International Research (Project No.: 2020W-03)

Project name: Morphological response of river in southern plains of Nepal in the case of sediment disaster
Principal Investigator: Umesh Singh
Affiliation: Hydro Lab
Name of DPRI collaborative researcher: Hiroshi Takebayashi
Research period: JUN 1, 2020 ~ March 31, 2022
Research location: Nepal
Number of participants in the collaborative research: 5 (DPRI staff: 2, non-DPRI staff:3)
- Number of graduate students: (Master students: 0, Doctor students: 0) (Included number)
- Participation role of graduate students [ ]

Implementation status in FY2020

Since it was difficult to visit Nepal and Japan each other due to the covid-19 epidemic in both Nepal and Japan, research meetings were conducted online using zoom. A horizontal two dimensional bed deformation simulation model was developed for analyzing the bed and channel deformation characteristics of the research area. Both bed slope and floodplain width are changed suddenly around the research area, and the channel deformation due to sedimentation are active. In addition, there is a large amount of seepage flow, and channel chokings occur very often. Therefore, we analyzed both the surface flow and the seepage flow at the same time, and made a numerical simulation model that can reproduce the spatiotemporal characteristics of the channels. In addition, since it is necessary to distort the grid shape to express the floodplain width changes, the basic equations written in the general coordinate system was used for the numerical simulation. The research field was located near the Indian border in southern Nepal, and it was the area with the highest number of covid-19 infections in Nepal, so it was difficult for researchers in Nepal to go to the research area. Hence， the planned field survey could not be carried out.

Implementation plan in FY2021

A field survey will be conducted as soon as the infection status by covid-19 in Nepal is improved and researchers in Nepal can go to the field observation site. In addition, when it becomes possible to travel to Nepal, DPRI researchers will also visit the field observation site to hold research meetings and exchange our ideas, and to survey the channel deformation characteristics and bed material size characteristics at the research site. Until the infection status by covid-19 is improved, research meetings and information exchange by zoom will be conducted online.

The channel deformation characteristics of the research area will be reproduced using the horizontal two dimensional bed deformation simulation model developed in 2020, and discuss the risk of flood and sediment disasters on the land around the sudden change area of the bed slope and floodplain width. If the infection status by covid-19 in Nepal does not improve and the field survey becomes difficult, analysis will be performed using DEM data opened on the web. If field surveys are difficult, flume experiments will be conducted to examine the channel deformation characteristics around the sudden change area of the bed slope and floodplain width.