

Geography Education Challenges Regarding Disaster Mitigation in Japan

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Abstract

After the March 2011 great East Japan earthquake, school teachers became much more interested in education for disaster prevention. The purpose of this paper is to indicate the extent education for disaster prevention is present in the Japanese National Curriculum. Before March 2011, some elements of disaster prevention education were added to the new curriculum on Social Studies and geography. Disaster education's role becomes much more important for saving children's lives. The roles of geographic education for disaster education emphasize the skills of map and regional characteristic reading and interpretation. The goal of geography education for disaster prevention is that people are better able to find safety with these skills.

Keywords: Disaster prevention, national curriculum, hazard map, land use, Social Studies

Introduction

Problem Statement

After the Great East Japan Earthquake of March 2011, the necessity for disaster prevention education has been advocated in various fields. Japan's geography has many unique features, such as its location over tectonic plate boundaries, its susceptibility to earthquakes and tsunamis, and the presence of volcanoes; these features make the country disaster-prone. Moreover, the narrow plains are constantly under the threat of floods, and the steep slopes created by the mobile belt can cause landslides. In Japan's elementary and secondary education, disaster prevention education is taught under the purview of health and physical education as a part of school safety education. However,

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considering the problematic geography of the country, people who live in Japan need to learn about disasters and disaster prevention with greater rigor.

In this paper, we discuss the current status of disaster prevention education in Japanese schools. Next, we consider the changes required in disaster prevention education and in geography education following the Great East Japan Earthquake.

The trend in Education after the Great East Japan Disaster

(1) The outline of the Great East Japan disaster

The Great East Japan disaster began with an earthquake measuring 9.0 on the Richter scale that occurred on the plate boundary about 500 km from Iwate on March 11, 2011. Persons declared dead numbered 15,882, and the number of missing persons was 2,668 (March 11, 2013, Fig. 1). The height of the tsunami that subsequently struck the seashore was over 30 m (Fig. 2). The seashore where the tsunami hit has a saw-toothed coastline. The narrow valley caused the tsunami wave to reach a greater height, dramatically worsening its impact along the coast.

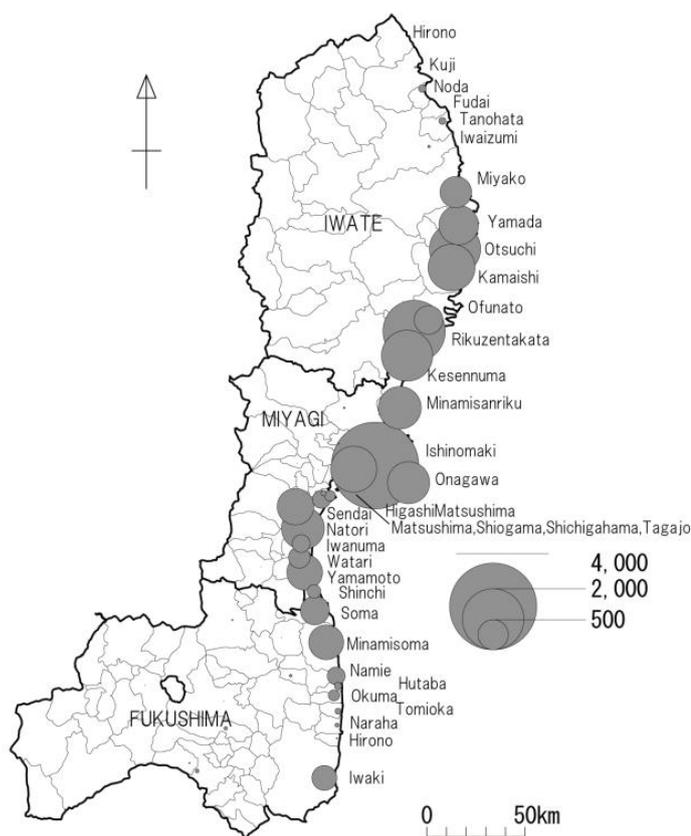


Figure 1.
Number of missing and dead from each municipality (Shimura and Yamagata, 2014)
 Source: Police publicity

