

Research Trends and Results

Making Opportunities For Everyone to Evacuate in Case of Approaching Flood

HATTORI Atsushi (Dr. Eng.), Head, YAMAMOTO Yoko, Senior Researcher, YANAGAWA Kazuhiro, Researcher
River Division, River Department

(Key words) Kanto-Tohoku torrential rain, flood risk assessment, evacuation

1. Background

In view of the possibility of unexpected intensification of flood disasters due to climate change and other factors, the NILIM has studied assessment methods for flood risk in the whole basin including floods exceeding the planned scale together with the Water and Disaster Management Bureau, Ministry of Land, Infrastructure, Transport and Tourism ("MLIT"). Then, we experienced the levee break in the Kinugawa River and serious flood damage following the break in the September 2015 Kanto-Tohoku torrential rain.

Effective combination of structural and non-structural measures has already been recognized as valid in active promotion of basin management measures to prepare for floods, but there are almost no cases where such measures took shape. This is partly because no method has been established for actually evaluating the effect of combination of such measures and materializing the plan. Hence, we are attempting to create a map ("risk map") that specifies the locations of houses where evacuation is impossible in case of a flood and reasons thereof in cooperation with Upper Arakawa River Office, Kanto Regional Development Bureau, as an approach for studying combination of specific measures to realize environment that can provide one or more means of evacuation to all the residents of areas with high risk of levee break and consequent flood. With utilization of such tools, we aim to study specifically the effective combination of structural and non-structural measures to be implemented by river administrators and local governments on the site.

2. Outline of risk map

The approach discussed herein is characterized in that various issues to be addressed by regions will be made clear by (i) considering inland flood prior to flood in the river, (ii) indicating the locations of individual houses on the map and specifying the areas of residents who particularly need to evacuate from there due to the relations between inundation depth, building structure, etc., and (iii) following the progress of flood in time series. In the case of the following figure, we specified the locations of individual houses where evacuation was

impossible as well as the factors of impossibility, including the houses (pink points on the Figure) where evacuation was impossible because houses and/or evacuation routes were already inundated by inland flood when evacuation recommendation was issued and the houses (blue points) that were isolated because low-story floors of the shelter were unavailable due to inundation or the shelter was too far. Based on the information of this risk map, it is possible to determine the clarification of areas requiring specific measures and strategies for each area, covering all the areas not provided with measures, including inner water drainage by reinforcing pump facilities for areas with many pink points representing houses where evacuation is impossible due to inundation by inland water and combination of structural measures such as establishment of more shelters for individual houses represented by blue point and non-structural measures such as prior strengthening of promotion of evacuation in large area.

3. Future development

At present, we are attempting what we have studied in the model area and intend to expand applicability to other areas with various characteristics.

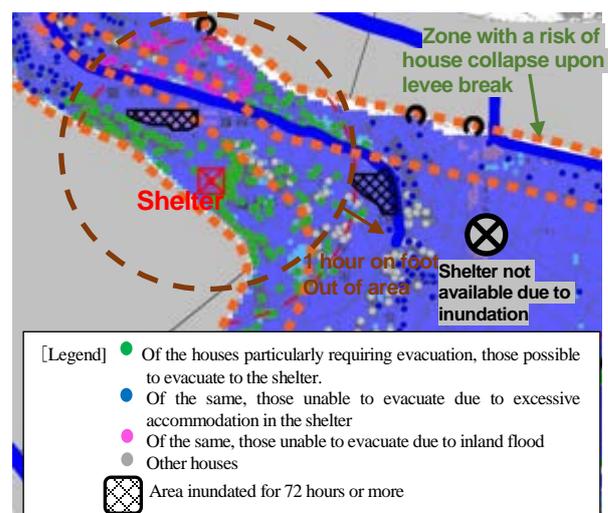


Figure: Risk Map (image)