

Designing a Next Step - Integration and Coordination -

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Recurrent Water-related Disasters in Japan

Events and Countermeasures

Oct., 2013

Izu Ōshima Island (Sediment)

- 824mm/24hrs (Typhoon)
- Human Loss: 39
- *evacuation warning*

Aug., 2014

Hiroshima City (Sediment)

- 121mm/hr (Typhoon, Frontal Line)
- Human Loss: 74
- *evacuation warning, land use*

Sep., 2015

Kanto & Tohoku (Bank Breach)

- 551mm/24hrs (Typhoons)
- Human Loss: 8
- *evacuated by helicopter: 1339 and by boat: 2919*

Aug., 2016

Hokkaido & Tohoku (Bank Breach and Sediment)

- 251mm/72hrs (Typhoons)
- Human Loss: 27
- *evacuation of physical handicaps*
- *local socio-economic impact*

June, 2017

Northern Kyushu (Sediment)

- 299mm/6hrs (Frontal Line)
- Human Loss: 42
- *sediment and flood complex*



Nov., 2014

Amendment: Sediment Disasters Prevention Act

Jan., 2015:

Policy Vision: Disaster Prevention and Mitigation against a New Stage

May, 2015

Amendment: Flood Risk Management Act

- Probable Maximum Rainfall for Life-Saving

Dec., 2015

Policy Vision: Rebuilding Flood-Conscious Societies: Class A Rivers

- Raising public awareness
- Structural measures for crisis management

Jan., 2017

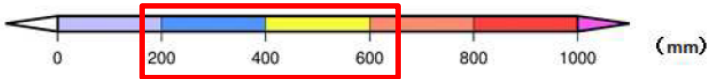
Policy Vision: Rebuilding Flood-Conscious Societies: Class B Rivers

- Life-saving of physical handicaps
- Local socio-economical continuity

May, 2017

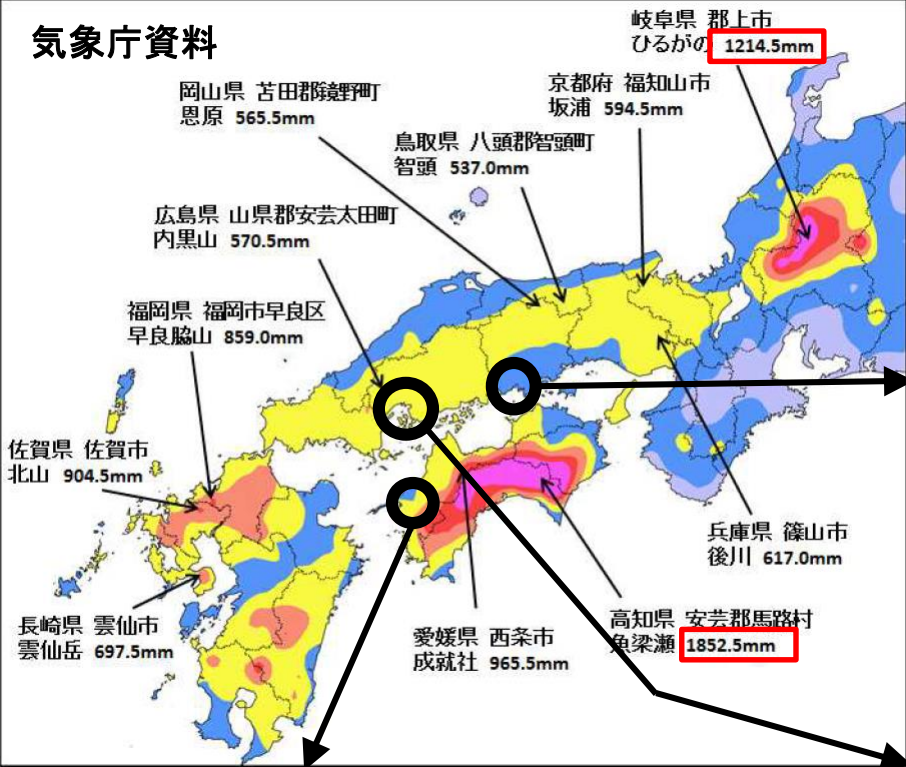
Amendment: River Act

- Joint Stakeholder Committee for FRR
- Evacuation planning and drilling for handicap-accessible facilities
- Recovery by the national government



Maximum 48hrs Rainfall from June 28th to July 8th (JMA)

気象庁資料



Western Japan Floods 2018

Okayama Pref.