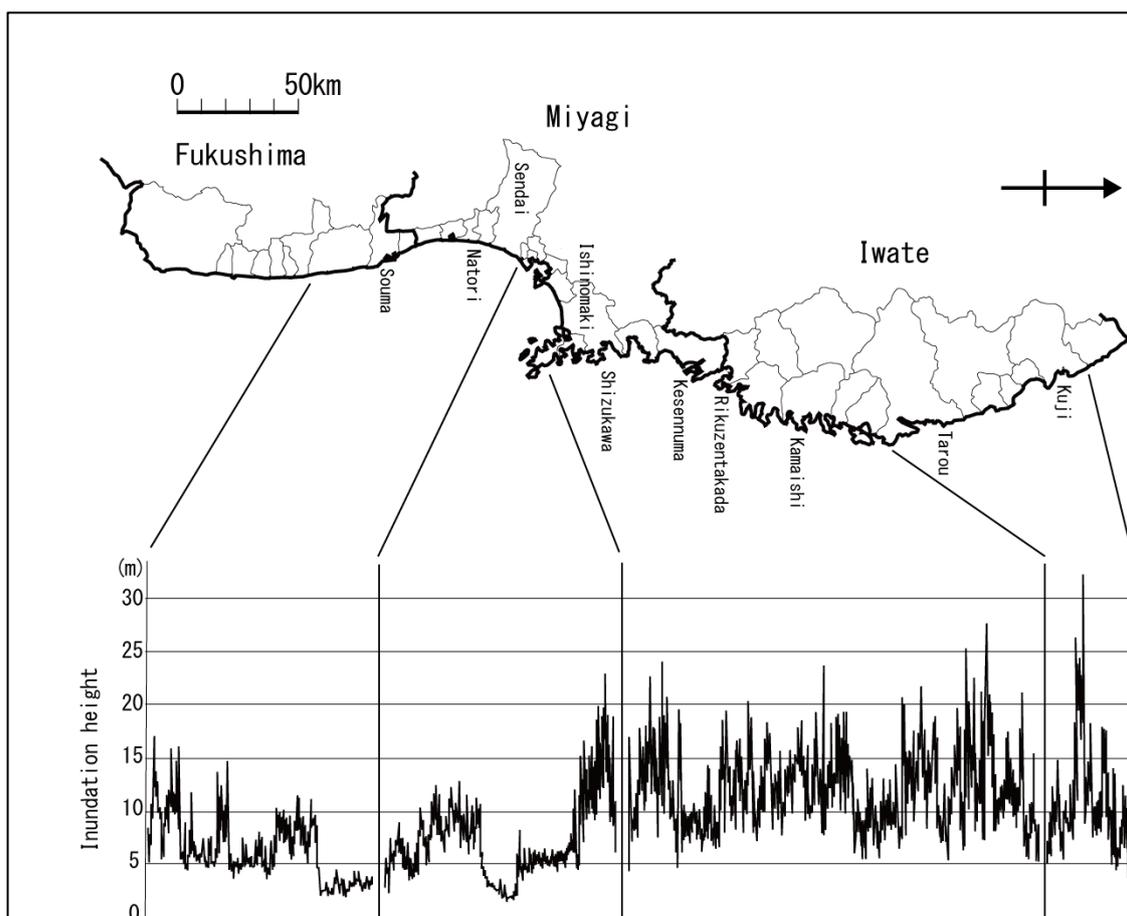


Figure 2. Inundation height distribution of the tsunami (Shimura and Yamagata, 2014. Source: Tsunami Damage Mapping Team, Association of Japanese Geographers, 2011)

The accident at the Fukushima I Nuclear Power Plant occurred due to the earthquake and tsunami. As a result, many people had to evacuate to avoid nuclear contamination (Fig. 3). The number of evacuated persons was spread over a wide area. There are many evacuated schools in Fukushima Prefecture because of nuclear contamination. Other damaged areas had a lot of devastated schools. The disaster damage became a heavy burden in children’s everyday lives.

(2) Engagement before the earthquake disaster

The Ministry of Education, Culture, Sports, Science and Technology has released the following documents on disaster prevention:

- “Disaster education fosters zest for living” (1998)
- “The safety education fosters zest for living” (2001, 2010 revision)
- “In order to protect children’s lives from the falling object by an earthquake” (2010)

Although the Ministry of Education, Culture, Sports, Science and Technology had attempted to impart disaster prevention education, the damage to children and students in the Great East Japan disaster has been serious.

