Report on “Radiation Disaster Recovery Studies”

Course: Radioactivity Social Recovery Course

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Regarding “Radiation Disaster Recovery Studies”

Radiation disasters result in enormous consequences for environmental contamination, health, and society. Radioactive materials released by the 1986 Chernobyl nuclear disaster spread over Europe, and it has been pointed out that the problems were economic and psychological, not health-related or environmental, in most areas (World Health Organization, International Atomic Energy Agency, & United Nations Development Programme, 2005). United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) estimated that the most important health effect from the 2011 Fukushima nuclear disaster is on mental and social well-being, related to the enormous impact of the earthquake, tsunami and nuclear accident, and the fear and stigma related to the perceived risk of exposure to radiation (United Nations, 2014).

Radiation disasters also have an indirect effect on health, such as with diabetes, and psychological distress, which could be seen after the Fukushima disaster. For example, the prevalence of lifestyle diseases, especially diabetes, among evacuees has increased significantly. Diabetes itself is linked to various health risks, including cancer, stroke, and heart attack. Previous research revealed that the average additional risk of diabetes among those in their 40s to 70s was much higher than the risk of direct radiation consequences (Murakami, Tsubokura, Ono, Nomura, & Oikawa, 2017). It has also been shown that the risk of psychological distress was strikingly higher than the direct risks from radiation exposure (Murakami, Tsubokura, Ono, & Maeda, 2018). It should be noted that radiation disaster effects on health indirectly.

Issues in the process of recovery from a radiation disaster include conflict over returning home, putting evacuees’ lives back in order, maintenance of life circumstances and community, reconstruction of industrial damage, and protecting the children’s future (Shimizu, 2013). In these processes, there are several opportunities for group-consensus building. International Commission on Radiological Protection (ICRP) emphasized the importance of stakeholder involvement in their

recommendation for the protection of people living in long-term contaminated areas resulting from a nuclear disaster (ICRP, 2009). In the case of the 2011 Fukushima nuclear disaster, communication with the public on recovery activities is essential to build trust (International Atomic Energy Agency, 2015). To communicate effectively, it is necessary for experts to understand the information needs of the affected population and to provide understandable information through relevant means, and communication improved in the aftermath of the accident, and the affected population became increasingly involved in decision making and remediation measures (International Atomic Energy Agency, 2015).

A round-table meeting in Kashiwa city, Chiba prefecture is an example of group-consensus building in which various stakeholders were involved. Although Kashiwa city is located more than 200 km from the Fukushima Daiichi Nuclear Power Plant, a high dose of radiation was found in the air in some parts of the city. As a consequence, a farmer's market's sales decreased by 40%. A round-table meeting group was then established by farmers, consumers, distributors, and restaurants. Based on a series of discussions, they established a voluntary limit of 20 Bq/kg, which is one-fifth of the national limit, 100 Bq/kg, for general food. The director of the meeting said communication that involved a feeling of human trust, rather than a discussion on numbers, removed consumers' anxiety (Inoue, 2013). This suggests that the communication style was important for group-consensus building.

The Fukushima disaster provoked an increase in the avoidance of nuclear energy, especially in Japan. In such circumstances, how can a convincing group-consensus be built on nuclear-related projects? My doctoral dissertation focused on procedural justice as a key factor in the building of convincing group-consensus. It investigated functions of procedural justice in the process of attitude changes on nuclear-related projects, and suggested a model of acceptance for such measures and facilities.

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Title of Doctoral Thesis

Studies on procedural justice for the acceptance of nuclear-related projects

Summary of Doctoral Thesis

NIMBY ("not in my backyard") problems involve a contradiction in which people recognize that facilities contribute to the public interest, but oppose the construction of such facilities near their homes. The construction of nuclear-related facilities (e.g., high-level radioactive waste facilities, and nuclear power plants), is a typical example of a NIMBY problem. Research on social acceptance of NIMBY facilities has indicated that high procedural justice increases trust and social acceptance of plans made by operating bodies. "Procedural justice" is defined as the fairness of group rules and decision-making processes, and is distinguished from distributive justice. Research on the acceptance of nuclear-related projects showed that procedural justice has a stronger effect than other factors on the perception of fair judgments. Perceived risk, perceived benefit, and trust in the authorities are common determinants of people's acceptance of nuclear-related projects. Procedural justice is strongly related to trust. There is little agreement on the strength of procedural justice toward acceptance of nuclear-related projects. This disagreement could be explained by the elaboration likelihood model (ELM;

Petty & Cacioppo, 1986), which is a representative theory of attitude change. It describes two strategies for changing one's attitude. If people have high motivation or ability regarding an issue, they change their attitude through a high-load process using central information (e.g., perceived risk, perceived benefit). On the other hand, if people have low motivation or ability, they change their attitude through a low-load process using peripheral information (e.g., procedural justice, trust). Although procedural justice is considered to be evaluated by consistence, bias suppression, accuracy, correctability, representativeness, ethicality, information disclosure, opportunities for participation (Leventhal, 1980), and the sense of values, these factors have been investigated respectively. The purpose of this doctoral study was twofold: to investigate the role of procedural justice toward the acceptance of nuclear-related projects in terms of ELM; and to investigate factors affecting perceived procedural justice on nuclear-related projects. In this study, strength of interest in an issue was defined as levels of motivation and ability.

First, a scenario-based experiment regarding consensus-building around NIMBY facilities was conducted with the aim of investigating the effects of procedural justice toward the acceptance of nuclear-related facilities. The results suggest that procedural justice increases the level of acceptance with results even with a loss in profits.

Second, a longitudinal questionnaire was conducted before and after restarting operations at nuclear power plants (NPPs). The aim was to investigate, using ELM, the effects of and changes in the perceived benefit, perceived procedural justice, and trust in the government and operators on a situation-dependent acceptance of restarting NPPs in Japan. The results revealed that trust, in addition to procedural justice and perceived benefit, is necessary for the acceptance of the NPP restart.

Third, a questionnaire was conducted to investigate factors influencing perceived procedural justice concerning the decontamination of areas affected by the Fukushima disaster. The results indicated that determinants of perceived procedural justice were different depending on people's levels of interest in the decontamination. The results indicated that various factors were associated with perceived procedural justice, which was based on the perceived necessity for decontamination. Moreover, inappropriate procedures, as well as trust in the government and the operators had an impact on perceived procedural justice in groups indicating both a high and a low necessity for decontamination. Especially, the interpersonal factor and information disclosure increased perceived procedural justice only in the group suggesting a low necessity for decontamination.

To conclude, a series of studies suggest a model for the acceptance of nuclear-related projects: perceived benefit, perceived risk, and procedural justice are used in both high and low levels of elaboration likelihood; however, different factors increased perceived procedural justice depending on elaboration likelihood. Furthermore, trust has a moderating effect for perceived benefit in the central route of ELM, and for perceived procedural justice in the peripheral route of ELM. The findings of this study showed the importance of bidirectional communication, and of increasing both procedural justice and trust to build a convincing group-consensus on nuclear-related projects.

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