Flood Levee Breach

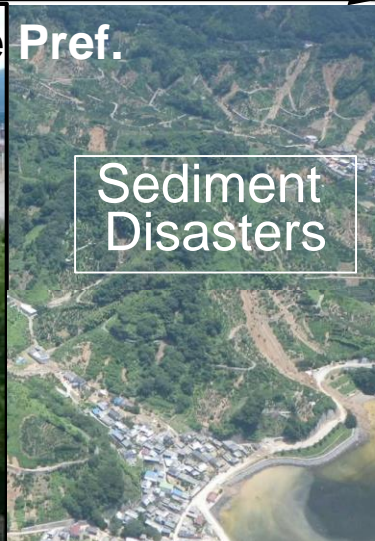


Ehime Pref.

Sediment Disasters

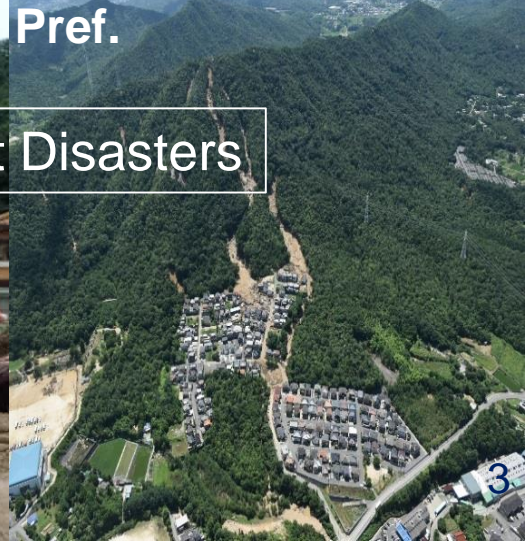


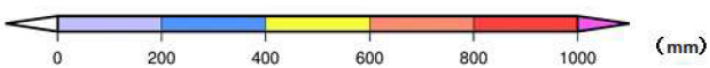
Overflow & Inundation



Hiroshima Pref.