(3) Engagement after the earthquake disaster

The following guidelines were created in response to the disaster:

Interim report of "Lessons learnt from the 2011 Great East Japan Earthquake and Tsunami" (June 26, 2011).

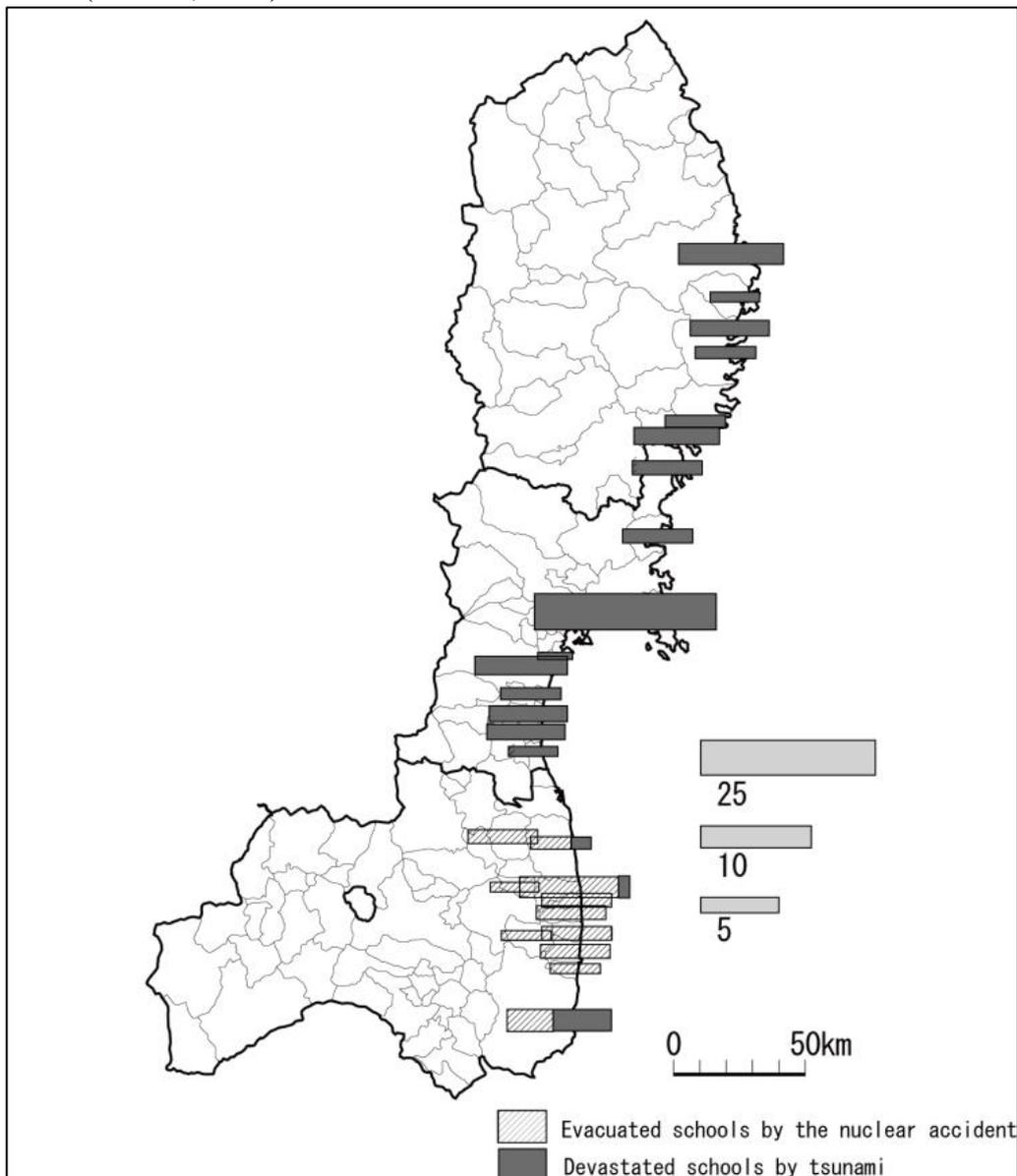


Figure 3. Number of schools affected by tsunami and the nuclear power plant accident (Shimura and Yamagata, 2014)

The following report was released by the Ministry of Education, Culture, Sports, Science and Technology:

“Experts meet to create interim draft on disaster prevention education and disaster prevention management based on lessons learnt from the Great East Japan Earthquake” (September 30, 2011).

