

Examination of the factors influencing the people's evacuation behaviors and cognition of reconstruction in the western Japan heavy rain disaster in July 2018

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The torrential rain from June 28th to July 8th in 2018 caused serious human suffering and damage of property. In such natural disasters, investigation of people's evacuation behaviors at the time and the subsequent recovery process is important to consider support for the affected areas and preparedness for future natural disasters. A previous study indicated that knowledge of disaster had an effect on evacuation behaviors and the subsequent cognition of disasters (e.g. Kimura et al., 2017). This study examined the influences of residents' features in the affected areas of the western Japan heavy rain disaster in July 2018 on the evacuation behavior and the subsequent cognition of risk and of recovery from the disaster.

We implemented a web survey study for 1000 residents in 13 districts in Hiroshima prefecture and 6 districts in Okayama prefecture where that suffered damage caused by the western Japan heavy rain disaster in July 2018. Figure 1a shows the framework of the web survey. The survey asked about the demographic information related to the disaster, damage situations, cognition of disaster risk, recovery and reconstruction calendar and so on. The study analyzed the relationships between residents' prediction for flood damage, evacuation behavior, risk perception, and cognition of recovery. Main results are summarized into four. First, the relationship between prediction for flood damage and evacuation behavior was analyzed by Bayesian inference (Figure 1b). There was a difference in evacuation behavior at the time depending on the level of prediction for flood damage ($b=.13$, 95%CI=.01~.25). Residents who thought that damage by flooding would not occur tended not to evacuate. Second, the relationship between knowledge about the hazard-map and evacuation behavior was analyzed by Bayesian inference (Figure 1c). Evacuation behavior at the time differed according to the level of knowledge about the hazard-map ($b=.30$, 95%CI=.19~.42). The less knowledge about hazard-map, the fewer residents tended to evacuate. Third, we compared the difference in risk perception (i.e. severity) after the disaster, according to the level of damage by the western Japan heavy rain disaster (Figure 1d). Bayesian inference indicated that there was a difference in perception of the severity of heavy rain between people who had not suffered and people who have suffered from flooding above floor level ($b=-.62$, 95%CI=-.92~-.32). People who had suffered above floor level perceived that they were more likely to suffer from future heavy rain than those who had not suffered. Finally, the study compared the difference in cognition of recovery according to the level of the damage by the disaster (Figure 1e). Bayesian inference indicated that there was a difference in cognition of recovery between people who had not suffered and people who had suffered from flooding above floor level ($b=2.70$, 95%CI=1.53~4.38). The cognition of recovery was weaker for people who had suffered from flooding above floor level than those who were not suffered.

The study suggested that people's recognition of natural disasters beforehand affected evacuation behavior at the time of the western Japan heavy rain disaster in July 2018. Without adequate knowledge of natural disasters, people are less likely to take evacuation behavior. Furthermore, the study showed that experience suffering from the disaster influenced afterward risk perception and cognition of recovery. The experience is reflected in people's awareness of disaster. Therefore, the study suggested that the dissemination of adequate knowledge of natural disaster such as the hazard-map is important to enhance

people's ability to cope with heavy rain disaster.

Keywords: Western Japan heavy rain disaster in July 2018, cognition of reconstruction, evacuation behaviors

