

# Research Trends and Results

## Empirical Study on B-DASH Project (Inundation Countermeasure Facilities Operation Support System Using ICT)

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### 1. Present situation of urban inundation countermeasures for sewerage

In recent years, heavy rain concentrated on local area in a short time, which is called "localized torrential rain," frequently occurs in many places in Japan. Moreover, as a result of the decrease in forests and farm land, through which rain water penetrates into the ground, due to the progress in urbanization, the amount of rain water that directly flows into sewerage or other drainage facilities has increased, and the risk of flood damage in urban areas is rising due to the concentration of population, assets, etc. due to urbanization. In individual cities, various measures for preventing inundation damage are ongoing or still on the way to development, and particularly for measures based on structural development; prompt action is difficult since they require a lot of cost and time. In urban areas, however, since various facilities including sewerage have been developed to a certain level, it is possible to mitigate damage using them as stock.<sup>1)</sup> For these reasons, information on such facilities and observation results should be accumulated and damage factors should be analyzed, before aiming to reduce damage using existing stock.

### 2. Outline of empirical study

This research is based on empirical study aiming for mitigation of inundation damage through establishment of a system that integrates individual technologies using ICT for the detection, transmission, analysis, and offer of information on precipitation, water level, etc and efficient operation of existing inundation countermeasures, and targets the Enami area, Hiroshima, as empirical field.

The Enami area is located at the mouth of the Ota River, which flows through Hiroshima Prefecture, and is long and thin from north to south. Urbanization is proceeding in the area, especially in the residential zones. On rainy days, rain water is supplied to the area using pumps from the outside (Yokogawa and Yoshijima areas). As topographic characteristics, the ground level is relatively high in the land facing the river and northern and southern land, and is lower than 1.0 m above sea level in other land. Therefore, the area has often suffered inundation due to rainfall. In this research,

rainfall and water level in sewers in the area are measured with 3 ground rain gauges (including existing ones) and 13 water gauges. Also, observation data of XRAIN is used to obtain rainfall information. All these information is collected in real time through the optical fiber cables laid in the area with a total extension of about 4 km and used to provide information on inundation forecast and support of pump operation, etc. (See Figure)

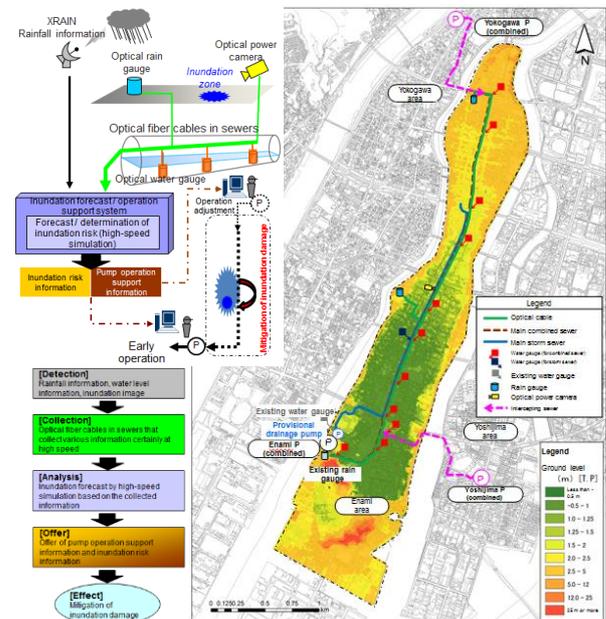


Figure: Outline of Empirical Field and System

### 3. Utilization of empirical study results

At present, the system construction has been completed and data collection and monitoring of have just started. In the future, we verify, with collected data, the effect of damage reduction in the case of utilizing the system's support information. Further, for the technologies used in this research, we are going to prepare a technical guideline based on the obtained results in order to disseminate them widely.

[Reference] 1) Working Committee for Improvement of Urban Inundation Countermeasure Function Utilizing Stock, "New Basic Concept for Improvement of Urban Inundation Countermeasure Function Utilizing Stock," April 2014