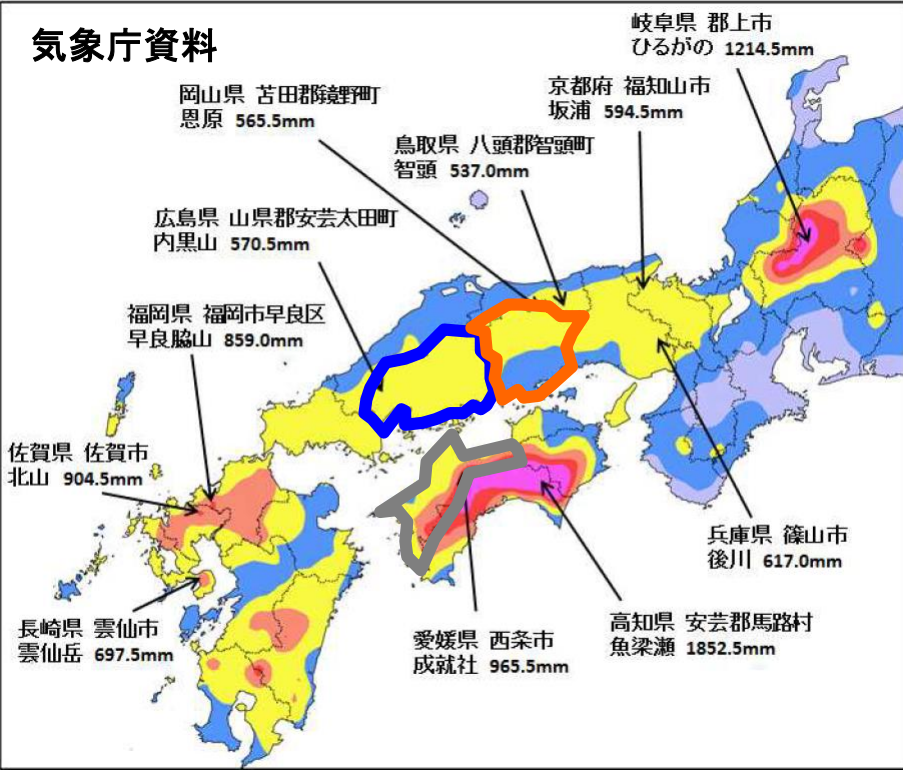
Sediment Disasters





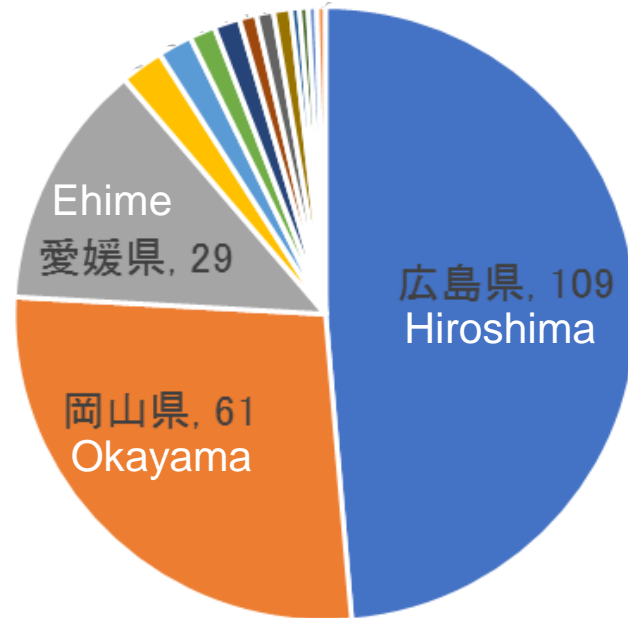
Maximum 48hrs Rainfall from June 28th to July 8th (JMA)

気象庁資料



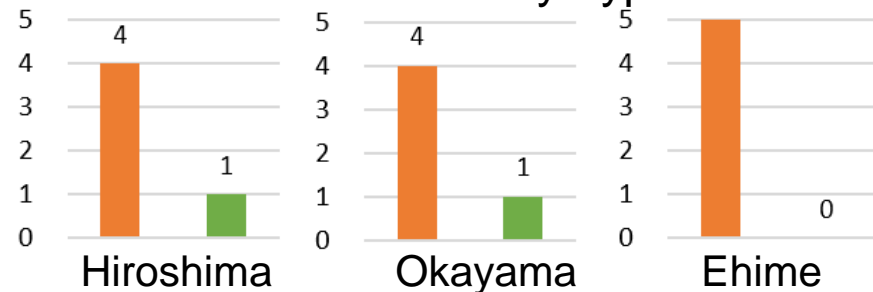
Western Japan Floods 2018

Mortality: 224
(the worst case after 1982)

