

**RESEARCH OF THE IDEAL METHOD OF PROVIDED EVACUATION
INFORMATION TO URBAN RIVERBANK RESIDENTS' AT THE TIME OF LOCAL
GUERRILLA HEAVY RAIN
- CONSIDERING THE ASANOAWA RIVER FLOOD OF KANZAWA CITY-**

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1. Introduction:

Natural disaster, such as flood, hurricane, earthquake, is inevitable even though there are advanced technologies. It can cause disease, scarcity, injury, damage of infrastructure, accommodation loss, or even worse, loss of life. Therefore, evacuation information plan is very important to mitigate the effect of an emergency or disaster on a community. However, the ideal method of provided evacuation information is a very complex problem involving many behavioral and management facets.

2. Purpose of the study:

These days a large amount of local torrential rain (that is called a guerrilla heavy rain) has been observed in some localized area of Japan. Many people are caught unprepared for the power and speed of a flash flood, which results in dangerous situations. This destroys lives and things badly.

This research intend to study about a ideal method of provided evacuation information to the riverbank residents' for saving lives and things more effectively at the time of local guerrilla heavy rain. The object of the study is the questionnaire survey regarding the Asanogawa flood disaster.

3. Methodology of the study:

To achieve the purpose, this research will be followed by a questionnaire survey method using simple statistical analysis. As a method of study, the flow is as below-

- Collect and understand the questionnaire survey data of Asanogawa River
- Analysis the survey data
- Define the result of the study and think about more effective method of providing evacuation information to the riverbank residents' considering the Asanogawa River of Kanazawa

4. Increasing Frequency of Heavy Rains in Japan

In Japan, the trend of increasing frequency of heavy rain is expected to continue. Both hourly and daily rainfall tends to increase. As a result, sometimes these lead to a flash flood in the localities like Asanogawa river bank residents of Kanazawa city. In figure 1, it shows the annual frequency of 100mm/hour or more precipitation events in Japan that is observed per 1000 localities.

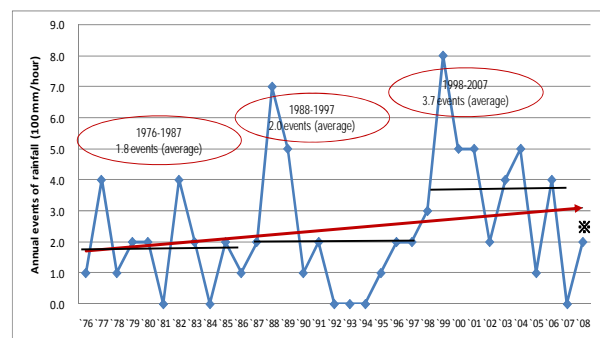


Figure 1 shows the annual frequency of 100 mm/hour or more precipitation events (per 1,000 localities) in Japan

5. Questionnaire survey of Asanogawa River flood disaster

It had been taken a questionnaire survey among the resident living around the Asanogawa River from our laboratory. The survey was performed regarding the flood disaster that occurred on 28th of July, 2008. The method of collecting information was postal survey

Table1: Distribution and collection of questionnaire

Number of the zone or area	12
Population size	86,570
Number of the households	35,421
Number of the households sampled	9,750
Number of the respondents	1,970
Response rate	20%

6. Inundation situation in the comparison of basins

Here, in the table 2, shows the Asanogawa River basins, Kanazawa city abandonment area district, households and the inundation situation of these districts on the disaster day. The middle and upper basin has been more affected than lower basin of Asanogawa River.

Table 2: Asano basins, districts, households and damage

Basin	The district name	Number of the households	Inundation/Damage
Upper basin	Yuwaku	462	Above the floor or the floor bottom
	Zaimokucho	2,822	partly
Middle basin	Baba	1,508	Above the floor or the floor bottom
	Meisei	2,974	Above the floor or the floor bottom
	Kousaka	4,376	Partly
	Moriyamamach	3,606	Partly
	Asanomachi	2,820	Above the floor or the floor bottom
	Moroemachi	6,523	Partly
Lower basin	Asanogawa	1,769	Partly
	Oura	2,756	Partly

7. Evacuation information method and the response rate

Here in the figure 2, it is shown the response rate of evacuation information acquisition from different sources at the time of flood disaster. It describes the overall situation of getting information of evacuation preparations, evacuation advices and evacuation directives.

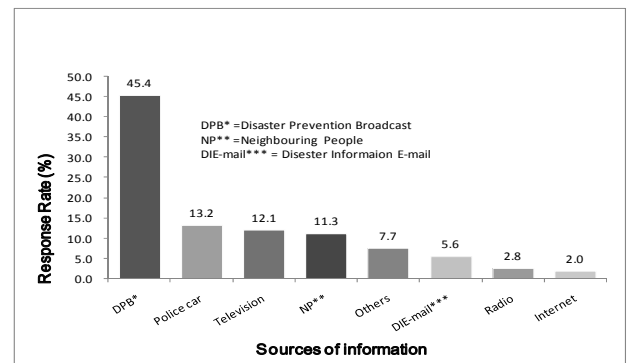


Figure 2: Rate of different sources of information acquisition n=1000

8. Evacuation Presence in response to evacuation preparation information

In the figure 3, it becomes clear to us that the percentage of the people those take evacuation is very low. It is also observed that a large number of people did not take evacuation though they were informed about the evacuation preparation.

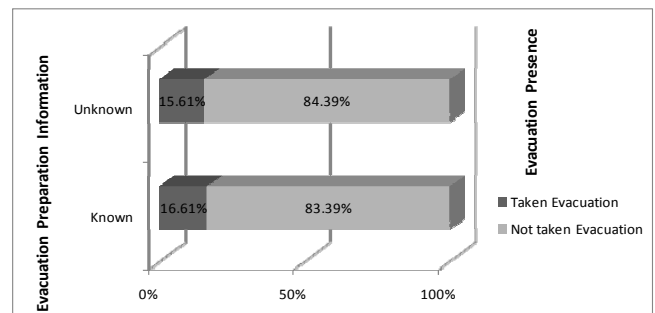


Figure3: Evacuation presence in acknowledged of information n=1357

9. Conclusion and future plan

The future plan of this research is: a) more statistical analysis of survey data of Asanogawa flood disaster. b) study the existing evacuation information plan for urban riverbank residents of different cities of Japan.

References: 1) Makoto TAKESHIMA, Hideo TAMURA: River Disaster Prevention, International Association of Traffic and Safety Sciences Review, Vol.32, no.2, pp. 51-57, 2007. 2) Ministry of Land, Infrastructure, Transport and Tourism, Japan: Flood damage mitigation efforts in Japan, Fifth US-Japan Conference on Flood Control and Water Resources Management, January 2009. 3) Ministry of Land, Infrastructure, Transport and Tourism, Japan: The Flood Report, 2008.