

Challenge to post-disaster recovery and reconstruction from sediment generated by the Great Floods on Kii peninsula

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INTRODUCTION

The Great Floods in Kii Peninsula brought by Typhoon Talas in 2011 caused great damage throughout southern Nara Prefecture, including Totsukawa Village (**Fig. 1**), through deep-seated landslides. As many as 30 of the 54 deep-seated landslides occurred in Totsukawa Village, where 15 persons were also killed or injured, and 62 residences were destroyed. The damage was so severe that Totsukawa Village was designated as a Warning Zone through the Disaster Countermeasures Basic Act as a result of river-course blockages caused by these deep-seated landslides.

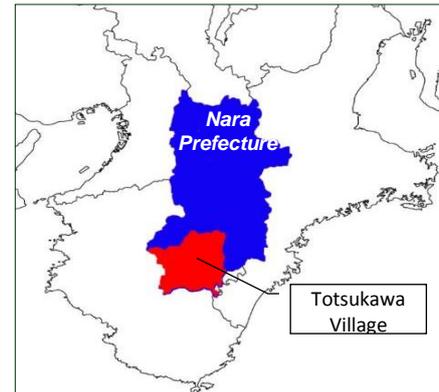


Fig. 1 Location of Totsukawa Village

This paper reports the characteristics of this large-scale sediment-related disaster and measures taken for future disaster risk reduction (DRR) and disaster risk management (DRM).

OUTLINE OF GREAT FLOODS OF KII PENINSULA

1. Characteristics of incidents resulting in casualties

Incidents resulting in casualties occurred at 3 locations in this disaster. What should be pointed out is that two instances occurred at the evacuation points for residents from the other areas, and the locations at which they occurred were not considered to be dangerous.

2. Collapse of roads and isolation

There is no other means of transportation than the use of roads in the village. Route 168, which is the main road in the village, was cut off by accumulated sediment in Nagatono, which is the gateway to the north, and the road shoulder was eroded, cutting off traffic in Kuwahata, which is the gateway to the south. The village was left in isolation.

3. Information disruption

In mountainous areas such as Totsukawa Village, most of the lifelines, such as communication facilities including electricity, telephone, cable TV and optical cable, and water supply, were set up underground or on poles. (Fig. 4)

Residents were able to receive and send information through a wireless station for disaster prevention provided by the public office. However, they were no longer able to communicate either with the public office or outside of the village; nor were they able to receive any information, because these lifelines were disrupted in many places along with the collapse of the roads.

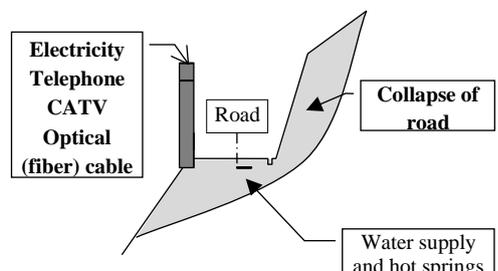


Fig. 2 Lifeline diagram in the mountainous area

As a result of the collapse of the lifeline roads including the main road, staff members of the public office, who are supposed to assemble at the Disaster Management Headquarters, were interrupted in doing so. This resulted in only 60 % of the total staff members being available, including staff for emergency response at the beginning of the disaster.

RESTORATION PLAN INITIATED BY TOTSUKAWA VILLAGE AND ITS PROGRESS

The restoration plan is a 10 year plan divided into the three stages of short-term, medium-term and long-term, viewing the picture of the village 100 years from now. The plan was established based on the idea of self-help, mutual-help and public-help with the principle of “helping each other and cherishing the pride of community”.

- Forestry resurrection by utilizing the forest covering 96 % of the village
- Temporary housing using wood produced in the village

FUTURE CHALLENGES

1. Triune development of mountains, rivers and roads

the triune development of mountains, rivers and roads is needed for the countermeasures to hillside collapse, and for road maintenance and sediment control on the rivers. Even if roads are rebuilt in a hurry, but the countermeasures against hillside collapse are not developed, the new roads would be damaged again.

Even if the sediment in the rivers is removed, new sediment would flow into the rivers again without countermeasures to hillside collapse. Implementing these all together is believed to be crucial.

2. Rise of the riverbed, and sediment disposal

Challenges to be considered in the triune development of mountains, rivers and roads in the future would be the control of the sediment already generated, and to be generated in the future. Accumulated sediment caused damage on any occasions it could find. There is the collapsed Oritachi Bridge on Route 168, and Otsuro Bridge on the village road, which did not collapse but caught a mass of driftwood and shook and swayed. It was caused by a large amount of river water at the time, but may have been also caused by the rise of the riverbeds.

CONCLUSIONS

Japan has been suffering from extensive damage by heavy rain and earthquakes, and it is important to understand and practice mutualism with nature in order for us to continue to live in this country. Harm to humans from flood, for example, may be avoided by early evacuation, in consideration of old lore and its scientific background. It is life to protect, and everybody should be keenly aware that you must try to defend yourself.

Keywords: large-scale sediment disasters, Disaster Imagination Game (DIG), disaster risk management