while. In contrast, 29% (2/7) of the people who do not intend to return visit Hirono Town very often, 58% (4/7) visit once in a while, and 14% (1/7) never visit. Even if they intend to relocate to another town or city, they have some connections to Hirono Town – but they tend to not be as strong, and thus are not visiting as often.



Do you vigit Uirono Toym?	Will you retur	n to Hirono Town?		Tatal
Do you visit Hirono Town?	Yes	No	Unsure	— Total
Vac voru often	15	2	2	19
Yes, very often	46.9%	6.3%	6.3%	59.4%
Veg energing enchile	7	4	1	12
Yes, once in a while	21.9%	12.5%	3.1%	37.5%
Not at all		1		1
not at all		3.1%		3.1%
Total	22	7	3	32
10(a)	68.8%	21.9%	9.4%	100.0%

Table 6. Frequency of Visiting Hirono Town by Intent to Return

One of the striking findings from the interviews was that while the strong majority (69%) intends to return to Hirono Town, an almost equally strong majority (66%) does not plan to leave early—that is, before the announced closure of the temporary housing in late March 2017. Table 7 shows the response regarding the possibility of early return. More than 30% of respondents indicated that they intend to leave before the temporary housing closes, with 70% of the early-departers planning to return to Hirono Town. More significantly, of the respondents who intend to return to Hirono Town, only 32% plan to leave the temporary housing early.

Do you plan to leave the temporary	Will you retu	Total		
housing before it closes?	Yes	No	Unsure	— Total
Yes	21.9%	6.3%	3.1%	31.3%
No	43.8%	15.6%	6.3%	65.6%
Unsure	3.1%	0%	0%	3.1%
Total	68.8%	21.9%	9.4%	100.0%

Table 7. Early Departure from Temporary Housing

The reasons for delaying return may be practical (e.g., the livability of their house), but in many cases less tangible reasons were cited and suggested by respondents. These are considered more in-depth in the next section. Table 8 cross-tabulates the intent of respondents to leave the temporary housing before it closes with the livability of their houses in Hirono Town. Most respondents (75%) have a livable house in Hirono Town, but they do not plan to leave the temporary housing before they have to. Only one-fourth of respondents both plan to leave early and have a house in livable condition. Another 6% have no livable house but plan to leave early. In total, the number of respondents planning to leave earlier accounts for 31%.



Do you plan to leave the temporary	Do you have a livable house in Hirono Town?		— Total	
housing before it closes?	Yes No			
Yes	25.0%	6.3%	31.3%	
No	46.9%	18.8%	65.6%	
Unsure	3.1%	0%	3.1%	
Total	75.0%	25.0%	100.0%	

Table 8. Early Departure and House Condition

Respondents widely reported that living in temporary housing was more convenient than living in Hirono Town. This convenience was related to the greater selection and quality of goods, services, and amenities in Iwaki City, which is approximately 60 times as populous as Hirono Town. Table 9 summarizes the perceptions of respondents with regard to several factors comparing their current living arrangements in temporary housing to their prior living arrangements in Hirono Town. The survey asked the respondents to compare the convenience of temporary housing vis-à-vis Hirono Town with respect to shopping, medical clinics, dental care, education, and recreation.

More than 80% of respondents found the temporary housing to be more convenient for shopping and medical clinics, and almost 80% found dental care to be more convenient than in Hirono Town. Indeed, during the interviews, respondents often talked about their access to health services (particularly dental care) and shopping. Respondents noted the diversity of options, ease of access, and cost. Education was generally perceived as better than in Hirono Town, although almost half the respondents declined to answer that question—with a number noting that since they no longer had school-age children they did not feel comfortable comparing the educational options in the two settings. There was a general preference for the recreation options in temporary housing, but this preference was not as dominant as the preferences for the other amenities.



