

Discussion for the review of Red Zones

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INTRODUCTION

Hazard zoning is an important way to reduce sediment disasters. In Japan, the Sediment Disaster Prevention Act, which came into effect in 2000, mandates that prefectures designate areas at risk of sediment disasters (Yellow Zone) and areas where a sediment disaster would completely destroy normal wooden buildings (Red Zone) [MLIT, 2017a)]. As of February 2017, there were 317,124 Red Zones, and investigations to designate these zones are planned to end in 2019 [MLIT, 2017b)]. Currently, a recommendation by the Ministry of Land, Infrastructure, and Transport of Japan proposes that Red Zones should be reviewed when the geological conditions change following an earthquake or when structural changes are undertaken to reduce the risk of the Red Zone. Thus, prefectures will have more frequent opportunities to review Red Zones.

Austria and Switzerland also use a system of hazard zoning as a non-structural measure to prevent natural disasters. We conducted case studies in Austria in 2016 and in Switzerland in 2017 and reviewed the relevant literature. The hazard zoning system in Japan differs from those in these two countries, but we learned much from their systems.

This paper provides a discussion about important topics in a review of Red Zones in Japan.

CASE STUDY

The current hazard mapping system in Austria started in 1975 (as part of a law pertaining to forests) and that in Switzerland started in 1991 (as part of a law pertaining hydraulic engineering and a law pertaining forests). The systems of these two countries started earlier than the system in Japan, and hazard mapping has already been completed in nearly all areas of Austria and Switzerland. Consequently, these two countries provide many examples of reviews of red zones (in this paragraph, we use “red zone” to indicate a zone at high risk of a sediment disaster).

In this research, we discovered various cases of review of red zones. In both countries, reviews were conducted following a catastrophic disaster. In Austria, we were told, for example, that reviews are conducted after hydrological data are updated and after a new simulation method is introduced. In a case in Switzerland, barrier net dams and a concrete dam were built following a severe disaster, and the red zone was subsequently reduced. In Austria, experts reviewed the red zone after structural measures had been undertaken in the basin around the red zone and decided not to change the red zone because the basin was at very high risk of landslide disasters. In another case in Austria, a simulation was used to evaluate the effect of structural measures on the red zone.

One difference between Japan and these European countries is that the red zones in Austria and Switzerland are determined as technical advice from experts. There is no legal definition of a red zone; rather, these zones are regulated in terms of land-use planning. In Japan, the regulation of a Red Zone is defined by law. We got the impression that the opinions of experts account for a large part of the decision-making process in these countries. One reason for this impression was that, in Japan, an equation relating to the force of sediment-related disasters has been noted by a ministerial announcement.

DISCUSSION

In Japan, opportunities for review of Red Zones will increase. Accordingly, we propose two problems for discussion in this paper.

First, we may need to organise our thoughts about a number of potential issues relating to a review of Red Zones. Some examples in this regard would be a step-by-step review in a basin where it would take a lot of time to complete a plan for structural measures and a review of Red Zones pertaining to the frequency of maintenance of structural measures. Additionally, using a system to check the validity of a review, such as a system addressing a designation, would also be useful.

Second, we have to provide residents with information not only by delineating a Yellow Zone but also by other methods. One method for doing this is providing visual information using simulations. We can show the effects of a potential disaster more visibly by using simulations and other methods in addition to demarcating a Yellow Zone, as designated by law. Another method is working with residents to make a hazard map, which is one useful way to collect local information.

CONCLUSIONS

In this paper, we presented two problems for discussion about the process of a Red Zone review in Japan. One pertains to the rules of review, and the other pertains to methods for disseminating information to residents. Additionally, we need to examine the problems in Japan in more depth and provide opportunities to discuss these problems.

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