

# Examining Risk Perception and Household Hazard Adjustments in Areas Subject to Joint Natural and Technological Hazards: Towards Reduction of Community Vulnerability to Disasters

## Introduction

The purpose of this study is to assess household hazard adjustments and risk perception for earthquake, tsunami, chemical and joint natural hazard triggered technological accidents/ hazards (known as Natechs) in Osaka and Kobe, Japan. Hazard adjustment refers to risk reduction and emergency management interventions to reduce disaster impacts. It includes hazard prevention and mitigation, and emergency and recovery preparedness. In the study we also examine to what extent disaster information, hazard proximity, past disaster experience, and demographic characteristics, among others, affect the adoption of hazard adjustments and risk perception for these events.

## Methodology

Survey questionnaires were mailed to 2000 randomly selected households living near industrial parks on Osaka Bay in Sakai (Osaka, Japan) and Higashinada (Kobe, Japan). A stratified sample was taken according to their distance to the industrial park ( $D \leq 700\text{m}$ ,  $700 < D \leq 1400\text{m}$ , and  $1400 < D \leq 2000\text{m}$ ) up to a distance of 2 km. Figures 1(a) (Sakai) and 1(b) (Higashinada) present maps of the three strata in each area sampled. A total 479 households replied. The effective response rate for the study is 25%.

## Conclusions

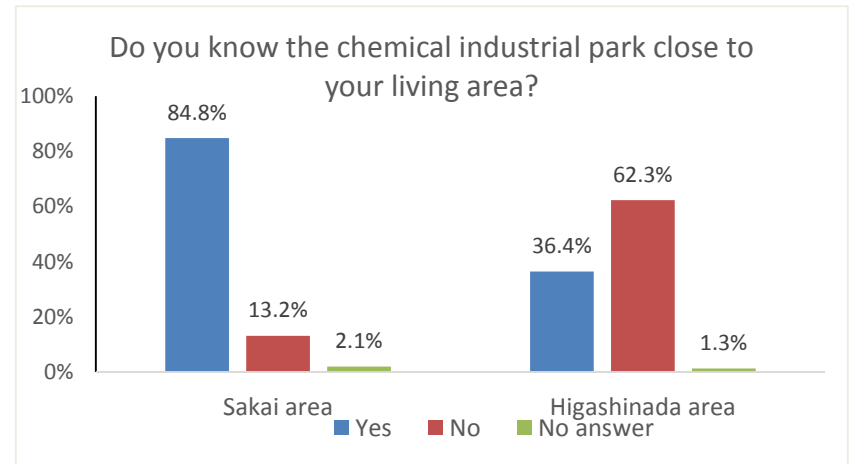
Our findings show that in both surveyed areas, households are well prepared for earthquakes and tsunami, but not for chemical and Natech accidents. Respondents said that they do not receive any information regarding chemical or Natech accidents. The survey has created awareness concerning chemical and Natech risks. Households indicated that they would start to prepare for chemical or Natech accidents after this survey. Nevertheless, the low preparedness levels suggest that more needs to be done. Local authorities, industries and other organizations should carry out activities to increase household knowledge and preparedness for chemical and Natech accidents. Such activities could include workshops, TV or radio programs, or information pamphlets, etc.



Figure 1. (a)Map of Sakai and (b) Higashinada industrial parks and neighboring residential areas showing the three strata sampled in each area.

This study found that households from both areas surveyed had lower risk perception (in terms of likelihood and severity) concerning the threats posed by chemical and Natech accidents as compared to earthquake and tsunami. Protective behavior during these types of accidents has been found to be positively correlated with risk perception (Yu, Cruz and Hokugo 2016). Low risk perception may mean that households may not take protective actions when needed in such emergency situations. Thus, measures should be adopted to increase household knowledge about the risk from chemical and Natech accidents in their neighborhood and/ or community, and the measures that can be taken to reduce that risk.

This study found that households' level of trust in government's ability to protect them under the risk of chemical and Natech accidents was low. Respondents had more trust in local government's ability to protect them against earthquake and tsunami threats, despite the fact that the perceived risk from these natural hazard phenomena was high.



## Outreach and outputs

The project has involved outreach activities with local communities in Higashinada Ward, Kobe. During the course of the current research project, we have participated in the monthly meetings of the "Goden Machidukuri Association (GMA)" in Higashinada Ward. The purpose of the meetings has been to raise awareness concerning preparedness for chemical accidents and Natech events in addition to earthquake and tsunami preparedness. The concerns of the GMA have been included in the survey questionnaire by specifically including questions on awareness of the presence of industrial parks near their houses, knowledge about prevention, preparedness and emergency response for these hazards. The results of the present study will be presented to the GMA on 3 April 2016.

The results of this study will be presented to the Goden Community Association, as well as at national and international conferences by several members of the research team.