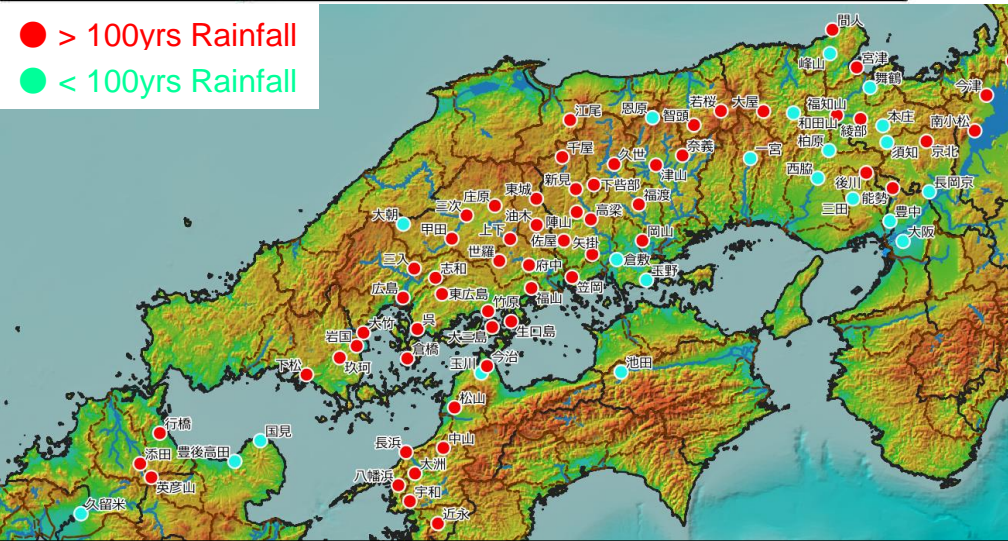


by courtesy Dr. M. Ohara, ICHARM

Major River of each Prefecture
Maximum Flood by Typhoon



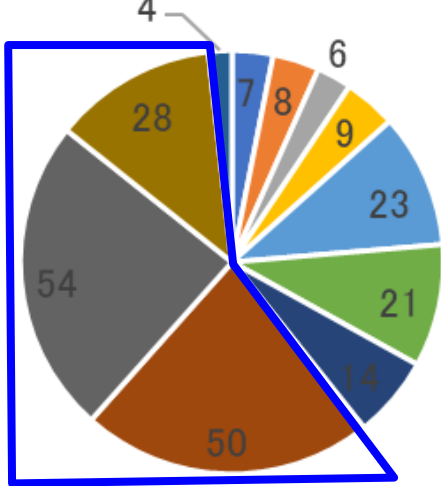
Top 5 Floods by Typhoons and Frontal Activities.



Recurrent Water-related Disasters in Japan

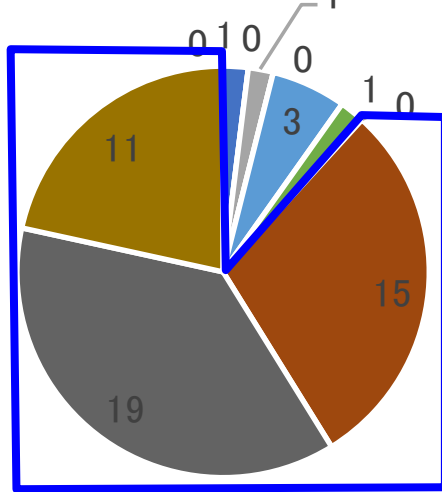
Changing Society

Nation-wide (224)



58.9% ≥ 65

Mabi (51)



88.2% ≥ 65

- 0-9
- 10-19
- 20-29
- 30-39
- 40-49
- 50-59
- 60-64
- 65-74
- 74-85
- >85
- unknown

