

Paper:

Issues Facing Voluntary Evacuees from the Fukushima Daiichi Nuclear Power Plant Accident Based on the Collection and Analysis of Cases of Voluntary Evacuation

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Although over three years have passed since the Great East Japan Earthquake, it is estimated that there remain approximately 135,000 evacuees from the nuclear power plant accident, 81,000 of whom had been living in areas under evacuation orders and 54,000 of whom had been living outside these areas (i.e., voluntary evacuees). However, the lived experience of such voluntary evacuees has been uncertain, as it is not possible to identify them. Consequently, it has not been possible to clarify the anxieties they harbor as they continue their extended existence as evacuees or to determine the issues they face in reconstructing their lives, making it difficult to extend suitable assistance measures. In this study, we worked with NHK to conduct a survey of voluntary evacuees. A list of interviewees compiled by NHK reporters was used to survey voluntary evacuees, who are difficult to identify. By analyzing the collected cases, we examined issues faced by “voluntary evacuees.” The results showed that the majority of the voluntary evacuees in this survey were mothers who had evacuated with their young children (but without their spouses) and who felt that they had had to evacuate due to anxieties about the effects of radiation exposure on their children’s growth. They tended to feel that it was difficult to return to their former areas of residence and that they had no choice except to continue living as evacuees. Furthermore, there were cases in which couples that had previously been living together had separated for reasons of work or place of occupation and had been forced into situations where they were obliged to economically support two households, with adverse effects on their budgets, minds, and bodies. In addition, the nuclear power plant accident made it difficult for them to decide where to base themselves in the future; in some cases, evacuees returned to their pre-disaster areas of residence only to evacuate again. Against the designation “voluntary,” the voluntary evacuees in this survey lived under circumstances in which they felt that they had had no choice but to evacuate; in enduring the difficulties of evacuation, they did not feel they had acted according to their voluntary will. This points to the need to implement effective assistance.

Keywords: Great East Japan Earthquake, life reconstruction process, seven elements of life reconstruction, life as evacuee, anxiety about radiation exposure

1. Introduction

1.1. Fukushima Daiichi Nuclear Power Plant Accident

On March 11, 2011, an accident occurred at the Fukushima Daiichi Nuclear Power Plant, a power plant operated by Tokyo Electric Power Co. (TEPCO) due to the Tohoku-Pacific Ocean Earthquake. The accident resulted in the release of radioactive material. Reactors 1–3, which were then operating, were automatically shut down during the earthquake. However, the tsunami that followed resulted in a complete station blackout; the cooling systems of the reactors were shut down, leading to a meltdown of the nuclear fuel (TEPCO, 2011) [1]. The pressure suppression chamber connected to the reactor containment vessel in Reactor 2 was damaged. Hydrogen explosions took place in Reactors 1, 3, and 4, damaging their secondary containment buildings. Damage to the secondary containment buildings caused an estimated 630,000–770,000 terabecquerels (TBq) of radioactive materials to be released into the atmosphere. The incident was rated a 7, the most severe level, on the International Nuclear Event Scale (INES) (INES 2009) [2]. An area within a 20-km radius from the Fukushima Daiichi Nuclear Power Plant was designated a restricted zone and declared off-limits in principle; areas outside this 20 km radius were designated planned evacuation areas, emergency evacuation preparation zones, and specific locations recommended for evacuation based on radiation dosages. Areas under evacuation orders were later reorganized into three categories: residence restriction areas, difficult-to-return zones, and zones prepared for the lifting of evacuation orders.

At the end of January 2015, residences in Fukushima Prefecture contaminated by the nuclear power plant accident had been 65% decontaminated (Ministry of the Environment, 2015) [3]. The area is on the way to recovery.

1.2. Evacuees from the Nuclear Plant Accident

According to “Number of Evacuees in Japan,” a document released by the Reconstruction Agency on February 27, 2015, there are 228,863 evacuees in 47 prefectures and 1,059 municipalities (Reconstruction Agency, 2015) [4]. The number of evacuees residing in Fukushima Prefecture was 72,790 as of February 12, 2015. However, the current residences of disaster victims who were resident in Fukushima Prefecture at the time of the disaster are unknown; furthermore, it is unknown whether such victims evacuated or merely relocated. Meanwhile, according to an estimate given in the television program “NHK Special: A Selection of 130,000 Evacuees – Three Years after the Nuclear Plant Accident,” which was broadcast on the NHK general television station on March 8, 2014 (NHK Sogo, 2014), there are still some 135,000 evacuees, despite the fact that three years have passed since the earthquake disaster. This figure can be broken down: 81,000 were formerly resident in areas under evacuation order and about 54,000 were formerly resident outside areas under evacuation order. The aforementioned NHK program referred to the latter, who make up about 40% of the total number of evacuees, as “voluntary evacuees”; this term is also used by the Reconstruction Agency (Reconstruction Agency, 2014b) [6]. Tanami makes the distinction between forced evacuees, who evacuated because they were instructed to do so by government bodies, and voluntary evacuees, who make up the remainder, and points out that among voluntary evacuees, some are eligible to receive legal support and some are not (Tanami, 2013) [7].

This shows that there is no clear definition for “voluntary evacuees”; they are neither “evacuees from areas outside of areas under evacuation order” nor “evacuees who are not forced evacuees.” Consequently, in asking what kinds of problem are shared among voluntary evacuees, there are no clear answers. Among the evacuees, reasons for evacuating, anxieties, and problems in reconstructing their lives in their extended existence as evacuees have not been clearly identified; thus, it is difficult to provide suitable assistance to them.

1.3. Seven Elements of Life Reconstruction

When major disasters affect the lives of disaster victims and disaster-struck areas for an extended period of time, it is necessary to clarify the process by which the disaster victims and local society adapt and reconstruct their lives in the new environment created by the disaster and to monitor the current status and issues of the disaster victims and affected area in order to understand disaster victims and their region and extend suitable assistance. The process in which, over time, people reconstruct their lives and forge new everyday lives is called the life reconstruction process or disaster process (Kimura et al., 2006, Kimura, 2012) [8, 9].

The life reconstruction process or disaster process (hereafter referred to only as the life reconstruction process) drew attention after the Great Hanshin-Awaji Earth-

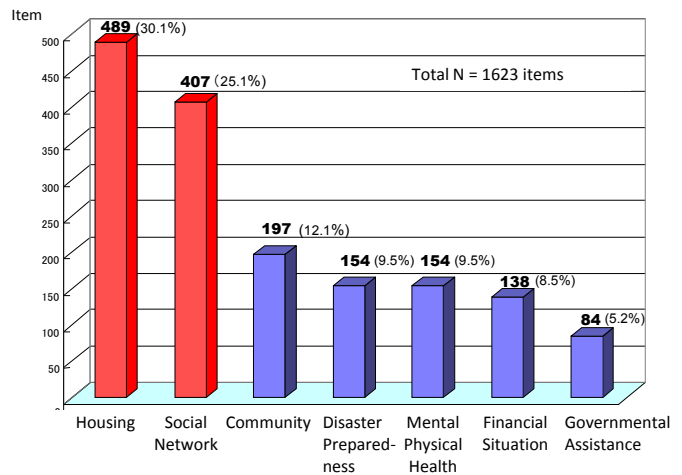


Fig. 1. Seven elements of life reconstruction issues.

quake. In 2000, five years after the Great Hanshin-Awaji Earthquake, the Life Reconstruction Committee of the Disaster Reconstruction Review and Verification Study Group of Kobe City hosted an event entitled “Grassroots Workshop with Citizens” (Tamura et al., 2000) [10]. In the workshop, they collected 1,623 opinion cards from the citizens of Kobe regarding issues of life reconstruction in order to clarify an overall picture of life reconstruction, which was unclear at the time. These opinion cards were classified using an affinity diagram, a method drawn from Total Quality Management; the group found that seven elements comprise life reconstruction – namely, housing, social network, community, disaster preparedness, mental and physical health, financial situation, and governmental assistance. The percentage of “housing” that constitutes a lifestyle foundation is highest, followed by “social network,” and only cards related to “housing” and “social network” account for the majority of all cards. The group emphasized that the recovery of housing and social network is particularly important and must be resolved early in the post-disaster period (Fig. 1).