In the report, the following things are discussed:

Target 1: Training on “attitude tied to action” and social participation

1) Training on “attitude tied to action”

- The necessity of carrying out refuge actions appropriately in the case of an unexpected disaster.
- Conquering the optimistic bias is also important.

2) Education about various aspects of a disaster

- Students should acquire proper knowledge about natural disasters through each subject.
- Education should be imparted with the view of reducing and conquering disasters.
- We should accept the dual aspect of nature: one aspect is that of disaster, which should be conquered; the other aspect is nature’s bounty, which is a benefit to human beings.
- We should consider making disaster prevention a subject.

Target 2: Disaster prevention education that raises the consciousness of a safe society

- Ensure that the lessons of past disasters are handed down from generation to generation.
- Learn the viewpoint of the supporters of disaster prevention.
- Improve social participation consciousness to ensure it acts as a supporter.

System of Disaster Prevention Education as a Part of Safety Education

Disaster prevention education is a part of school safety education. The system of school safety is arranged in the form of three aspects: a domain, a technique, and a time series (Mitsuhashi, 2013).

A Domain

The domain of school safety consists of “safety education,” “safety control,” and “organization safety.” Furthermore, “safety education” is subdivided into the three domains of “life safety (crime prevention.),” “traffic safety,” and “disaster prevention” (Fig. 4). The broad themes within “disaster prevention” are a fire, an earthquake, a volcano, storm and flood damages, a nuclear hazard, etc.

The classification as a technique

The “techniques” of school safety education are classified into “safety learning” and “instruction of safety” (Fig. 5). “Safety learning” aims to raise the understanding of the basic safety contents and the presence of mind and judgment. Health and physical education is central to disaster prevention education and it should be connected to other subjects. The purpose of “safe instruction” is to raise the consciousness of safety and to improve practical ability and attitudes for keeping safe in daily life. It is important to teach this through everyday classroom activities.

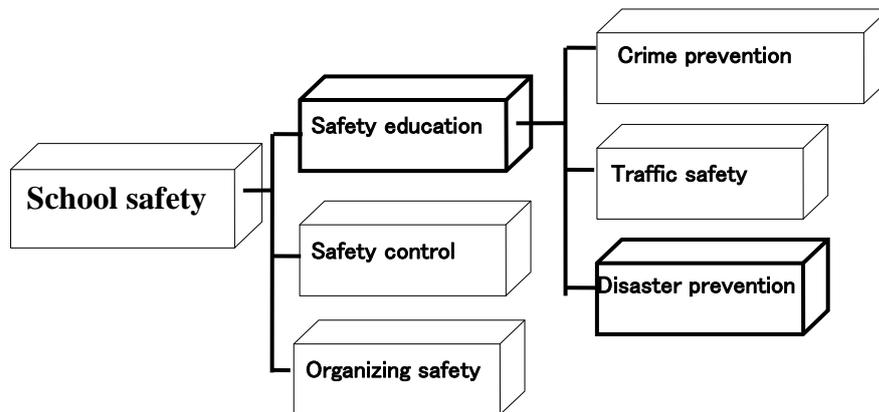


Figure 4.
The image of System in the domain of school safety education

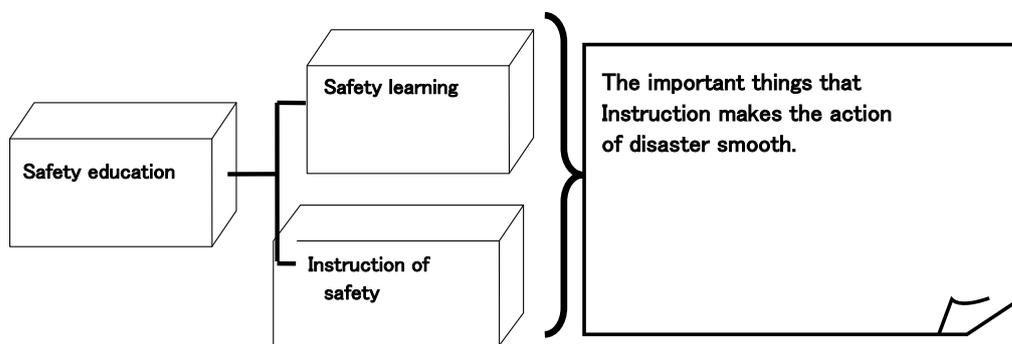


Figure 5.
System image of the technique of school safety education

Arrangement by a time-axis

School safety education is caught on a three-time-axis: prior to the crisis, crisis, after crisis. The three times have different education contents.

