

Research Trends and Results

Grasp of Sediment Movement for Basin Sediment Management after Large-scale Sediment Production

MATSUMOTO Naoki, Researcher
UCHIDA Taro, Senior Researcher
NIWA Satoshi, Guest Research Engineer
KANBARA Junichi, Head
Sabo Planning Division, Sabo Department

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1. Background

Heavy rain or earthquake may cause a large-scale slope failure or simultaneous multiple slope failures, and as a result, a lot of sediment may be supplied to torrents, rivers, etc. (Photo 1). After such a large scale of sediment production, a large amount of sediment discharge is expected to continue for a long term. Thus, several years after sediment production are considered as one of the important periods for advancing comprehensive sediment management. Then, we have been implementing the project research titled "Research on comprehensive sediment management for sediment transport after large-scale sediment production" since 2012 in order to upgrade the basin sediment management. This project research has grasped the sediment movement after large-scale sediment production and evaluated the methods of forecast / evaluation by numerical computation and man-made effects. This report introduces two out of the cases where we grasped the actual condition.



Photo 1. Example of Natural Dam Formed by the 2008 Iwate-Miyagi Nairiku Earthquake.

2. Examination of cases caused by heavy rain or earthquake

We examined the effect on the amount of sediment discharge after large-scale sediment production using the amount of sediment deposit in the erosion control dam in the target basin and the amount of collapsed sediment calculated with the collapsed land area map, etc.

○ Case by heavy rain

Target basin: Kawabe River (upstream basin of Hounoki Sabo Dam in Kuma River System)

Year of disaster: August and September 2004 and September 2005

Characteristics: Sediment deposit in Hounoki Sabo Dam considerably changed in the year of the disaster and the

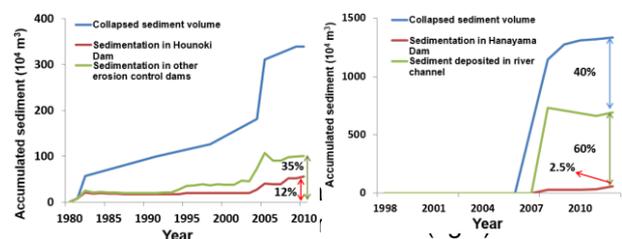
inflow of sediment into the Dam was large for the 5 consecutive years from the disaster. From the sediment balance for 5 years after occurrence of the disaster, it is considered that 12% of the sediment produced deposited in the Hounoki Sabo Dam, 35% reached other sabo (erosion control) dams, and other sediment deposited on river channels and slopes (Photo 1).

○ Case by earthquake

Target basin: Ichihama River (upstream basin of Hanayama Dam in Kitakami River System)

Year of disaster: Iwate-Miyagi Nairiku Earthquake in June 2008

Characteristics: Sediment deposit in the Dam considerably changed in the year of the disaster, up to about 11 times the average value before the Earthquake, but changed little thereafter. This is considered attributable to the deposit of sediment in the natural dam formed in the basin. According to the sediment balance for 5 years after occurrence of the Earthquake, 2.5% of the sediment produced reached the Hanayama Dam and a large amount of sediment accumulated in the basin, and from the topographic survey using a laser profiler, it is considered that 60% of the sediment in the basin deposited on river bed and 40%, on the slopes (Figure 1).



3. Conclusion

From the study on the two cases above, it was found that sediment discharge after large-scale sediment production can be influenced considerably by heavy rain, earthquake, or other causes and by the presence of a natural dam. Accumulation of the results of analysis of such cases and organization of approaches for reflecting them in erosion control plans are expected to contribute to sediment management and crisis management after large-scale sediment production.

[Reference]

1) UCHIDA Taro, NIWA Satoshi, KANBARA Jun-ichi: "Sediment Discharge after Large-scale Sediment Production" Civil Engineering Journal, Vol. 56, No.10, pp. 24-27, 2014