In this study, in relation to the seven elements of life reconstruction, we examine the current status of voluntary evacuees who are continuing to live lives of evacuation despite the fact that three years have passed since the Great East Japan Earthquake.

2. Method of Survey

2.1. Survey Targets and Investigating Party

The data used in this study are based on a questionnaire survey conducted by the NHK News Department from December 18, 2013, to February 3, 2014.

The voluntary evacuees targeted in the survey had been living in areas in Fukushima Prefecture outside of the areas under evacuation order and were continuing to live lives of evacuation at the time of the survey. Although conducting a random sampling survey based on the basic resident registers or voter registration lists was desirable, since the Great East Japan Earthquake, disaster victims

have evacuated to considerably dispersed areas outside of Fukushima Prefecture; as this survey was conducted three years after the earthquake disaster, the current locations of many disaster victims were difficult to determine from basic resident registers or similar sources. Furthermore, even if it were possible to locate evacuees, determining whether they were voluntary evacuees or not would have been difficult; at present, conducting a statistically representative social survey of the voluntary evacuee population is virtually impossible.

Therefore, for this survey, we used a list of disaster victims and NPO groups that had been previously interviewed by NHK reporters. Disaster victims responded to questions sent to them by mail or other means; snowball sampling was conducted. Snowball sampling is a method of recruiting additional survey targets through the social networks of existing survey targets. In this method, survey targets who have already by some means been recruited are asked to introduce other targets. Repeating this process expands the group of survey targets. *The Encyclopedia of Contemporary Sociology* (2012) [11] indicates that snowball sampling is “a valid method of securing targets of a survey when they make up a social group of which the necessary name list cannot be obtained for a random sampling.” In this survey, questionnaires were first sent to primary targets (disaster victims, NPO groups, etc.) included on the NHK list along with requests for cooperation in increasing the number of survey targets. Subsequently, questionnaires were sent to those who were considered voluntary evacuees. The present writers compiled the questionnaire and NHK was the principal party that sent out the questionnaires. In addition to this, questionnaires were distributed to and collected from disaster victims in person; these disaster victims were interviewed and agreed to fill out the questionnaire. We were able to collect 307 valid, filled-out questionnaires. The survey lasted from December 18, 2013 to February 3, 2014. It should be noted that the results of this survey only represent those surveyed and do not necessarily accurately represent the entire population of voluntary evacuees. However, at present, government bodies are unable to identify voluntary evacuees from among disaster victims. The present survey, based on cases of voluntary evacuees obtained by means available to us, can be considered meaningful as a foundation for examining the issues faced by voluntary evacuees and considering appropriate measures for assistance.

2.2. Survey Items

Considering the special circumstances of voluntary evacuees, namely, that they evacuated from areas in which the government did not specifically advise evacuation, the issues they face are not necessarily identical to those that would be elicited from a general survey of victims of the Great East Japan Earthquake; voluntary evacuees face distinct issues. Since no survey targeting voluntary evacuees has been conducted, it was the objective of this study to understand the concrete situation from actual cases of vol-

untary evacuees and extract issues related to life reconstruction. Specifically, we asked the respondents regarding their attributes, their current evacuation status, their thoughts and changes in their lives over time, their views on assistance programs provided by the government or municipalities, difficulties they face, issues they believe require attention (which they were invited to freely comment on), and so on.

3. Characteristics of Voluntary Evacuees Found from the Survey

3.1. Characteristics of Voluntary Evacuees from Basic Analysis

Voluntary evacuees in this survey were characterized by determining their attributes, evacuation status, thoughts, and life situations.

First, we asked the respondents regarding their gender, age, current lodging, the number of family members at present, the number of family members living separately because of the earthquake disaster, and the area in which they currently reside. Note that, unless stated otherwise, the percentages given in this chapter are in relation to 307 (= 100%), the number of valid responses received. Regarding gender, 13.7% ($n = 42$) of respondents were male and 85.3% female ($n = 262$); women made up more than 80% of the total (missing value = 3). The respondents ranged in age from 14 to 86 years and the average age was 42.0 ($SD = 10.7$) years (missing values = 10). The average age among male and female respondents were 48.4 and 41.0 years, respectively, and these two values exhibited a statistically significant difference ($t(47.7) = 3.5$, $p < .01$). To compare this with the results of other surveys on the Great East Japan Earthquake, in one survey ($n = 1,006$) conducted two years after the Great East Japan Earthquake of people residing in the three prefectures of Iwate, Miyagi, and Fukushima (Kimura et al., 2014a) [12], the respondents were 54.5% men and 45.4% women with an average age of 58.1 years ($SD = 14.4$); in another survey conducted three years after the earthquake disaster (Kimura et al., 2014b) [13], the respondents were 58.3% men ($n = 700$) and 41.4% women ($n = 497$) with an average age of 61.0 years ($SD = 13.5$) (missing value = 20). These surveys were not based on a random sample of victims of the Great East Japan Earthquake; they were conducted to obtain an overall picture of disaster victims. When compared to these surveys, we can speculate that many of the voluntary evacuees in the present survey were mothers with young children.

Examining the number of family members respondents lived with, at the time of the survey, three years after the disaster, respondents lived with an average of 2.4 family members ($SD = 0.7$); 5.9% lived alone. The average number of family members who had lived with respondents before the earthquake disaster but currently lived elsewhere was 0.9 ($SD = 1.0$); 64.5% ($n = 198$), or over half of the respondents, had family members who they

had come to live separately from since the disaster. In comparison, in the survey mentioned previously that was conducted two years after the earthquake disaster, one-third of respondents (34.6%) indicated “At least one of my family members has come to live separately from me since the earthquake disaster and nuclear power plant accident.” This suggests that since the earthquake disaster, voluntary evacuees have exhibited a higher tendency to live separately from their family members. When asked the major reasons for living separately (they were allowed to select up to three reasons from the given list), 77.8% of the respondents who had a family member that they lived separately from indicated “reasons of work or place of occupation,” 25.3% indicated “difference of opinion regarding evacuation or radiation,” and 21.7% indicated “attachment to local area of residence.” When asked about their reasons for evacuating (select up to three major reasons), 93.5% indicated “concern about the effects of radiation exposure,” 68.4% indicated “the unstable situation at the nuclear power plant,” and 53.8% indicated “could not trust assertions by experts that ‘there is no need to evacuate.’”

A characteristic of the voluntary evacuees in this survey was that about 90% (87.9% to be specific) of the respondents had evacuated with their children. Examining the composition of the households the respondents resided in, 30.3% of households consisted of two parents and their child or children, 47.9% of households consisted of a mother and her child or children, 1.0% of households consisted of a father and his child or children, 3.6% of households consisted of a married couple with no children, 5.9% of households consisted of single individuals, 10.7% of households consisted of others, and 1.0% of households did not indicate an answer. Thus, close to half of the households the respondents resided in consisted of a mother who had evacuated with her child or children. Among those who lived with their children, 97.4% indicated that “concern about the effects of radiation exposure” was their reason for evacuation; this figure was about 20% higher ($\chi^2(1) = 43.1, p < .01$) than the equivalent figure among respondents who did not live with children, 70.3%, showing that the great majority of respondents who lived with children evacuated because of the fear that their children would be exposed to radiation (Fig. 2).

Regarding the respondents’ areas of current residence, 21.5% lived in the Kansai region and further west, 27.7% in the Kanto region, 15.3% in the Chubu-Koshin’etsu region, and 34.9% in the Tohoku region and further north, indicating that respondents had evacuated to areas across Japan. Examining the housing situation of the respondents, 64.2% lived in rental accommodations for which they were not obligated to pay rent, 15.0% in rental accommodations for which they had to pay rent, 6.2% in houses that they owned and had purchased new or had built, 7.2% in their parents’ or children’s houses, and 0.7% in other relatives’ or acquaintances’ houses.