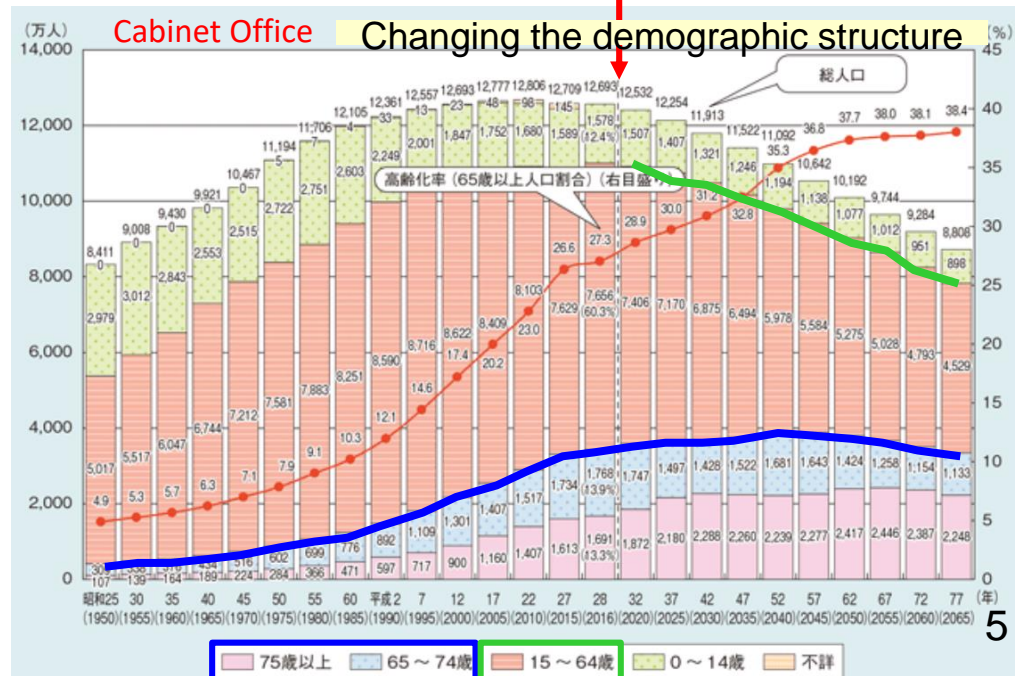
by courtesy Dr. M. Ohara, ICHARM



now

Rapid Aging:

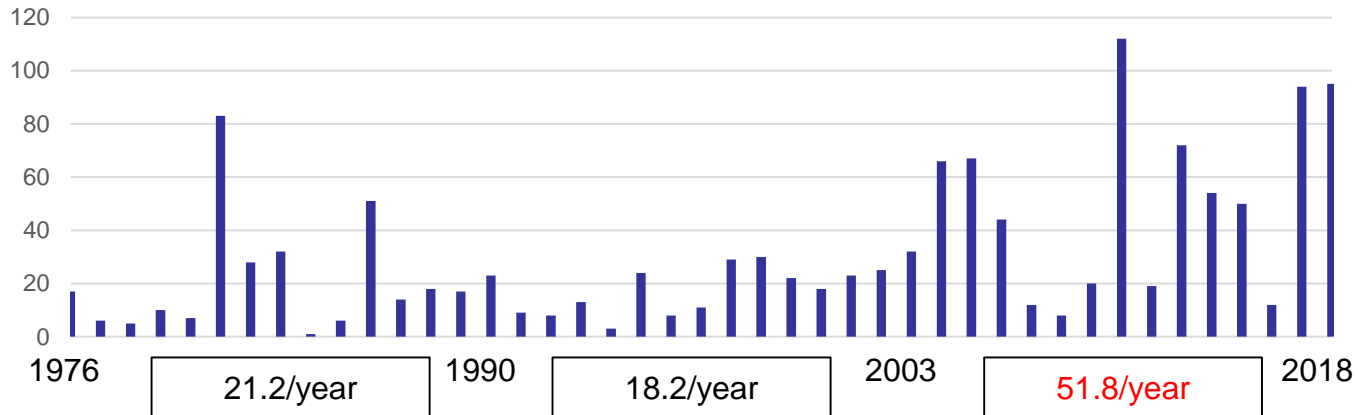
- increase of the percentage of those who should be supported.
- decrease of the percentage of those who can support.



Recurrent Water-related Disasters in Japan

Changing Hazards

Number of rain gauge stations where the historical maximum 24hrs rainfall were updated in each year.

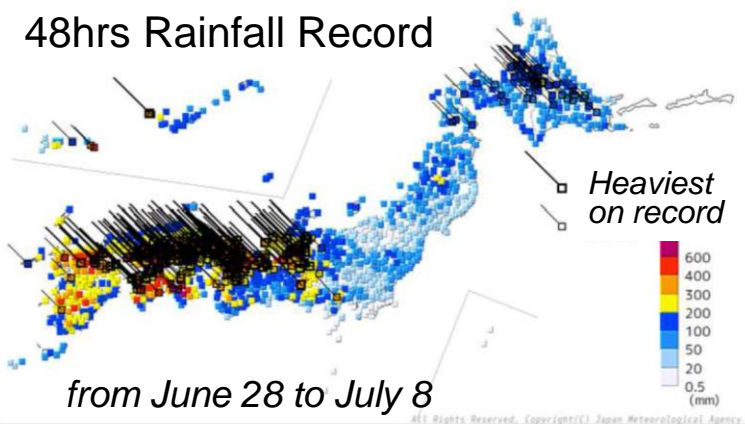


Torrential heavy rainfall happens everywhere more frequently. No exceptions. The areas where have not experienced heavy rainfall are likely to be seriously damaged.

The June 2018 floods raised two new issues:

- 1) Simultaneous events in the wider area.
- 2) Longer duration.

