

Land-use change and flood disaster of semimountainous region -A case of Taketa City, Japan-

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1. Preface

A huge tsunami due to the East Japan Great Earthquake that had occurred in March, 2011 caused the great deal of harm in Japan also even in the region by taking precautions against tsunami such as breakwaters. In the history, Japan has experienced not only the large earthquake, but also repeating the flood and the sediment disaster by the heavy rain from the seasonal rain front and the typhoon. The authors considered Taketa City, Oita Prefecture, where the four times of heavy rain within 30 years was experienced, the flood and the sediment disaster occurred in every case and the human suffering, the house destruction, and the farmland damage occurred. Taketa City is almost located on the central part on Kyushu Island, and it has the characteristic of a typical semimountainous area of Japan in the point that the population decreases and the aging of the population has progressed. The purpose of the present study considers the flood situation, a geographical features condition and the relation to the land use change as a case of the flood damage that occurred in the Taketa City in July, 2012.

2. Flood damage in Taketa City from the Northern Kyushu Downpour Disaster in July, 2012

The Northern Kyushu Downpour between 3rd and 14th of July, 2012 was a natural disaster that the slope failure and the river flood generate by the seasonal rain front activated on the northern part of Kyushu Island including Oita Prefecture. Taketa City received the big flood damage again by the Northern Kyushu Downpour in July, 2012. The total amount of rainfall was not large, but the rainfall of 30-40 millimeters per one hour continued from 3 to 9 o'clock on the 12th. The water level of the Inaba River and the Tamarai River rose rapidly in only about six hours because there was a large amount of precipitation that reached 250 millimeters.

There was fortunately no overflow in Inaba River though the water level rose to the very limit top of the embankment in the Inaba River where the dam had been completed in the previous year. However, the flood occurred in several places in the Tamarai River around Haidabaru Area. The water level rose from the top of the embankment to 2.5 meters in the Haidabaru Area. Driftwood by the slope failures in the upper stream of Tamarai River that hung to the bridge in the downstream in addition to the overflow by the water rising promoted the overflow.

3. The flood damage and land use change in several decades in Taketa City

Recently, the residential house, the commercial establishment, and communal facilities tend to be located in the flat plain of the river valley though it was a valuable agricultural area in a rice field and a dry field in the Taketa City since the latter half of the twentieth century. On the other hand, the land use change of afforestation on the farmland in the mountainous region is also general due to shortage of person in charge of agriculture by the population decrease and the aging of the population. It is understood that the land use and the social change connected with the factor and the background of the flood damage confirmed in Chapter 2 are progressing in Taketa City.

It is difficult to induce an existing land use such as residential house move enough to preferable use by the viewpoint of the disaster prevention in the present legal system of Japan. The flatland that is appropriate for the urban land use is very little in the hilly, mountainous area that the present study considers. The discussion of the ideal way of the land use in the river valley plain that becomes basic of the citizen's life is expected to be advanced as a base of the improvement of citizens' disaster awareness to achieve the disaster prevention and mitigation in the future in Taketa City.

Keywords: Semimountainous region, Flooded area, Urban development, Population decrease