We asked the voluntary evacuees whether they wished to return to their areas of residence from before the earth-

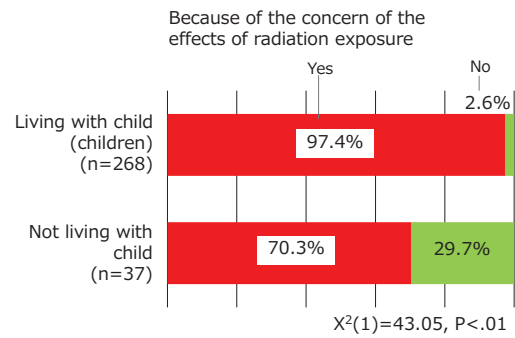


Fig. 2. Living with child (or children) and evacuation due to concern for radiation exposure.

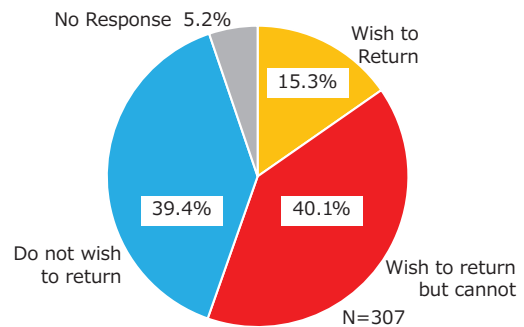


Fig. 3. Intent of returning to area of residence before earthquake disaster.

quake disaster. Only 15.9% responded that they wished to return and had the intent to eventually return. Meanwhile, 39.4% responded that they did not wish to return, indicating that they had no intent to return, and 40.1% indicated that they wished to return but could not, indicating that they wished to return but had been unable to do so; these two figures accounted for nearly 80% of the respondents (79.5%; Fig. 3). In the survey conducted two years after the earthquake disaster, over 30% of respondents (34.9%) had either already returned to their former areas of residence or intended to return; in the survey conducted three years after the disaster, 18.7% wished to return, 34.8% wished to return but were unable to, 18.7% did not wish to return, and 15.2% had already returned. Compared to these results, the results of this survey suggested that voluntary evacuees tended to have greater difficulties in returning to their former areas of residence.

To sum up the above results, among the voluntary evacuees in the present survey, many came to live separately from family members that they had previously lived with following the earthquake disaster and nuclear accident, largely for work reasons. They had evacuated to disperse locations across Japan. Many were mothers with young children; nearly half were mothers who had evacuated with their children but without their spouses. Furthermore, many were motivated to evacuate by fear of the effects of radiation exposure and believed that returning to their former areas of residence would be difficult.

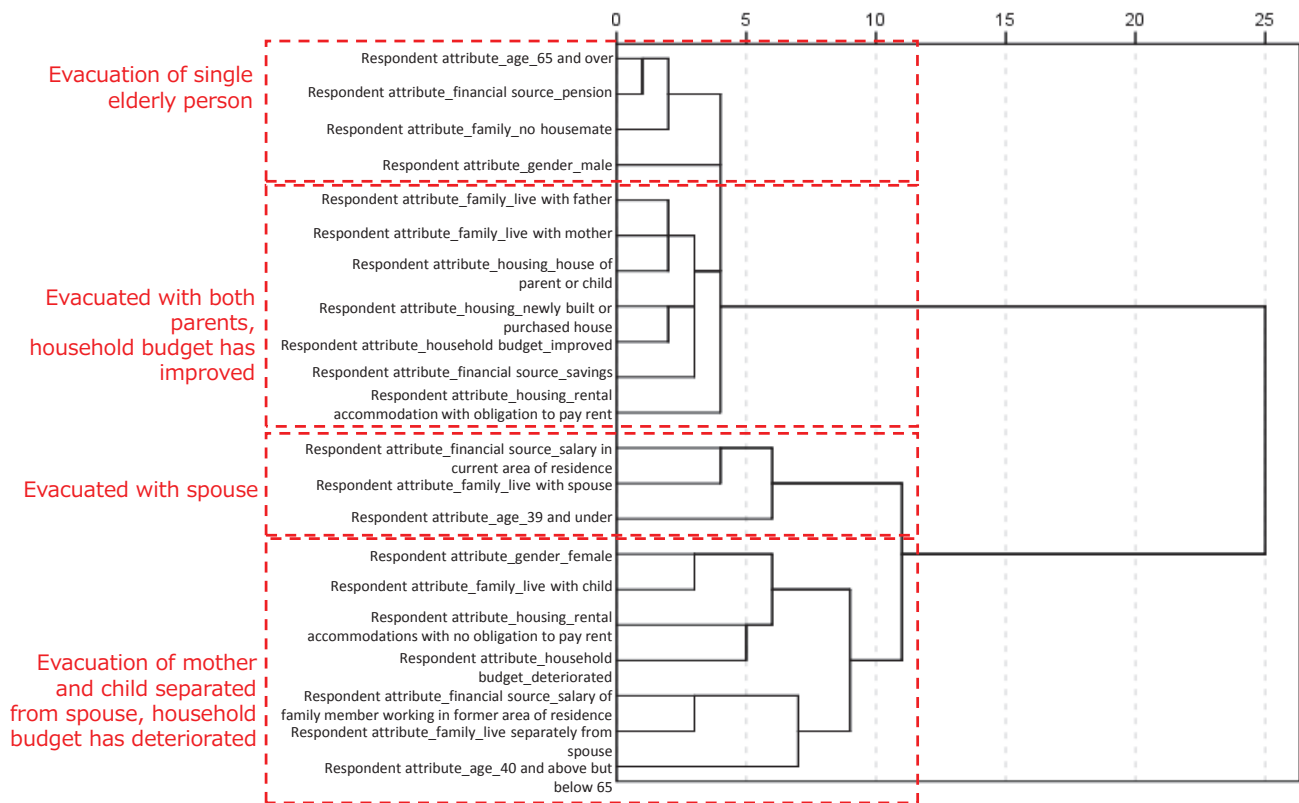


Fig. 4. Classification of voluntary evacuees based on cluster analysis.

3.2. Classification of Voluntary Evacuees in This Survey Based on Cluster Analysis

To clarify the characteristics of the voluntary evacuees in this survey, the respondents were classified into several groups based on their attributes. The voluntary evacuees were classified using cluster analysis and the results were examined. For this analysis, attributes of the respondents, including gender, age, financial resources, lodging, and household makeup, were used as the input variables. Based on this analysis, the voluntary evacuees in this survey were classified.

Figure 4 shows a dendrogram constructed from the cluster analysis results. The results show that the voluntary evacuees in this survey could be classified into four types: voluntary evacuees who evacuated as single elderly people; voluntary evacuees who evacuated with both parents and whose household budgets have improved; voluntary evacuees who evacuated with their spouses; and voluntary evacuees who evacuated as part of households comprised of only of a mother separated from her spouse and her children and whose household budgets have deteriorated. Voluntary evacuees who evacuated as single elderly people were aged 65 and above; regarding financial resources, they spent their pensions to evacuate. Voluntary evacuees who evacuated with both parents and whose household budgets have improved compared to the period immediately following the disaster have seen progress in regard to life reconstruction to a certain extent. Voluntary evacuees who evacuated with their spouses relo-

cated to other areas with their spouses and depended on salaries from jobs in the relocated area. Voluntary evacuees who evacuated as part of households consisting of a mother separated from her spouse and her children and whose household budgets have deteriorated depended on income earned by their husbands, who continued to work in their former area of residence; this group was particularly likely to have had difficulty in regard to life reconstruction. Since many of the voluntary evacuees in this survey were living separately from family members as a result of the earthquake disaster and were mothers who had evacuated with their children, the life reconstruction issues faced by this group may be common among voluntary evacuees. For this reason, this group was further analyzed.