48hrs Rainfall Record



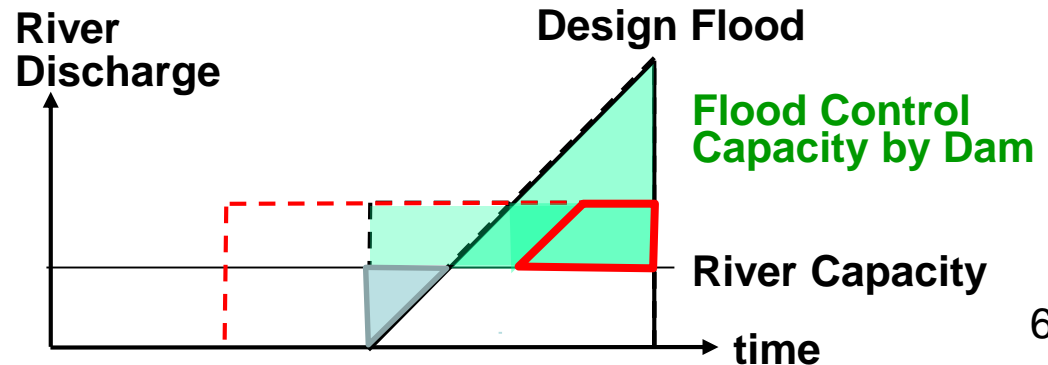
River Discharge

Design Flood

Flood Control Capacity by Dam

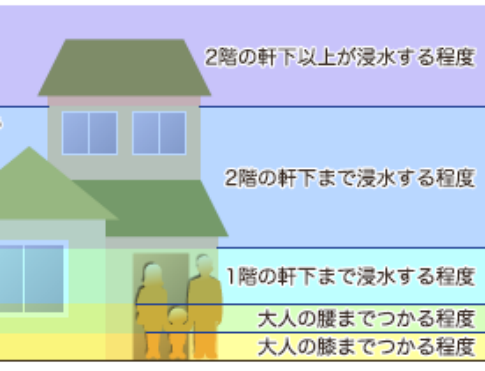
River Capacity

time

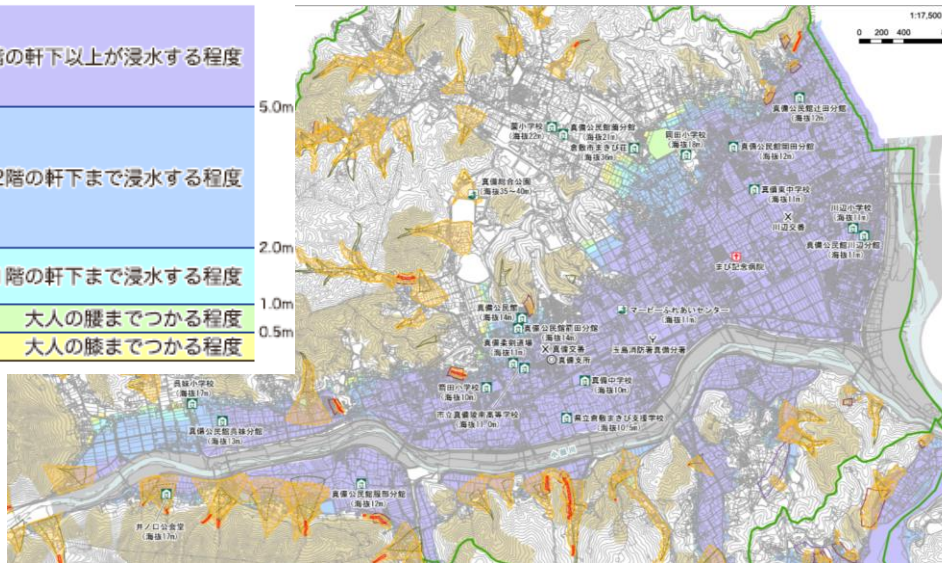


Recurrent Water-related Disasters in Japan

Changing Society



Flood Hazard Map



Mabi, Okayama Pref.