Disaster Prevention in the National Curriculum Standard in Japan

Before the Great East Japan Earthquake of March 2011, disaster prevention contents were strengthened in the Japanese national curriculum.

Elementary education

In elementary school Social Studies, disaster prevention is mentioned in the 3rd grade and the 4th grade learning contents. “Students have to learn about the people who are engaged in decreasing accidents and disasters in the neighborhood. The contents are taken up from fire, storm and flood, and earthquake to teach disaster prevention. For accident prevention, the contents are taken up from crime prevention or traffic accident. In some cases, it is taken up from landslides, a mudflow, tsunami, or a volcano as a disaster.” This unit should be carried out according to the actual conditions of the area of the school.

In the 5th grade as well, the contents are taken up from fire, storm and flood, and earthquake to teach disaster prevention. For accident prevention, the contents are taken up from crime prevention or traffic accident. Students are taught that they should be alert for information about disasters in everyday life, and that it is people’s responsibility to raise awareness about disaster prevention.

In the 6th grade, engagement in disaster restoration is treated in “work of the politics of local government or regional government” A city office, a town office, and a prefectural office is prepared for performing rescue operations systematically in case of emergency, or planning of construction for disaster restoration. Regional government helps the local government, and performs rescue operations and disaster restoration on behalf of the local government. Students learn about horizontal cooperation in the same area and the perpendicular cooperation system of the government-in all-prefectures, cities, towns, and villages.

Junior high school Social Studies

In junior high school Social Studies, on the topic of natural environment, students learn about the geomorphological features of Japan, and the engagement in the reduction of disaster in Japan. In the regional topics, students learn of the uniqueness of the natural environment, which strongly affects local industries. The engagement in disaster prevention is different according to the features of the region.

High school Geography

In high school, the subject name “Geography A” has the unit “natural environment and disaster prevention.” Students learn the special features of the natural environment of Japan and its natural disasters. They also understand that the engagement against disaster based on regionality is important. Students learn how to evaluate the danger of

disaster with objective data. Through the activity, they gain the ability to see disasters objectively.

For disaster education, map reading is an important skill. Students learn how to read and use hazard maps and topographical maps related to everyday life.

Disaster prevention education in the Social Studies and Geography syllabus on national curriculum standard was changed. In elementary school, the aim for disaster education is “getting to know disaster and engagements for disaster prevention.” In junior school, students learn “regionality through disaster prevention.” In senior high school, students learn about human-environment relationships in natural disasters, and brush up on map skills.

Examples of Disaster Education Lessons: Learning Disaster through Map Reading

According to the changes in the National curriculum standard, teachers have to develop the practical text and materials for geography classes. There are various kinds of hazard maps and disaster descriptions. But they have no way to use these materials in class. They need practical examples to use these materials in geography class. In this section of our paper, the geography class example with topographical map and flood hazard map is indicated.

Read the history of land use

This is an educational practice at the elementary school in Toyama Prefecture (Ohnishi, 2012).

With past disasters and the Great East Japan Earthquake, people recognized the relationship between disaster damage and the past land use. Then, I tried to foster students' awareness of disaster through learning from past land use maps of their neighborhood. In Japan, people determined the place of residence according to micro-geomorphological features before the rapid economic growth of the 1950s (Fig. 6). It is effective to understand disaster by comparing old topographical maps with new topographical maps. Students can read about the change in land use.

Children learned about their neighborhood's vulnerability to disasters. Children's disaster consciousness was developed through this lesson. Children also learned the history of their own town through maps. It is a very good lesson to understand their neighborhood.