4. Issues Faced by Voluntary Evacuees and Obstacles to Their Resolution

4.1. Obstacle No.1: Effects of Supporting Two Households

As stated in the previous section, the great majority of voluntary evacuees in this survey had come to live separately from other family members as a result of the earthquake disaster. Among voluntary evacuees, families that were forced to support two households were particularly noticeable. The *Daijirin* Japanese dictionary defines “double life” as “a living situation in which a family is



Fig. 5. Relation between double life and reasons for living separately.

divided into two locations” [14]; the expression “double life” has been used by the Reconstruction Agency with regard to the Great East Japan Earthquake. The Reconstruction Agency formulated a measure to provide expressway toll passes to mothers and fathers residing in areas that had been designated for assistance who had evacuated with their children while leaving their spouses behind; this measure was implemented to assist in “the reunion of families who are forced to maintain two households because of evacuation due to the nuclear power plant accident” (Reconstruction Agency, 2013) [15]. Furthermore, in disputes made public by the Nuclear Damage Compensation Dispute Resolution Center established by the Dispute Reconciliation Committee for Nuclear Damage Compensation of the Ministry of Education, Culture, Sports, Science and Technology, set up for the purpose of resolving disputes on damage claims by disaster victims against nuclear operators, there have been indications that living expenses have increased for families that have been divided and now reside in two locations as a result of voluntary evacuation [16]. Taking into consideration these previous examples, this paper considers cases of voluntary evacuation in which families that formerly lived in single households have been forced to financially maintain two households as a result of evacuation.

Nearly half, or 44.0%, of the respondents were forced to maintain two households; 68.2% of respondents who indicated that they now lived separately from family members they had previously lived with were forced to maintain two households. Among those who maintained two households, 94.8% gave “reasons of work or place of occupation” as their reason for living separately. This figure was about three times ($\chi^2(1) = 68.0, p < .01$) that among respondents who did not maintain two households, 32.9%; respondents who were forced to maintain two households for reasons of work or place of occupation exceeded one-third of the total number of respondents (Fig. 5). Furthermore, 94.8% of those maintaining two households lived with their children; 98.4% of these respondents were women. As was stated earlier, virtually all respondents with children had evacuated because of concerns regarding the effects of radiation exposure. Based on these findings, we can speculate that the majority of those who maintained two households were mothers who

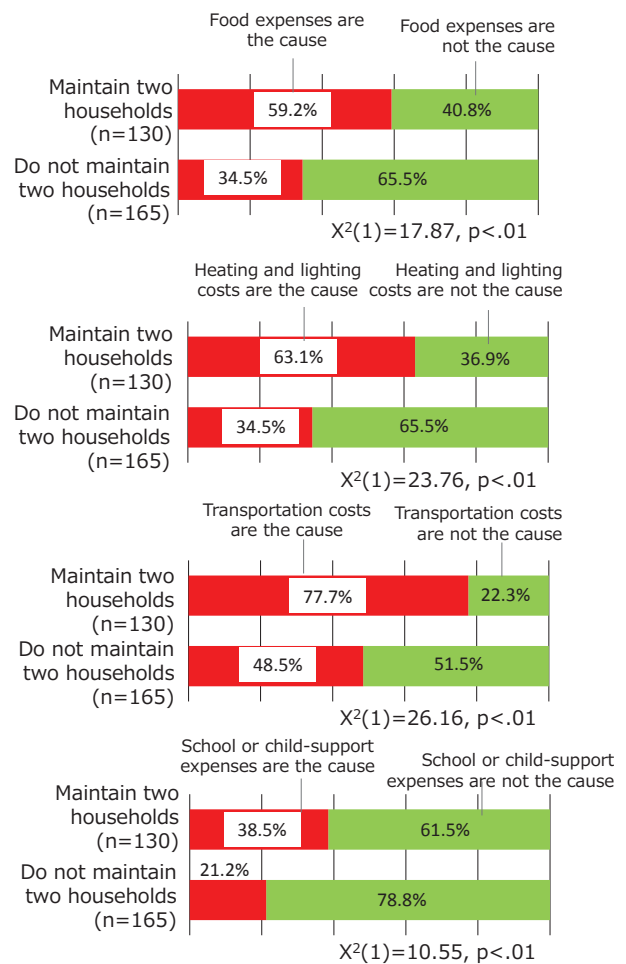


Fig. 6. Burden on household budget of those maintaining two households.

had evacuated with their children because of their concerns regarding the effects of radiation exposure and had become separated from their husbands for reasons of work or place of occupation. This perhaps explains why many of the respondents in this survey were mothers who had evacuated with their children (but without their spouses).

With further analysis, it became clear that in maintaining two households, reconstruction in regard to economic standing (one of the seven elements of life reconstruction) and interpersonal ties were obstructed: the former because of increased economic burdens and the latter because of changes in family relationships.

When respondents maintaining two households were asked about their household budgets, 69.9% responded that their financial situation had “deteriorated.” When further asked to select all applicable items in a given list regarding the causes of changes in their household budgets, characteristic patterns emerged among those maintaining two households: respondents maintaining two households exhibited a tendency to ascribe the deterioration in their financial situation to food expenses, heating and lighting costs, school and child-support expenses, and transportation costs (Fig. 6). While 59.2% of those maintaining two households indicated that food expenses had

caused changes in their household budgets, 34.5% of those who did not maintain two households cited it as a cause ($\chi^2(1) = 17.87, p < .01$). Meanwhile, 63.1% of those maintaining two households indicated that heating and lighting costs were a cause, compared to 34.5% of those not maintaining two households ($\chi^2(1) = 23.8, p < .01$). Furthermore, 77.7% of those maintaining two households indicated that transportation costs were a cause, compared to 48.5% of those not maintaining two households ($\chi^2(1) = 26.2, p < .01$). Furthermore, 38.5% of those maintaining two households indicated school and child-support expenses were a cause, compared to 21.2% of those not maintaining two households ($\chi^2(1) = 10.5, p < .01$). In having to financially support two households, increased food expenses and heating and lighting costs were a burden. The burden of transportation costs arose because of expenses involved in traveling between two households. It was highly probable that those living outside designated areas and those who lived so far from their families that travelling by car was difficult were unable to benefit from the Reconstruction Agency's measure to provide free expressway passes, mentioned earlier. The burden of school and child-support expenses arose because most of those maintaining two households had children.

Some comments indicated extreme difficulty in regard to household budgets, such as "it is economically hard because of the increased living expenses due to maintaining two households and transportation costs to return home (so that the children can see their father)," and "since living expenses have risen due to maintaining two households, we cannot afford to send our child, who is now preparing for an entrance examination, to a private tutoring school." Considering that these families are likely to continue maintaining two households in the future, it is unlikely that their food expenses, heating and lighting costs, and transportation costs will be in any way reduced, further exacerbating the issue of economic standing.

To examine interpersonal ties, respondents were asked to rate their degree of satisfaction with regard to current family relationships; the choices were "unsatisfied," "somewhat unsatisfied," "neither satisfied nor unsatisfied," "somewhat satisfied," and "satisfied." Among respondents maintaining two households, 31.3% were "unsatisfied," 29.9% were "somewhat unsatisfied," 23.9% were "neither satisfied nor unsatisfied," 11.9% were "somewhat satisfied," and 3.0% were "satisfied"; respondents who indicated they were "unsatisfied" or "somewhat unsatisfied" accounted for 61.2%, or about six-tenths. Meanwhile, among respondents who did not maintain two households, 8.6% were "unsatisfied," 11.7% were "somewhat unsatisfied," 26.2% were "neither satisfied nor unsatisfied," 22.7% were "somewhat satisfied," and 28.8% were "satisfied"; respondents who were "unsatisfied" or "somewhat unsatisfied" accounted for only 20.3%, or about two-tenths. This is in stark contrast to those maintaining two households ($\chi^2(1) = 66.4, p < .01$), suggesting that maintaining two households for an extended period of time had resulted in dissatisfaction with regard to family ties (Fig. 7). We then asked those maintaining two

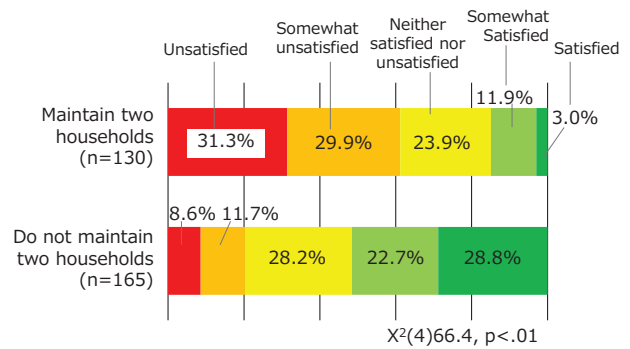


Fig. 7. Double life and degree of satisfaction with family relationships.

households about the changes in their relationships with family members living separately. Among those who responded that their relationships had deteriorated, 71.8% cited "fewer conversations take place" while 60.8% cited "personal problems are discussed less frequently," suggesting that a lack of communication was adversely affecting their level of satisfaction with regard to family relationships.