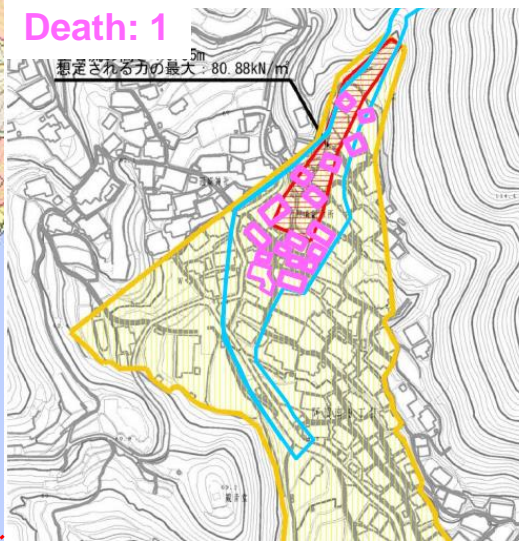
Flood Levee Breach

Sediment Disaster Prevention Act
special alert area: **red zone**
alert area: **yellow zone**

Risk has been informed but not recognized.



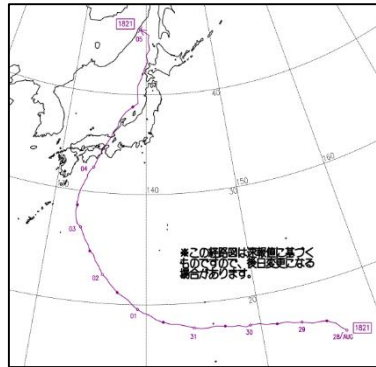
Fully Collapsed: 17 houses
Death: 1



Debris Flow

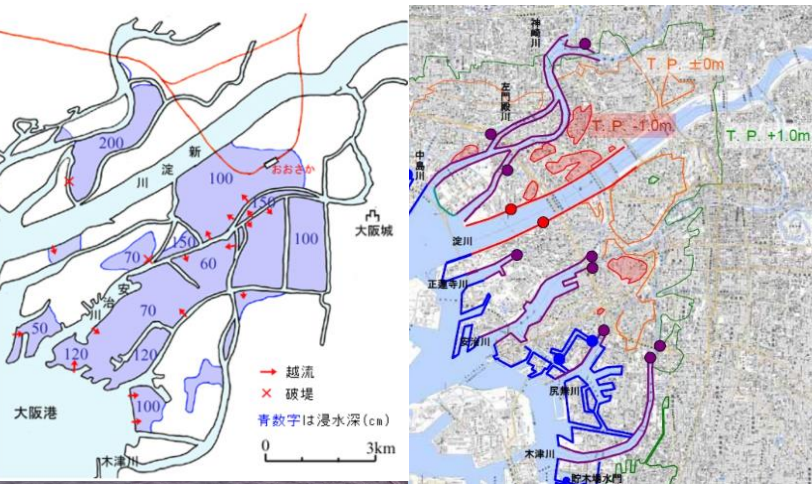