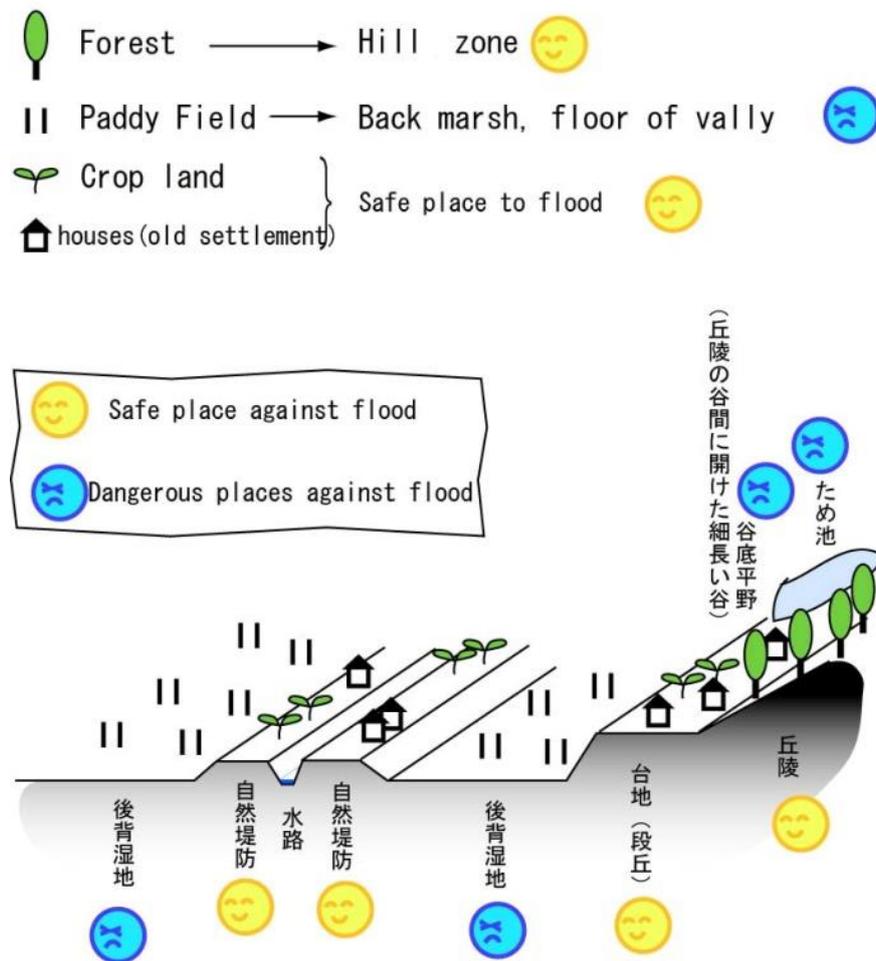


Figure 6.
The relationship between land use and micro-topography

Hazard maps and DIG

Flood hazard maps and earthquake hazard maps are being made in many cities, towns, and villages in Japan. How does one utilize these maps? It is effective to do an emergency drill on a hazard map. The emergency drill on a map is called DIG (Disaster Imagination Game).

People imagine struggling through a disaster in a DIG, which is a kind of simulation of disaster. In order to do a simulation, a scenario will be created based on the situation (Ohnishi et al., 2007). Fig. 7 is the flood hazard map of Toyama. I would like to simulate the activities at the time of a disaster. The scenarios are as follows:

A certain family's residence is located on the left bank of Jintsu River, and there are three people in the family: a mother, father, and 11-year-old girl. The Jintsu River left bank collapsed at 6:00 p.m. The mother was in the house, the

father in his office, and the daughter is in the cram school. What kind of action should the three persons take?

In DIG, people simulate their activities on a hazard map. They will be trained on how they should act at the time of disaster by DIG. It speeds up the refuge action at the time of a disaster.