4.2. Obstacle No.2: Difficulty in Making the Decision to Return

The Great East Japan Earthquake was a wide-area disaster caused by a subduction-zone earthquake with a scale unprecedented in modern Japanese history. Furthermore, the additional occurrence of the nuclear plant accident has obscured the prospects of reconstruction. This can be viewed as a major difference from the Great Hanshin-Awaji Earthquake, which was caused by an inland epicentral earthquake. In a survey based on a random sampling of victims of the Great Hanshin-Awaji Earthquake, Kimura asked respondents when they came to feel again that things were safe; 93.2% responded that they thought things were safe once three years had passed since the earthquake (Kimura, 2007) [17]. In comparison, in a survey conducted three years after the Great East Japan Earthquake, Kimura et al. asked respondents in the three major prefectures that received extensive damage the same question; 50–60% of those in Iwate and Miyagi Prefectures responded that they thought things were safe, while only 15.8% of those from Fukushima Prefecture responded in the same manner (Kimura et al., 2014b). This indicates that, compared to the Great Hanshin-Awaji Earthquake, it has taken longer for the three prefectures hit by the Great East Japan Earthquake to arrive at a point where residents feel safe and have peace of mind. In particular, Fukushima Prefecture lagged behind considerably, most likely because of the nuclear plant accident. This situation has made it extremely difficult for voluntary evacuees to decide whether to return to their former areas of residence. As stated in Section 3.1, when questioned about their intent to return, the great majority responded that they either did not wish to return or wished to return but could not. The difficulty of returning is likely to be an

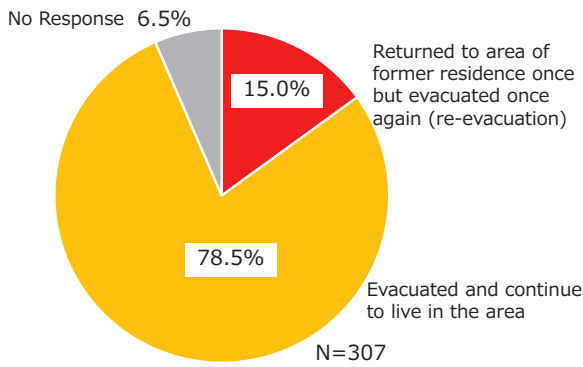


Fig. 8. The presence of “re-evacuees.”

obstacle to resolving the issues of lodging and community (town), which are among the seven elements of life reconstruction.

An issue related to the difficulty of returning is seen in cases of “re-evacuation” in the Great East Japan Earthquake. “Re-evacuation” refers to when people who have returned to their former area of residence evacuate again. In this survey, 15.0% had re-evacuated, which is not an insignificant number (Fig. 8). Respondents who had re-evacuated ($n = 46$) were asked to indicate up to three major reasons for returning to their former areas; 23.9% indicated that they had become tired living separated from their family members, 23.9% that they had returned for their children’s schooling, 19.6% that they had been told to return by family or acquaintances, and 19.6% that they had been unable to feel at home in the environment of the area to which they had evacuated (Fig. 9). When asked to indicate up to three major reasons why they evacuated again after returning, 84.8% indicated that they had become concerned again about the health effects of radiation exposure, 26.1% that the situation at the nuclear power plant became unstable, and 17.4% that they had been recommended to re-evacuate by family or acquaintances (Fig. 10). Many of those who re-evacuated due to concerns in regard to radiation exposure or the nuclear power plant did so likely because, after deciding once to return to their former areas under uncertain prospects, their anxiety about radiation exposure and the nuclear power plant showed no sign of improving. The cases of re-evacuation strikingly show how difficult it is for voluntary evacuees to decide on where to base themselves in the future – whether in their former areas of residence or in locations to which they have evacuated.

For voluntary evacuees, reconstruction in regard to lodging will be delayed as long as they are unable to decide where to base themselves. Furthermore, the possibility of reconstructing communities in disaster-struck areas diminishes when a large number of people do not return to their former communities after disasters.

4.3. Hope for Future Life Reconstruction

The Japanese government is currently implementing various measures aimed at evacuees. The Child and Vic-



Fig. 9. Reasons why those who re-evacuated had returned to former area of residence (select up to three major reasons; part of the items are obtained by categorizing other responses).

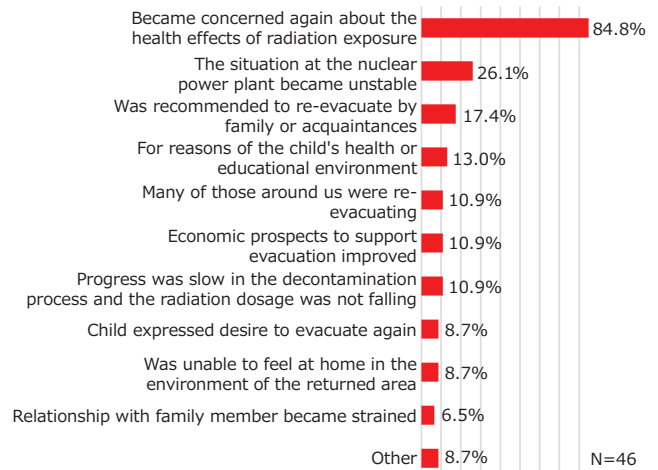


Fig. 10. Reasons for evacuating again after returning to former area once (select up to three major reasons; part of the items are obtained by categorizing other responses).

tims’ Support Law is a government measure to assist disaster victims, including voluntary evacuees. The respondents were asked to choose up to three major items that they thought were particularly lacking in this law. The results show that 48.5% and 45.6%, or about half, felt that the law was lacking in regard to securing housing in the relocated area and to investigation of the effects of radiation on health, respectively. This shows that the voluntary evacuees strongly felt that the government should provide assistance for reconstructing housing and should implement measures to alleviate concerns regarding radiation exposure. When asked about the Child and Victims’ Support Law, only 26.4% responded that they knew the name of the law and its contents, 43.0% that they knew the name but not its contents, and 28.7% that they did not know the name of the law or its contents. It appears that the contents of the law were not widely known among voluntary evacuees at the time of the survey. This suggests that it is

Table 1. Factors for deciding future living base.

	Return (n=76)	Settles (n=167)	Relocate (n=42)
1. Radiation dose	23.0%	②48.8%	②48.8%
2. Concerns about the effects of radiation exposure	20.3%	①63.3%	①51.2%
3. Economic reasons	③47.3%	24.1%	29.3%
4. Owned land, houses, family graves	②54.1%	7.2%	7.3%
5. Securing new housing	4.1%	17.5%	26.8%
6. Work reasons	20.3%	32.5%	17.1%
7. Kin such as family or relatives	①56.8%	17.5%	22.0%
8. Acquaintances or friends	9.5%	18.1%	4.9%
9. Child-rearing and educational environment	16.2%	31.9%	19.5%
10. Healthcare and welfare services	8.1%	10.8%	17.1%
11. Convenience to shopping or transportation facilities	6.8%	19.9%	22.0%
12. Government services	1.4%	10.2%	7.3%
13. State of one's own mind and body	35.1%	35.5%	③46.3%
14. State of one's child's mind and body	32.4%	③37.3%	19.5%

necessary to ensure that information important to voluntary evacuees is visible and to establish a system for voluntary evacuees to share information among themselves.

