
Release of Research Report on Climate Change Adaptation Measures in River and Coast Fields

(Research period: FY 2010–2015)

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1. Research Objectives and Background to the Preparation of the Report

Under climate change, the intensification and frequent occurrence of water-related disasters, such as floods and drought, due to the generation of external forces exceeding the planned target levels of rivers and coasts, as well as existing facility improvement levels (such as heavy rain and low rainfall) are a concern. Therefore, we developed a method for translating the climate change forecast results into river planning indicators, a method for assessing the disaster risk in the event of an excessive external force, and a method for expanding the menu of countermeasures for mitigating such water-related disasters. In addition, for the purpose of promoting the realization of climate change adaptation measures by proposing the concept of disaster prevention and reduction management generalizing the above methods, we also conducted project research entitled “Development of basic technology supporting the establishment and selection of measures against large-scale water-related disasters under climate change” from 2010 to 2013. Then, following the IPCC 5th report and the Environment Ministry’s global and regional climate change forecast data were released (2014), we conducted follow-up research based on them to 2015. After summarizing these achievements, we released the final achievement report of the above project research¹ in February 2017. This research was conducted at the Climate Change Adaptation Research Group in which the River Department, Water Quality Control Department, former Environment Department, and former Disaster and Emergency Management Technology Research Center worked together.

2. Major Research Results

(1) Developed a method for translating the climate change forecast results into the influences on the development and management of rivers

Using the rainfall amount forecast data based on four types of climate forecast models of the Meteorological Research Institute, flood flow, inundation risk, and the influence on additional river development efforts required were investigated. As a result, although the rate of increase in rainfall amount was only approximately 1.16 times, the influence on river development efforts was increased 2.87 times, having showed that the adaptation to climate change is an important task. In addition, we also assessed the influence on coast disaster prevention, water resources, and river environments.

(2) Developed a method for assessing the inundation damage risk through exhaustive grasp of inundation damage scenarios

We grasped the relationship between the fulfillment of the functions of flood control facilities in the event of an excessive

external force between the way inundation damage occurs in an exhaustive manner to develop the method for grasping various inundation damage patterns in advance.

(3) Suggested a framework of the examination of disaster reduction management controlling the way damage occurs

Considering excessive external forces exceeding hardware improvement levels, such as levees, dams, and flood control basins, we proposed a framework of examination to realize disaster reduction by selecting and combining various countermeasure menus, including software countermeasures. In short, we suggested the concept for combining countermeasure menus so that the way damage occurs can be controlled to prevent a rapid increase in disasters, after grasping the risks of inundation damage relative to excessive external forces of various levels.

(4) Suggestion and expansion of various countermeasure menus contributing to disaster reduction

We examined effective urban storm drainage measures that included a method for observing torrential rain using X-band MP radar, a sophisticated method for operating a dam using ensemble rainfall forecast information, and disaster reduction technology based on flood control function maintenance and utilization measures. In addition, we also studied the utilization of recycled water as adaptive measures against tight water resources.

3. Toward the Realization of Comprehensive Water Disaster Prevention and Reduction

The disaster reduction efforts against water disaster risks due to heavy rains exceeding facility improvement levels are urgent issues that need to be addressed right now, as well as after tens of years. An important task in the future is to promote concrete examination toward the realization of disaster reduction management at river planning and control sites, setting these achievements as a starting point.

☞ For details, refer to:

1) NILIM Document No.56

<http://www.nilim.go.jp/lab/bcg/siryou/kpr/pm0056.htm>