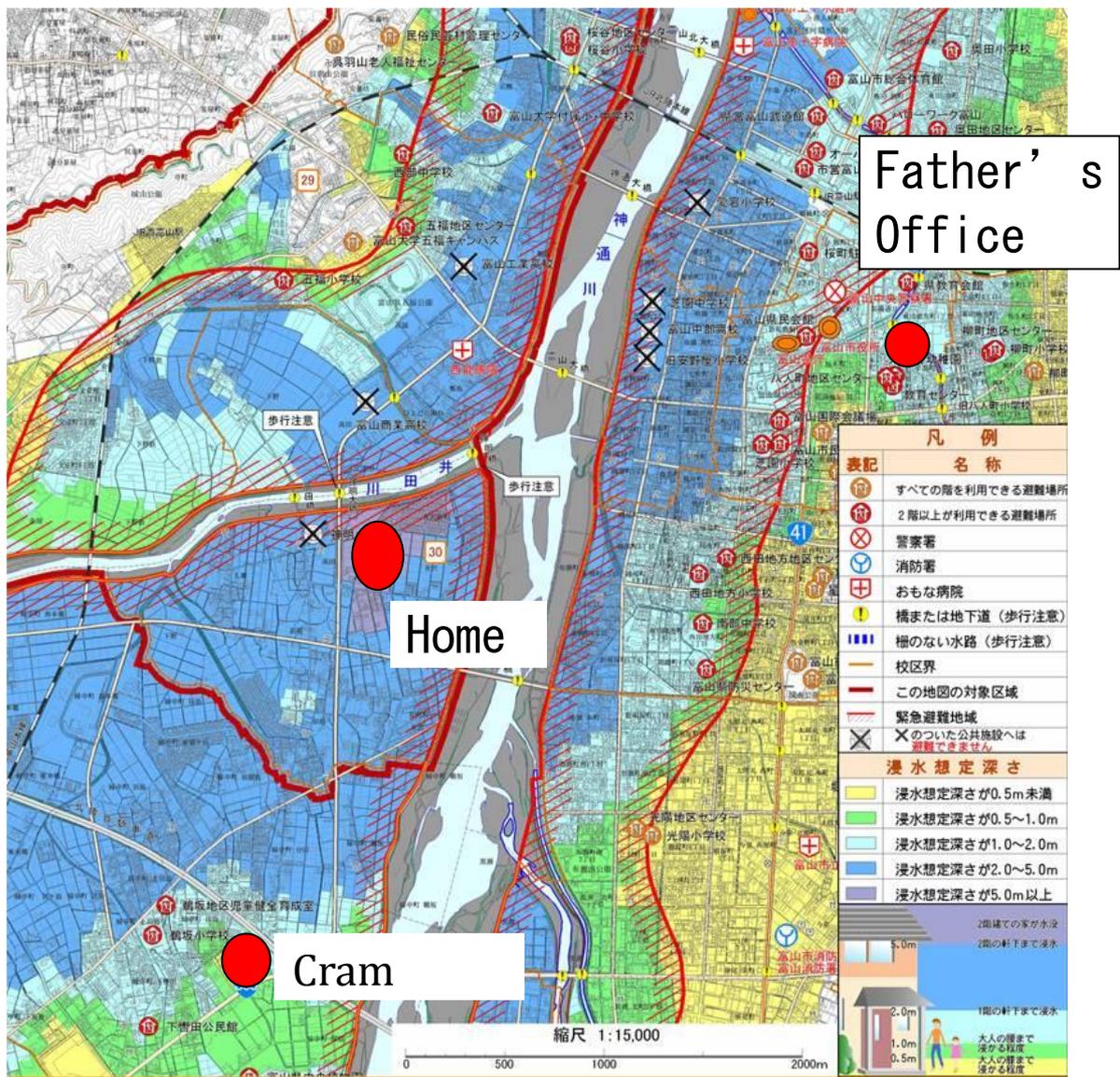


Figure 7.
An example of DIG

Conclusion

Disaster prevention education as part of school safety education aims at the routinization of refuge action. Disaster prevention education in Social Studies is

important to improve knowledge or judgment. Science education, and health and physical education are also important. Furthermore, disaster prevention education in Social Studies facilitates learning of the diversity of the region and of nature's two aspects: one is the blessing of nature, the other is disaster.

Moreover, in disaster prevention education in Social Studies, maps, including hazard maps, is an important element. Therefore, it is important to (1) overlay various maps, (2) read map information and expression maps, and (3) gain geographical views and geographical skills and (4) have a combination of lecture and fieldwork.

I discussed the relation between Social Studies and disaster prevention education. Based on the views on Geography education, we have to develop the lesson materials for disaster education to protect our own lives.

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Biographical statements

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