Comprehensive Sediment-related Disaster Prevention Countermeasures in Kagoshima Prefecture

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INTRODUCTION

The geology of Kagoshima Prefecture is primarily covered with problem soils, including shirasu. Since it is located in one of Japan's rainiest areas, it also experiences sediment-related disasters almost every year. For this reason, the prefecture conducts comprehensive sediment control measures from both structural and nonstructural perspectives, including the development of sediment control dams and other facilities, and it provides residents with information on dangerous locations and disaster prevention. This paper explains some of the efforts made by the prefectural government.

OVERVIEW OF KAGOSHIMA PREFECTURE

Kagoshima Prefecture is located on the southern tip of the island of Kyushu. It comprises two large peninsulas (Satsuma and Osumi) as well as many remote islands including Tanegashima, Yakushima, and Amami-Oshima. It is vast in size, measuring about 272 km from east to west and about 590 km from north to south.The prefecture extends across temperate and subtropical climate zones, resulting in complex and varied weather and a high level of precipitation. In terms of geology, more than half of mainland Kagoshima is covered in volcanic deposits such as shirasu soil, which erodes easily. Therefore, the prefecture is subject to concentrated torrential rains and typhoons, leading to massive sediment-related disasters and damages caused by slope failures and debris flows almost every year. For the past 10 years, about 8% of the total number of sediment-related disasters in Japan occurred in Kagoshima (**Tab. 1**).

Tab. 1 Total number of sediment-related disasters occurred for the past

Year		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average
Kagoshima Prefecture	Debris flow	6	3	0	36	30	9	1	14	13	49	16
	Landslide	1	3	1	6	3	1	0	3	2	0	2
	Slope failure	86	55	7	124	70	86	27	36	66	81	64
	Total	**93**	**61**	**8**	**166**	**103**	**96**	**28**	**53**	**81**	**130**	**82**
National total		966	695	1,058	1,128	1,422	837	941	1,184	788	1,492	1,051

SEDIMENT-RELATED DASTER PREVENTION COUNTERMEASURE POLICY IN KAGOSHIMA PREFECTURE

In Kagoshima, where sediment-related disasters occur frequently, one of the biggest challenges the prefectural government faces is the preservation of prefectural land and of the lives and property of the people of Kagoshima so as to build a safe and prosperous place for everyone to live. In order to prevent sediment-related disasters and reduce its damages, the prefecture has introduced a comprehensive, two-pronged approach using structural measures, such as the construction of sediment control dams, and non-structural measures, such as warning and evacuation systems. It

also provides residents with information on disaster prevention and areas prone to sediment-related disasters.

SEDIMENT-RELATED DISASTER WARNING INFORMATION

When the risk of sediment-related disasters increases due to prolonged heavy rainfall, the Kagoshima prefectural government and the Kagoshima Local Meteorological Observatory issue joint warnings by municipal unit. They help each municipality make suitable decisions about disaster management activities and issuance of evacuation advisories. Such early warnings help residents decide for themselves whether to evacuate and seek refuge. In September 2005, Kagoshima became the first prefecture in Japan to implement a sediment-related disaster warning information system. As of 2016 (about 12 years since its implementation), 114 warnings have been issued, while 60 of which correlated with actual sediment-related disasters.

Photo 1 Example of sediment control dam to catch debris flow and driftwood (Kirishima City, Kagoshima Prefecture)

SEDIMENT-RELATED DISASTER ALERT ZONE

Based on the Sediment-related Disasters Prevention Act enforced in 2001, Kagoshima has been working to identify sediment-related disaster alert zones in the prefecture, and implementing non-structural measures such as disseminating information on the potential dangers in these areas and maintaining the early warning system, so as to reduce the loss of lives from sediment-related disasters.As of the end of March 2017, the prefecture has officially identified 17,341 areas in 36 out of the 43 municipalities of Kagoshima Prefecture as sediment-related disaster alert zones. The prefecture will continue to work with individual municipalities in future.

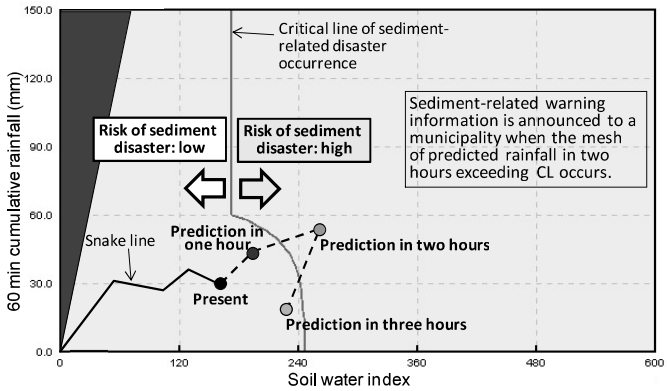

Fig.1 Standard procedure for the issuance of sediment-related disaster warning information in Kagoshima Prefecture

CONCLUSIONS

Kagoshima Prefecture has suffered a number of sediment-related disasters. In order to prevent such disasters and mitigate damages, it is necessary for the administration as well as residents and voluntary disaster prevention organizations to understand their respective roles and cooperate in sediment-related disaster prevention measures with a positive attitude about sediment-related disaster preparedness.In this respect, the prefecture is required to continue its comprehensive sediment- related disaster measures from both structural and non-structural perspectives, with the cooperation of the people and the administration, in order to achieve a safe and secure prefecture.

Keywords: comprehensive sediment-related disaster measures, sediment-related disaster warning information, sediment-related disaster alert zone