We shall now examine what the voluntary evacuees hope for with respect to lodging reconstruction. When asked about where they intended to base themselves in the future, 24.8% indicated that they planned to return to their areas of residence from before the earthquake disaster; 54.4% indicated that they would continue to live in their current locations, to which they had evacuated; and 13.7% indicated that they planned to move to new areas that were neither their area of residence before the disaster nor the area to which they had evacuated. We queried the respondents regarding which factors were relevant to their choice of where to base themselves in the future; respondents were asked to select all applicable items from a given list. Regarding the factors according to their selected future living base (**Table 1**), among those who planned to return, 56.8% indicated that kin such as family or relatives were a factor, 54.1% indicated that owned land, houses, and family graves were a factor, and 47.3% indicated that economic reasons were a factor, in descending order. Among those who planned to “settle,” 63.3% indicated that concerns about the effects of radiation exposure were a factor, 48.8% indicated that radiation dose was a factor, and 37.7% indicated that the state of their child’s mind and body was a factor. Among those who planned to relocate, 51.2% indicated that concerns about the effects of radiation exposure were a factor, 48.8% indicated that radiation dose was a factor, and 46.3% indicated that the state of their own mind and body was a factor. In the disaster, respondents that planned to return had been separated from kin such as family or relatives and owned land, houses, and family graves; they came to prioritize regaining these things. Furthermore, the results also suggested that some respondents had no choice but to return because of economic reasons, even as

they continued to live as evacuees. Meanwhile, respondents who either planned to settle or relocate emphasized concerns about the effects of radiation exposure, radiation dosage, the state of their child’s mind and body, and the state of their own mind and body as the deciding factors in their choice of their future living base, indicating that they placed an emphasis on protecting their own and their children’s emotional and physical health from radiation exposure.

Dividing the choice of future living base into “return” and “not return,” we conducted a decisiontree analysis of the factors affecting that decision. “Return” expressed an intent to “return,” while “settle” and “relocate” were both taken to express the intent to “not return.” In decisiontree analysis, the variables on the result side are used as objective variables and those on the cause side as explanatory variables to determine the relation between the two. Specifically, it is a method of multivariate analysis in which the sample is divided repeatedly into smaller subgroups, for each of which the explanatory variables that strongly affect the objective variables are extracted. Based on this analysis, we examined the factors that divided those with an intent to “return” from those with an intent to “not return.”

First, the decisions regarding their living base, “return” or “not return,” were set as the objective variables, while the items used for this decision (all applicable items from the given list) are set as the explanatory variables. This yielded the major factors that affected the choice of living base. The following items were used as the explanatory variables:

- Radiation dosage
- Concerns about the effects of radiation exposure
- Economic reasons
- Owned land, houses, family graves
- Securing new housing
- Work reasons
- Kin such as family or relatives
- Acquaintances or friends (other than kin)
- Childrearing and educational environment
- Healthcare and welfare services
- Convenience in shopping or transportation facilities
- Government services
- State of one’s own mind and body
- State of one’s child’s mind and body

Figure 11 shows the decisiontree that was constructed from the decisiontree analysis. The bar charts in the figure represent responses regarding the choice of living base. Within each box, the bar charts on the left (green) and right (red) represent the ratios of those who responded that they would “return” and “not return,” respectively.

We first examined the deciding factors for “return.” Beginning at the top of the decision tree, for respondents

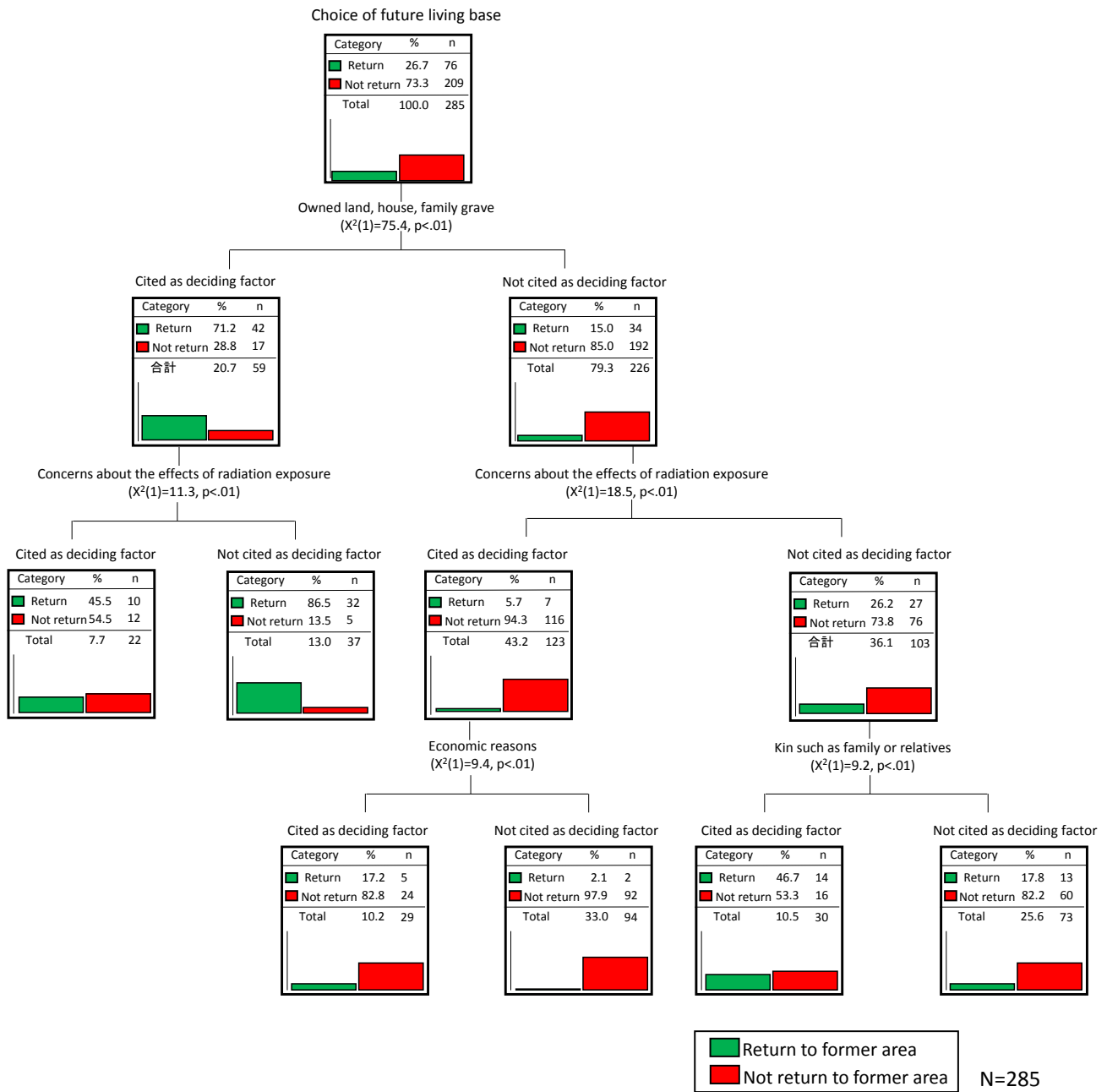


Fig. 11. Decision-tree analysis on choice of living base (analysis based on deciding factors).

who indicated that they would return, owned land, houses, and family graves were extracted as the major deciding factor in returning to former areas of residence. Among respondents who indicated that owned land, houses, and family graves were a deciding factor, 71.2% responded that they would return while only 28.8% responded that they would not return. Since a greater number of those who planned to return cited land, houses, or family graves as a deciding factor compared to those not planning to return, we can speculate that having land, houses, or family graves was a strong motivating factor behind the intent to return. Descending to the next level in the tree, even among those who cited owned land, houses, and family graves as a deciding factor, the choice of future living base

was divided depending on whether they considered concerns about the effects of radiation exposure as a deciding factor. Among those who did *not* cite “concerns about the effects of radiation exposure” as a deciding factor, 86.5% responded that they planned to “return.” In comparison, 45.5% of those who *did* cite “concerns about the effects of radiation exposure” as a deciding factor responded that they planned to “return.” This suggests that even among those emphasizing land, houses, or family graves, strong fears regarding the effects of radiation exposure served as an obstacle to deciding to “return.”

