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Risk Sharing in Practice towards Integrated Flood Management

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Introduction Construct of Flood Risk Risk Sharing under Integrated Flood Management Flood Management in Rokkakugawa **River** basin **Residual Risk and Materialized Risk** Cocluding Remarks

Floods

Settling on floodplains has enormous advantages and at the same time poses great risks, also new challenges of flood management, such as:

Increasing Flood Risks Climate change uncertainity Absolute safety against floods is a myth Growing environmental concerns

Integrated Flood Management

- > Flood Management in the context of Integrated Water Resources Management, aiming at:
 - Sustainable development: balancing development needs and flood risks
 - Maximising net benefits from floodplains: ensure livelihood security and poverty alleviation thereby reducing vulnerability
 - Minimising loss of life: in particular through end-to-end FF&W Systems and preparedness planning for extreme events
 - Environmental preservation: ecosystem health & services

Flood Risk Management





Lowland-Saga Plain





Characteristics of Saga Plain



-Low and Flat Plain under Ariake Sea (maximum 6 m tidal difference)

Frequent Sedimentation and vegetation



After 1 year on 11 November 1998

vegetation

Rokkakugawa R. in July 1990

Daily Precipitation 320mm Inundation Area 10, 430ha Above floors 3, 028 Below Floors 5, 658

Rokkakugawa R. in July 2009



Precipitation Trend in Saga Plain

1974-1993 1.71 times/year ↓ 1989-2008 2.24 times/year (Kasegawa R.)

1955-1974 2.00 times/year ↓ 1989- 2008 2.65 times/year (Ushizugawa R.)



Events over 30mm hourly precipitation

Expenditure in Rokkakugawa River Basin



Facilities in Rokkakugawa RIver Basin



Potential Annual Losses for each Flood Probability in Rokkakugawa River Basin



CCTV (Closed-circuit Television) Monitoring



Observation Points



Facilities near vulnerable area



Tentative marking



Clear marking observed through CCTV

Disaster Drill – DIG method (disaster imagination game)

30 organizations participation on 11 November 2010

XDIG method is one of the drilling methods in room without any scenarios. Each participant is expect to consider;

- What kind of information are immediately required?
- What kind of actions are immediately necessary?
- How to establish the collaboration with many players?



Reducing Residual Risks

Self-help

Resident's sheltering action

Mutual aid

Local flood prevention activities

Public support

Government's information





Aims of the Development of a Disaster-Prevention Community at the Takeo Office of River

Voluntary Disaster Prevention Organizations — Personal Disaster Prevention Map

Past disaster areas map

For awareness-raising among the residents

"Personal Disaster Prevention Map" For disaster prevention awareness sharing by the residents





Ubiquitous Flood Hazard Maps start in spring 2011

Takahashi, Takeo city on 13 March ~Expected flood level appears first!!~



Tachibana, Takeo city on 6 April ~Expected flood level appears.~

Shuku, Imari city on 22 March ~Recorded flood level in 2006~





Questionnaire Survey after 2009 Flood

	Town A	Town B		
Number of respondents	267	541		
Evacuation rate during 2009 flooding	35%	5%		
Diffusion rate of evacuation advisory	89%	76%		
Way of receiving the evacuation advisory information	Radio 35%, Neighbor 41% Email 4%, TV, radio 12% Other 8%	Radio 61%, Neighbor 11% Email 4%, TV, radio 16% Other 8%		
Thresholds of evacuation decision to persons who evacuated	Own judgment 28% Actual flooding 12% Neighbors' advice 45% Evacuating neighbors 4% Compare to the past floods 11%	Own judgment 34% Actual flooding 34% Neighbors' advice 20% Evacuating neighbors 10% Compare to the past floods 3%		

Consideration of people's awareness of disaster prevention through workshops



Town A (high evacuation rate)

A sense of crisis about floods caused by streams coming from the mountains



Town B (low evacuation rate)

 A sense of crisis about inundation within a levee

Differences in the sense of crisis between the two towns caused by the difference in local characteristics

Differences in the transmission of an evacuation advisory
Differences in sharing information within the community
Differences in evacuation activities

The results of the questionnaire survey has shown these differences.

Considering the local characteristics and developing the non-physical infrastructure for each community



The importance of communication is proven by the questionnaire survey results.

Voluntary Disaster Prevention Organizations — Establishment of the System

 Using the "Manual for voluntary disaster prevention organizations" published by Saga

[Rules for the Katajiro district voluntary disaster prevention organization]

Preventing and mitigating damage from disasters by conducting voluntary disaster prevention activities through a spirit of cooperation among the residents

• Stipulating that a <u>disaster prevention plan</u> and a <u>diagram of a disaster</u> <u>prevention system</u> should be prepared

○ Disaster prevention plan

Specifying the necessary matters for the activities of the voluntary disaster prevention organization

- (1) Setting up the disaster headquarters,
- (2) Implementing disaster drills, and
- (3) Disseminating information on disaster prevention

Voluntary Disaster Prevention Organizations — Diagram of a Disaster Prevention System



Voluntary Disaster Prevention Organizations — Disaster Facilities Improvement Activities

Setting up disaster prevention equipment (Improving the safe and secure stations)



Stored disaster prevention equipment



Chain saws Searchlights Helmets Double ladder Armbands etc. 15 goods

Placing water level measurement poles (four places along Route 498)





Voluntary Disaster Prevention Organizations — Advantages of establishing an organization

Emergency drill (2008)



Ex. Actual Flood on July 26, 2009

O Flooding record

Date			Nīstas				
Time	- 9:00		11:00	13:00	15:00	17:00	Notes
Precipitation in Yahazu (mm)		101	44	26			Total:171 mm
Water level (T. Pm)	River water	6.14	7.05	7.56	7.17	6.80	Maximum: 7.58 mm
	Rainfall	5.69	6.25	6.72	6.90	6.82	Maximum: 6.92 mm
Flooded roads	City roads	Katajiro-Hanashima l	Pood closed				
				Former prefectural road (0.55m)			Koad closed
	National road		Route 498 (Maximu	498 (Maximum depth of inundation: 0.9 m)			
	Above the floor	-	Three households started to be inundated below the floor.	3 households (30cm-15cm)			(Evacuation) 4 persons (community center)
Inundated houses	Below the floor	-	-	3 households (35 cm-5 cm)			4 persons (neighboring houses)
	Evacuation			8 persons from 2 households			
Inundated warehouses, etc.			10 buildings (55cm-1				
Operation of a drainage Operation: From pumping station		Operation: From 7:20) to $00:30$ of the next of				
Activities of the voluntary disaster prevention organization							

Further Approaches for appropriate risk sharing (image)

How to create an appropriate « incentive » for reducing residual risks?

- Visualizing current residual risks in each community and understanding their vulnerability
- Visualizing residual risk reduction in accordance with participation for actions like voluntary disaster prevention organization, mapping, drills, floodproofing
- Insurance or alternative mechanisms for risk trasfer

Concluding remarks

Floodplains provide: Excellent livelihood opportunitis, and ■ Flood risks Risk sharing is one the one of the risk management aspects Actual case in Saga Plain, Japan indicates the potential flood risk has been eliminated through risk reduction projects & activities and communities' participation such as,

- Mapping,
- Drilling, and

■ Voluntary disaster organizations, etc.

Thank you for your attention!

http://www.qsr.mit.go.p/takeo/html/eng.html