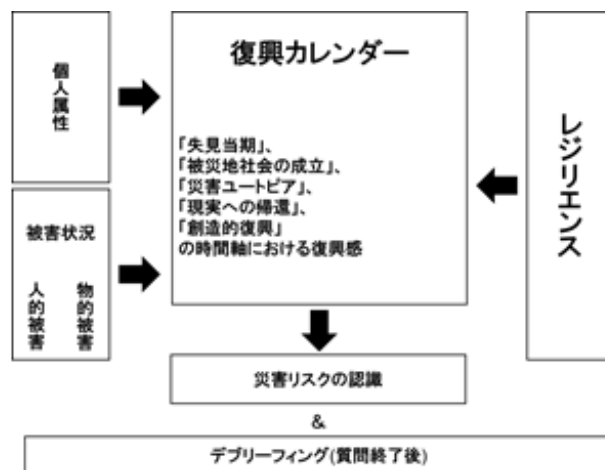


Figure 1a The framework of the web survey in the study

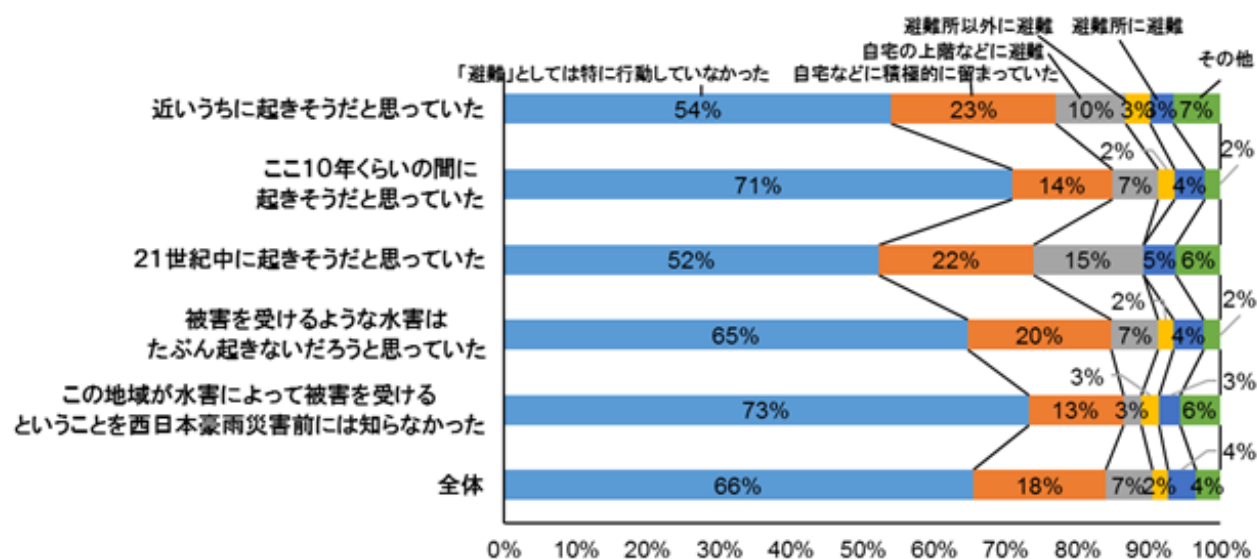


Figure 1b The cross table of prediction for flood damage by evacuation behavior

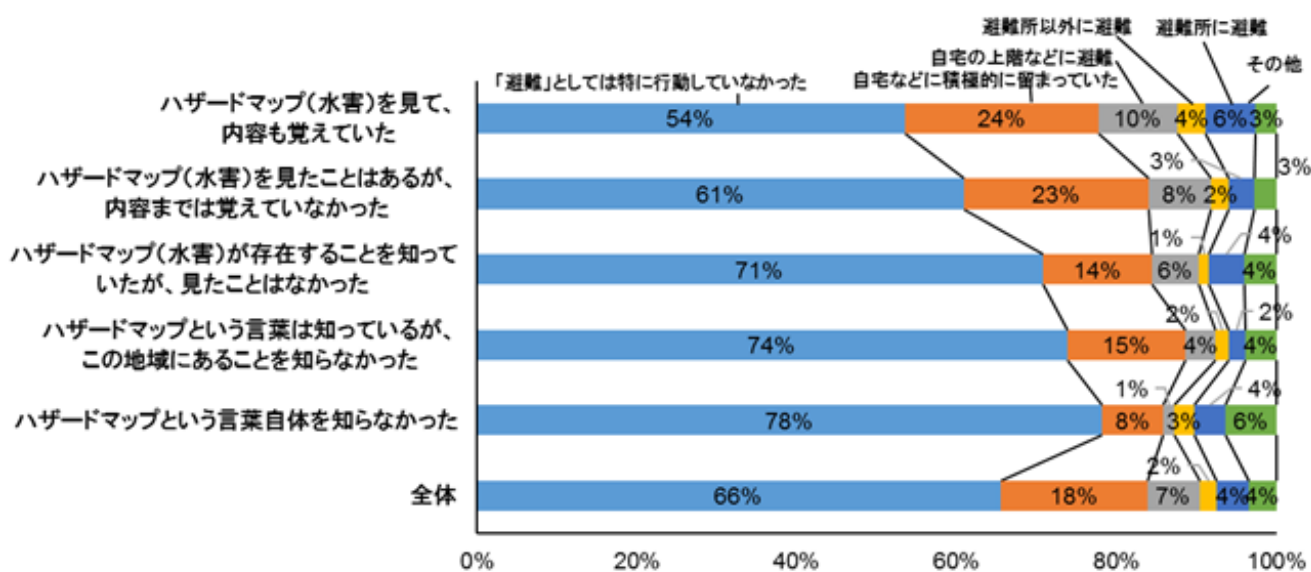


Figure 1c The cross table knowledge of hazard-map by evacuation behavior