We next examine the analysis results regarding the decision to not return. The first thing we noticed was that among respondents who did not cite owned land, houses,

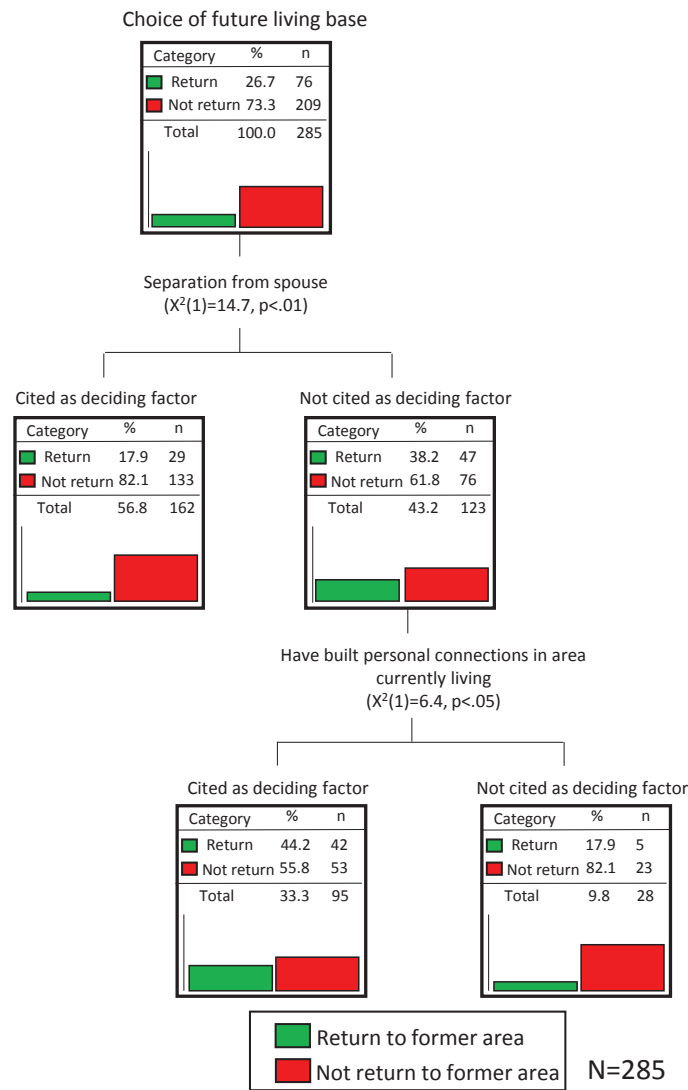


Fig. 12. Decision-tree analysis on choice of living base (analysis based on variables excluding the deciding factors).

and family graves as a deciding factor had a greater tendency to plan to not return than those who did. In particular, 94.3% of those who cited concerns about the effects of radiation exposure as a deciding factor responded that they would not return. Descending further down the tree, 97.9% of those who did *not* cite economic reasons as a deciding factor responded that they would not return. Based on these findings, we can state that respondents who had the greatest tendency to desire not to return placed less importance on owned land, houses, and family graves and had strong fears about the effects of radiation exposure. Among those who did not cite owned land, houses, and family graves or concerns about the effects of radiation exposure as a deciding factor, “kin such as family or relatives” was a factor affecting the choice of living base. Thus, 53.3% of those who did not cite either owned land, houses, or family graves or concerns about the effects of radiation exposure but cited kin such as family or relatives as a deciding factor responded that they would not return, compared to 82.2% of those who did not cite any of these as a deciding factor. This suggests that placing an

importance on community ties, including ties to kin such as family or relatives, led to the desire to return to their former areas and facilitated deciding against returning.

Explanatory variables in the analysis discussed thus far were those items given in the questionnaire representing factors that directly affected the choice of living base. For the next step, we removed the factors directly relevant to the choice of living base and conducted decision tree analysis to search for other factors affecting this choice. Using “return” and “not return” as the objective variables in the choice of living base, the respondent’s attributes, initial motivation for evacuating, reasons for continuing to be an evacuee, and items related to the living situations of being an evacuee were used as the explanatory variables.

Figure 12 shows a decision tree constructed from decision tree analysis. The first thing we noticed was that “separation from spouse” was extracted as a factor strongly affecting the choice of living base. Among those who were not separated from their spouses, only 17.9% responded that they planned to return, whereas 38.2% of those who were separated from their spouses, or more than twice this

percentage, responded in the same way. This is likely to have been the effect of respondents having had to maintain two households and having had to separate from their spouses. We can speculate that the economic burden or lack of communication caused maintaining two households encourages the decision to return. One can easily imagine cases in which people are forced to return in order to ameliorate economic burdens caused by maintaining two households or to prevent family relationships from further deteriorating due to lack of communication. Among those who were separated from their spouses, the choice of living base was affected by whether they had built personal connections in the area they currently lived. Thus, 55.8% of those who had *not* built personal connections in the area to which they had evacuated responded that they planned to not return, whereas 82.1%, or over eight-tenths, of those who had built personal connections responded that they would not return. This suggests that developing personal connections in the area of evacuation acted as a strong factor in promoting the decision to not return. It is natural to think that a person will settle in the new area and have less desire to return to her former area once they have developed personal connections in the area to which they have evacuated.

4.4. Exploring Ways of Extending Assistance Based on the Characteristics of Voluntary Evacuees

It was found from this survey that voluntary evacuees had no choice but to evacuate, even as they felt the strain of an extended existence as an evacuee; furthermore, certain issues with regard to life reconstruction in the long run were found to be characteristic among voluntary evacuees. Many of them had evacuated with the conviction that they had no alternative but to evacuate based on their fears of radiation exposure and tended to feel that despite their present difficulties, it would be even more difficult to return to their former areas of residence.

In this chapter, we examine how the use of the term “voluntary evacuee” to refer to such evacuees has resulted in misconception on the part of potential supporters such as people around these evacuees and the staff of government agencies. The word “voluntary” is defined in the *Daijirin* Japanese dictionary as “acting on one’s own judgment without interference or protection from others,” [14] which has the possibility of giving rise to the misconception, unfounded on the reality of their situation, that a voluntary evacuee is a “person who has decided to evacuate on his or her own judgment even though there is no need to evacuate.” Among the comments given in the questionnaire sheets, there were those that hinted at the suffering stemming from misconceptions against voluntary evacuees, such as “although people may think that a voluntary evacuee is someone who evacuated at her own discretion, it is precisely because one may return if one wishes to do so in voluntary evacuation that there are so many worries.” Other comments included ones such as “there are many people who say ‘Why is it necessary to evacuate? You should come back because it’s safe,’” or “I

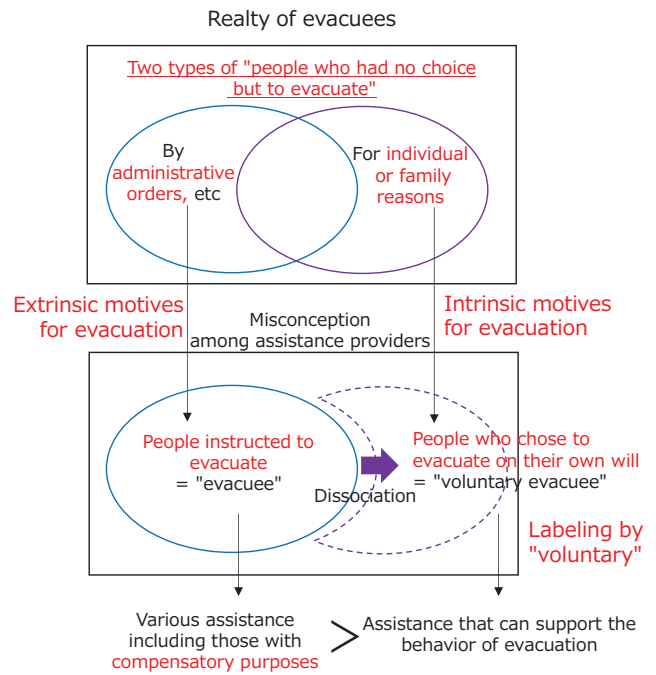


Fig. 13. Lived experience of evacuees and misconceptions among assistance providers.

