

Risk information and proposal of a method to examine it for specific purposes of measures to reduce flood damage

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1. The necessity of the information on flood risks for specific purposes of measures

When examining measures to reduce flood damage, it is necessary to examine measures to reduce risks to reduce the onset of damage in case of a heavy rain and flooding that exceed the designed capacities of facilities, in addition to the development of disaster control facilities that are expected to be effective for certain until the level of a disaster reaches the designed capacity. The proper understanding of regional risks is necessary as preparation. It is also necessary to note that there are different factors and flooding scenarios that are closely related to damage, and the risk information to be identified varies depending on the targets to be protected (figure 1).

2. Development of risk analysis method based on an average scenario

The examination of the risk information based on an average flooding scenario (figure 1) requires the implementation of Monte Carlo simulations or other methods to comprehensively extract various types and scales of expected flooding. The precision and reliability of risk information would not necessarily improve for the cost it requires, however, because of the uncertainties that are unavoidable in the expectation of external forces based on limited amount of data. The cost should be as low as possible as the method is going to be used around the nation.

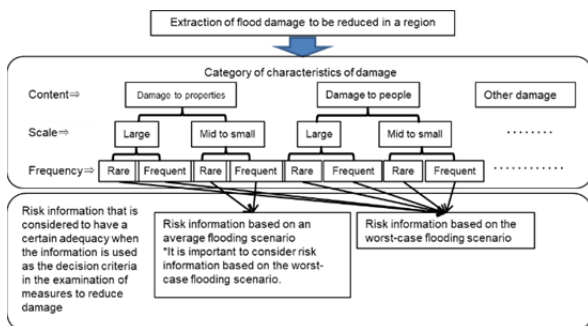


Figure 1: The relationship between targets to be protected and necessary risk information

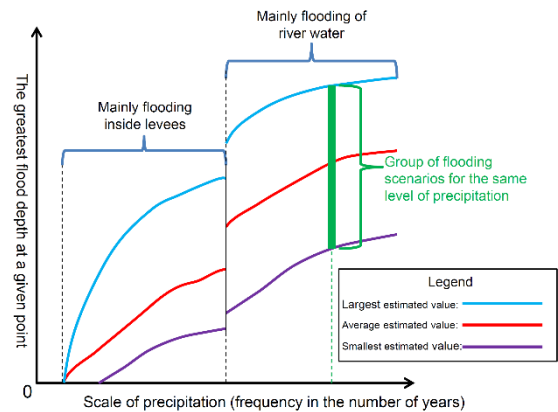


Figure 2: The conceptual diagram of risk information based on the group of flooding risks

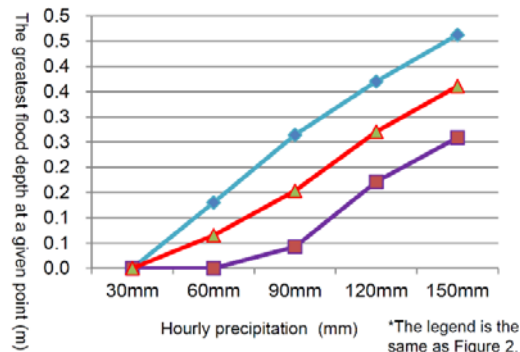


Figure 3: Example of estimating flood depths based on flooding inside levees by the scale of heavy rain

Therefore, the authors developed a method to set up multiple cases (e.g. high tide and low tide) for expected external forces and other conditions (e.g. chronological distribution of precipitation and starting water level in a river), estimate the outline of largest, smallest, and average flooding scenarios, and specify and provide risk information for specific purposes (figure 2). Figure 3 shows the example of estimation in model districts.

3. Future research activities

The authors are going to continue researches on methods to prepare, provide, and use information of flood risks for specific purposes.