Factor	Rank	Ν	Percent
Is temporary housing more, less, or the same convenience as	Worse	4	12.5%
Hirono Town for shopping ?	Same	2	6.3%
	Better	26	81.3%
	Total	32	100.0%
Is temporary housing more, less, or the same convenience as	Worse	3	9.4%
Hirono Town for medical clinics ?	Same	3	9.4%
	Better	26	81.3%
	Total	32	100.0%
Is temporary housing more, less, or the same convenience as	No answer	2	6.3%
Hirono Town for dental care ?	Worse	1	3.1%
	Same	4	12.5%
	Better	25	78.1%
	Total	32	100.0%
Is temporary housing more, less, or the same convenience as	No answer	15	46.9%
Hirono Town for education ?	Worse	2	6.3%
	Same	5	15.6%
	Better	10	31.3%
	Total	32	100.0%
Is temporary housing more, less, or the same convenience as	No answer	3	9.4%
Hirono Town for recreation ?	Worse	6	18.8%
	Same	8	25.0%
	Better	15	46.9%
	Total	32	100.0%

Table 9. Convenience of Temporary Housing vis-à-vis Hirono Town

A rather surprising finding of the survey was that more than 70% of the respondents reported being either very happy or somewhat happy living in temporary housing. Only about 16% of respondents reported being not so happy and 13% not happy at all. This finding was surprising because when the authors first talked with people living in temporary housing—in June 2014, a little more than three years after they had been displaced—there was widespread unhappiness. A few people commented that the quality of the construction of the temporary housing was poor in comparison to their homes, as the temporary housing was constructed with prefabricated materials and had no soundproofing (so they could hear sounds from their neighbors easily).

When the researchers reported the aggregated findings from the research for public discussion at Onigoe temporary housing on March 3, 2016, residents confirmed the general happiness living in temporary housing, even as they expressed concerns—including whether they would have to leave. The next section discusses the most commonly cited reasons for the happiness in temporary housing and the reasons for staying in temporary housing.



Are you happy living in temporary housing?	Number	Percentage
Yes, very	12	37.5%
Yes, somewhat	11	34.4%
Not so much	5	15.6%
Not at all	4	12.5%
Total	32	100.0%

Table 10. Happiness in Temporary Housing

3. Reasons for Staying in Temporary Housing

Based on the interviews and ancillary discussions with staff from Hirono Town, the temporary housing, and the government relocation authority, there appear to be five primary drivers encouraging people to stay in temporary housing: (1) community, (2) convenience, (3) a sense of injustice, (4) contamination, and (5) compensation. These are discussed in turn. The researchers had anticipated that convenience and contamination might be strong reasons that people might be staying in the temporary housing, and many of the questions aimed at teasing out the convenience aspects of the decisionmaking. The community and injustice aspects were not predicted, but came out strongly in the interviews.

3.1 Community

The most commonly articulated reason for staying in temporary housing was the sense of community that they had built. The housing units were close together, and the researchers often observed residents walking a few meters, and sitting on their neighbor's steps talking at length. There were frequent events at the common space, including origami, hula, and other opportunities for residents to socialize and be (moderately) active. Residents noted that the staff from the temporary housing would go door-to-door once a week and check in on people, especially people who were not participating in group activities. A few female respondents who had married men from Hirono Town and moved there after the marriage noted that before the displacement that they had not made many friends in town; but once they had settled in the temporary housing, they started making many friends.

Respondents expressed concern that if (and when) they returned that they would be alone in their house, and not within easy walking distance to friends. Hirono Town does not have a retirement facility that would allow people to live independently, but within an easy walk of one another. While the modest scale of Hirono Town might make it difficult to site and build a retirement facility in the town, it may be possible. Sōma—another town in Fukushima prefecture, with a population of approximately 35,000—built an one-story "apartment" house for elderly persons displaced by the Great East Japan Earthquake. This housing places people in close walking distance, while also giving them space for independent living.



3.2 Convenience

The second most commonly articulated reason for staying in temporary housing was convenience. As noted in section 2.2, above, residents widely perceived temporary housing to be more convenient for shopping, medical care, and dental care. Respondents noted both the *availability* of stores, clinics, and dentists (greater number and selection) and their *accessibility*. There were occasional buses, and a dedicated shuttle that would take people shopping on a weekly basis. The elderly population was particularly interested in medical care and dental care.

The availability and accessibility of amenities has evolved. Shortly after the researchers conducted the interviews, a new Aeon convenience store opened that was larger than the previous stores in town and offered greater selection. A combined middle and high school "Futaba Future School" was also established. And many of the businesses that were damaged and abandoned were gradually being rebuilt.

3.3 A Sense of Injustice

A third reason that respondents noted for staying was a sense of injustice and inequity in how they were being treated. While this was not stated as often as the two reasons above, they were stated forcefully and—based on feedback from public meetings and forums—appear to be shared by a number of residents.