was accused at my workplace in front of many coworkers that I play the ‘disaster victim,’” suggesting that they were unfairly judged in their former areas of residence as well as in the places they had evacuated to as people who had evacuated at their own discretion even though there was no need to do so. The assistance extended to voluntary evacuees by government organs are also based on such perceptions, resulting in a substantial gap between the assistance provided to them and to evacuees from Areas under Evacuation Orders (TEPCO, 2014) [18]. However, many voluntary evacuees evacuated because they feared the effects of radiation exposure on their children, continue to lead the difficult life of an evacuee due to such effects as maintaining two households, and have difficulty in deciding their future living bases. For this reason, it is necessary to provide assistance that is appropriate to the issues faced by voluntary evacuees, based on the recognition that voluntary evacuees are people who had no alternative but to evacuate. A diagram that summarizes the above discussion based on the present survey results is presented below (Fig. 13).

When we examine the lived experience of evacuees, we find that there are two types of people who had no choice but to evacuate: those who evacuated because they were subject to evacuation orders or other administrative instructions and those who evacuated for individual or family reasons. Thus, there are those who evacuated from the extrinsic motive of an administrative instruction, those who evacuated from the intrinsic motive of fear of the effects of radiation exposure, and those who evacuated from both motives, and all of these people had no choice but to evacuate. However, those in the position to provide assistance have a tendency to view only those evacuating

because of extrinsic motives, such as an evacuation order, as evacuees – people instructed to evacuate; people evacuating from intrinsic motives without extrinsic motives are voluntary evacuees – people who chose to evacuate on their own will. The label “voluntary” is used to distinguish between the two. A difference exists between these two groups in the current level of assistance provided; various assistance programs and institutional mechanisms, including those aimed to provide compensation, exist for “evacuees,” while there is a lack of assistance programs and mechanisms that can support the behavior of evacuation chosen by “voluntary evacuees.” This has given rise to inequalities and disparities in assistance.

It is more realistic to assert that “evacuees” and “voluntary evacuees” are not mutually exclusive categories and that some of the latter too had no choice but to evacuate. The designation of “voluntary evacuee” should not be construed as expressing the attitudes or views of the disaster victims who evacuated. It should be viewed instead as a convenient label used to separate victims who evacuated from areas under evacuation orders and those who evacuated from other areas. It is unlikely that the gap between “evacuees” and “voluntary evacuees” will be closed as long as those in the position to provide assistance, including people around the evacuees and government personnel, lack this understanding. Yet the comments given in the questionnaire sheets suggest that there are many cases in which the voluntary evacuees are perceived in a light that differs from reality.

This can be viewed as a problem of how those in the position to provide assistance, such as government officials and disaster workers, segment disaster victims living under different circumstances. The voluntary evacuees in the aftermath of the Great East Japan Earthquake targeted in this survey represent a case in which the importance of segmentation has come to the surface. As Tanami has pointed out (Tanami, 2013), in the future, the number of those designated as voluntary evacuees is likely to increase as areas under evacuation orders are de-designated. Unless the prevailing perception of voluntary evacuees is changed, there is the danger that problems stemming from the rift between the lived experience of voluntary evacuees and perceptions among assistance providers will grow more severe. It will be difficult to implement assistance in a manner that is appropriate to the range of disaster victims unless proper segmentation is carried out by understanding the lived experience of victims and obtaining an overall picture.

In an interview on the question of voluntary evacuees in the television program “NHK Special: A Selection of 130,000 Evacuees – Three Years after the Nuclear Plant Accident” (NHK Sogo, 2014), Takumi Nemoto, the Minister for Reconstruction and Minister in Charge of Reconstruction and Coordination after the Fukushima Nuclear Power Plant Accident at the time, was asked “There appears to be a large gap between the ideals declared in the laws and the reality of those who evacuated voluntarily. What are your views?” His response was that “As each person feels differently, there is in addition to the issue of

policy the issue of the mind. The issue [of voluntary evacuees] harbors that aspect. We would like to stand by them and provide assistance whatever the case may be. We will work to implement measures needed by the voluntary evacuees accordingly.” This indicates that the administration also recognizes the complexity of the problem of voluntary evacuees, as well as the need to provide assistance that is appropriate to voluntary evacuees. Fukushima Prefecture is extending economic assistance to households with children or pregnant women who have voluntarily evacuated to areas outside of Fukushima but plan to return (restricted to households that are already in rental housing provided by the prefectural government) [19]. However, it has been announced that this assistance will be discontinued at the end of 2016. Moreover, this assistance program targets only those voluntary evacuees who plan to return to Fukushima Prefecture. It will be necessary to continue the dialogue on assistance measures for voluntary evacuees.

5. Conclusions

In this study, we conducted a survey to examine the issues faced by “voluntary evacuees” who are still forced to live an evacuee existence three years after the accident at Fukushima Daiichi Nuclear Power Plant triggered by the Tohoku-Pacific Ocean Earthquake and Tsunami. Since it was difficult to identify voluntary evacuees for the purposes of the survey, cases were collected by making use of a list of people interviewed by NHK reporters; the survey results were analyzed to examine the issues faced by voluntary evacuees. The results showed that nearly half of the voluntary evacuees in this survey were mothers who had evacuated with their young children (but without their spouses) and who felt that they had to evacuate due to anxiety about the effects of radiation exposure on their children’s growth.

Furthermore, among the voluntary evacuees, there were many cases in which couples that had previously been living together had separated for reasons of work or place of occupation and were forced to financially maintain two households. As a result of increases in living expenses, such as food expenses, heating and lighting costs, and transportation costs due to having to travel back and forth to the area of residence before the disaster, in addition to school and child-support expenses for their children, the burden on the household budget for those maintaining two households was extremely serious. Maintaining two households also affected the level of satisfaction with family relationships; where the portion of those maintaining two households who felt dissatisfaction with family was about 40% higher than those who did not maintain two households. Thus, maintaining two households presented a major obstacle to the reconstruction of their lives and, in particular, was an obstruction to reconstruction in regard to economic standing and interpersonal ties, which are among the seven elements of life reconstruction.

Because of the nuclear power plant accident that had

occurred in addition to the unprecedented wide-area disaster, the decision to return to their areas of residence before the disaster was an extremely difficult one for voluntary evacuees. The results, which showed that about two-tenths of the respondents had “re-evacuated” (i.e., returned to their areas of residence before the disaster but had evacuated again from fears about the effects of radiation exposure and other reasons), hinted at the difficulty of deciding on their future living bases. As long as people are unable to decide on their living base, there will be obstacles to reconstruction in regard to lodging and community, which are among the seven elements of life reconstruction.

Although those in positions to provide assistance, such as the people around them and government personnel, use the label “voluntary,” we found that the lived experience of voluntary evacuees was that they were people who found themselves in a situation where they felt that there was no other alternative even as they experienced hardship in their continued existence as evacuees. Thus, we feel that it is necessary for assistance providers to understand that neither evacuees from areas under evacuation orders nor voluntary evacuees had the choice to evacuate; suitable assistance programs must be implemented. Since the number of people designated voluntary evacuees is likely to increase in the future as changes are made in the areas under evacuation orders, it will be ever more important to apply suitable segmentation by understanding the lived experience and obtaining an overall picture of the disaster victims. We call on those in positions of providing assistance to deepen their understanding of the voluntary evacuees, grasp an overall picture, and implement suitable measures for assistance at the earliest possible date.

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