Respondents noted that visitors from other towns were receiving better support and treatment. For example, it was noted that the expenses of moving back to Hirono Town and rebuilding are no longer covered (they had been covered initially) but residents from Naraha have these expenses covered. Similarly, the Tokyo Electric Power Company (TEPCO) which owns the Fukushima Nuclear Power Plants, has been providing 100,000 Yen (approximately US\$ 8,500) per person per month for people displaced by the accident as consolation money; evacuees from Hirono Town received this compensation for one and half years, while others, including people from Naraha, are still receiving the consolation money. Naraha lies to the north of Hirono Town, is closer to Fukushima Daiichi, and in early September 2015 the government declared the town reopened for residents to return (Crone, 2015). The perceived unequal treatment of residents was particularly strong for those who lived on the northern edge of Hirono Town and saw neighbors in Naraha eligible for benefits they could not access—even though their houses were only a few hundred yards apart.

Aggrieved, these respondents sought to secure whatever benefits they could. They expressed an intent to stay in temporary housing and take advantage of other subsidies and benefits for as long as they could.

3.4 Contamination

During the interviews, a few people expressed worries about radiation. The number of people expressing these concerns and the strength of the concerns was remarkably reduced from those that the interviewers heard 15 months earlier in the group discussions. During the public meetings discussing the research findings, a couple participants noted that once the

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government had installed monitors that showed the radiation levels for all to see that they started believing it was safe—or at least safer. Moreover, it appears that the radiation levels (at least those that are officially monitored) in Hirono Town, Iwaki City (where many of the temporary housing units are), and other cities in Fukushima are now at comparable levels—with the exception of a relatively narrow band extending northwest from Fukushima Daiichi (see http://fukushima-radioactivity.jp/pc/). Thus, the substantial distrust about government statements regarding the safety of the town that was witnessed in June 2014 had largely been replaced by concerns of community, convenience, and injustice noted above.

3.5 Compensation

Relatively few respondents noted compensation in the interviews. Based on the frequency and forcefulness with which some members of the community raised issues of compensation, though, the researchers suspect that in addition to the few respondents who explicitly commented on compensation that some of the other comments received from respondents point to concerns about compensation. Respondents noted that return to Hirono Town could complicate or even compromise their legal ability to claim compensation. There were also suggestions that they needed to be displaced for five years before they could claim full compensation for their "vacant" houses under the law. In separate interviews, though, Hirono Town staff expressed skepticism: since the government declared Hirono Town safe for people to return to in September 2011, the subsequent extended displacement was not compelled—and thus compensation would not be awarded.

Notwithstanding this skepticism, there has been a steady call for compensation from some residents, activists, and scholars (Lerner and Tanzman, 2014; Mealy, 2016; Mohrbach, 2013; UN Human Rights Council, 2013). Scholars have argued that compensation for the accident has been complicated by the government's response, which has resisted holding TEPCO strictly liable (per existing law) as that would risk TEPCO going bankrupt (Farber, 2012). Based on experience to date and past experience with compensation for methyl-mercury poisoning in Minamata Bay, these scholars project a drawn-out process for compensation.

4. Conclusion

In *Anna Karenina*, Leo Tolstoy observed that "Happy families are all alike; every unhappy family is unhappy in its own way" (Tolstoy 2014, 3). Similarly, people living in limbo more than four years after a disaster often have their own combination of reasons for neither moving back nor moving on. Indeed, most people in Hirono Town had moved back, with another sizeable number moving on with their lives in other towns. The people in temporary housing all had their own reasons for staying. Some reasons were negative, such as a sense of injustice, fear of radioactive contamination, and a desire for compensation. Other reasons, though, were positive. They had constructed new lives in the temporary housing, had built anew their social support network, and had a situation with greater convenience. And many people had both positive reasons for staying and negative reasons for not leaving temporary housing.



Understanding these diverse reasons is the first step in developing effective policies to help the displaced to transition to healthy and rewarding long-term lives. Indeed, over the more than two years during which the researchers visited Hirono Town and the temporary housing units with residents of Hirono Town, we have seen the town authorities take many measures that address our preliminary and advanced research findings. Life in Hirono Town has become more convenient, the town leadership has spoken out against the inequitable treatment its residents have received vis-à-vis other towns affected by the accident, and there is growing interest in how best to foster the new sense of community among those living in temporary housing.

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References

Adams, V., Kaufman, S. R., Van Hattum, T., & Moody, S. (2011). Aging disaster: Mortality, vulnerability, and long-term recovery among Katrina survivors. *Medical Anthropology*, *30*(3), 247-270. https://doi.org/10.1080/01459740.2011.560777

Amano, Y. (2015). *The Fukushima Daiichi accident*. Report by the Director General GC(59)/14. Vienna.

Cabinet Office (n.d.). *Okyu Kasetsu Jutaku (Temporary Housing)*. http://www.bousai.go.jp/taisaku/pdf/sumai/sumai_5.pdf

Crone, J. (2015, September 5). Japan says it's finally safe for residents to go back to town evacuated after Fukushima nuclear disaster. *The Daily Mail*. Retrieved from http://www.dailymail.co.uk/news/article-3223455/Japan-says-s-finally-safe-residents-town-e vacuated-Fukushima-nuclear-disaster.html

Farber, D. A. (2012). Introduction: legal scholarship, the disaster cycle, and the Fukushima accident. *Duke Environmental Law & Policy Forum, 23*, 1-21. https://doi.org/10.1017/cbo9781139024129.002

Groen, J. A., & Polivka, A. E. (2010). Going home after Hurricane Katrina: Determinants of return, migration, and changes in affected areas. *Demography*, 47(4), 821-844. https://doi.org/10.1007/BF03214587

Gudjonsson, H. (2016, March 13). Care continues for the elderly survivors of the Great EastJapanEarthquake.ICRC.Retrievedfromhttp://www.ifrc.org/es/noticias/noticias/asia-pacific/japan/care-continues-for-the-elderly-survi



vors-of-the-great-east-japan-and-earthquake-72003/

Hongo, J. (2012, March 2). Evacuated town prepared for residents' return. *The Japan Times*. Retrieved from

http://www.japantimes.co.jp/news/2012/03/02/news/evacuated-town-prepares-for-residents-re turn/#.WIThMBsrI2w

IAEA (International Atomic Energy Agency). (2011, April 14). Fukushima nuclear accident update log: IAEA Briefing on Fukushima nuclear accident. Retrieved from https://www.iaea.org/newscenter/news/fukushima-nuclear-accident-update-log-20

IDMC (International Displacement Monitoring Centre). (2015). *Global estimates 2015: People displaced by disasters*. Geneva: Norwegian Refugee Council.

Lerner, K., & Tanzman, E. (2014). Making victims whole: compensation of nuclear incident victims in Japan and the United States. *New York University Journal of Legislation and Public Policy*, *17*, 543.

Mealy, R. (2016, December 16). TEPCO: Fukushima nuclear clean-up, compensation costs nearly double previous estimate at \$250billion. Australian Broadcasting Corporation. Retrieved from

http://www.abc.net.au/news/2016-12-17/fukushima-nuclear-clean-up,-compensation-costs-ne arly-double/8127268

Mohrbach, L. (2013). Fukushima two years after the tsunami – the consequences worldwide. *International Journal for Nuclear Power*, 58(3), 152-155.

OCHA (United Nations Office for the Coordination of Humanitarian Affairs). (2011, March 21). Japan Earthquake and tsunami situation report No. 10. http://reliefweb.int/sites/reliefweb.int/files/resources/01AC3A641A6AD092C125785A00368 40D-Full_Report.pdf

Oskin, B. (2015, May 7). Japan earthquake and tsunami of 2011: Facts and Information. *Live Science*. Retrieved from http://www.livescience.com/39110-japan-2011-earthquake-tsunami-facts.html

Ranghiere, F., & Ishiwatari, M. (eds). (2014). *Learning from megadisasters: Lessons from the Great East Japan Earthquake*. Washington, DC: World Bank.

Tolstoy, L. (2014). Anna Karenina. Transl. R. Bartlett. Oxford University Press.

UN Human Rights Council. (2013, May 2). Report of the Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health, Anand Grover: Mission to Japan (15 - 26 November 2012). A/HRC/23/41/Add.3

UNSCEAR (United Nations Scientific Committee on the Effects of Atomic Radiation). (2013). *Sources, effects and risks of ionizing radiation*. UNSCEAR 2013 Report to the General Assembly: Volume 1. New York: United Nations.

USGS (U.S. Geological Survey). (2012). Largest earthquakes in the world since 1900. Retrieved from https://earthquake.usgs.gov/earthquakes/world/10_largest_world.php

WHO (World Health Organization). (2008). Older persons in emergencies: An active ageing
perspective.Geneva.Retrievedhttp://www.who.int/ageing/publications/EmergenciesEnglish13August.pdf



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