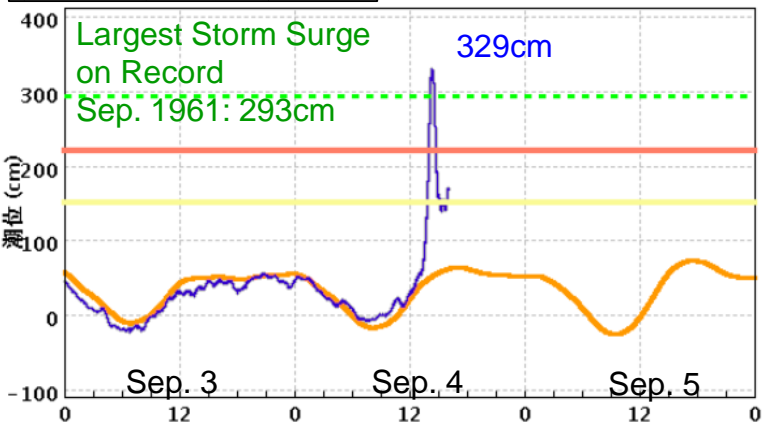
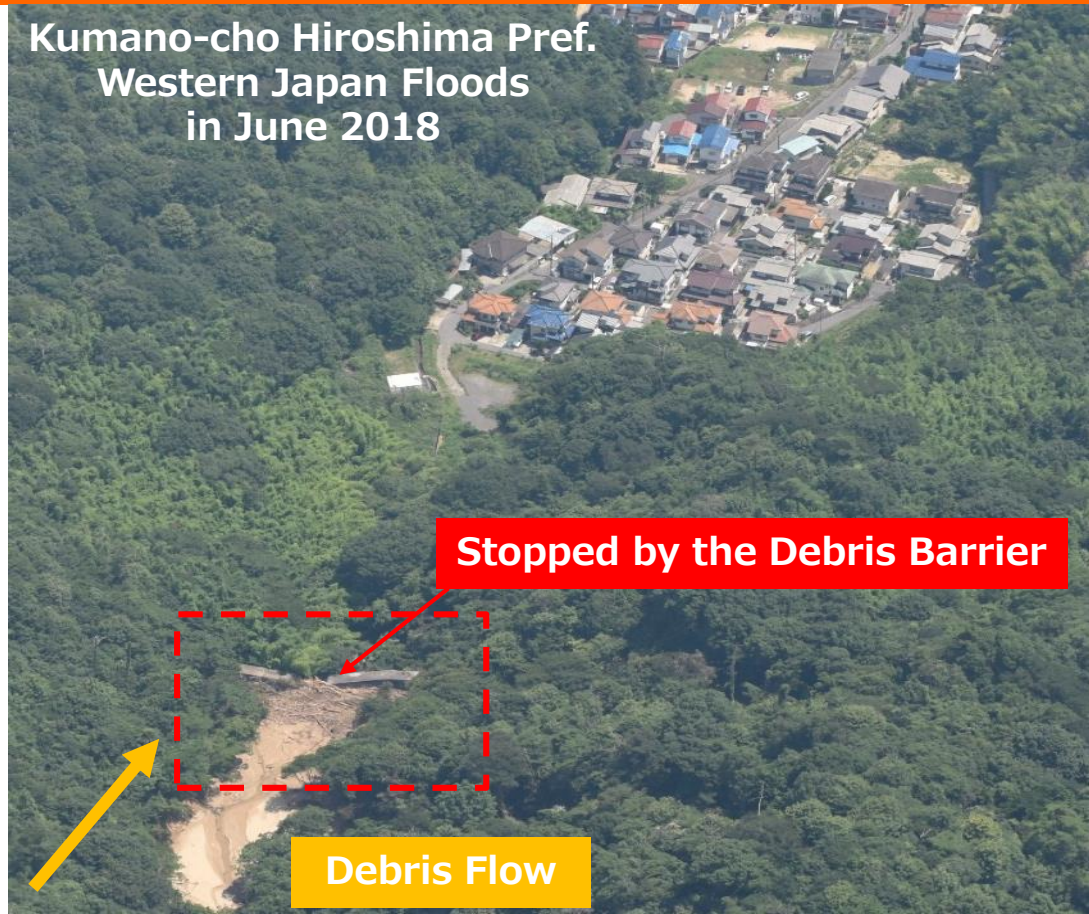
Recurrent Water-related Disasters in Japan

Infrastructure Investment

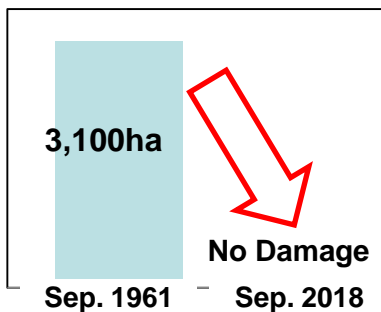


Typhoon 21
Sep.4, 2018

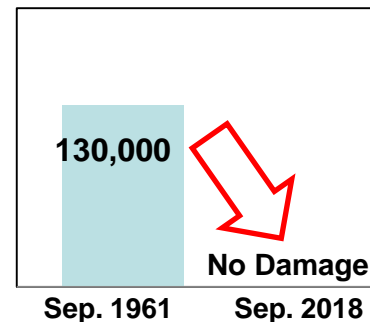
Kumano-cho Hiroshima Pref.
Western Japan Floods
in June 2018



Inundated Area

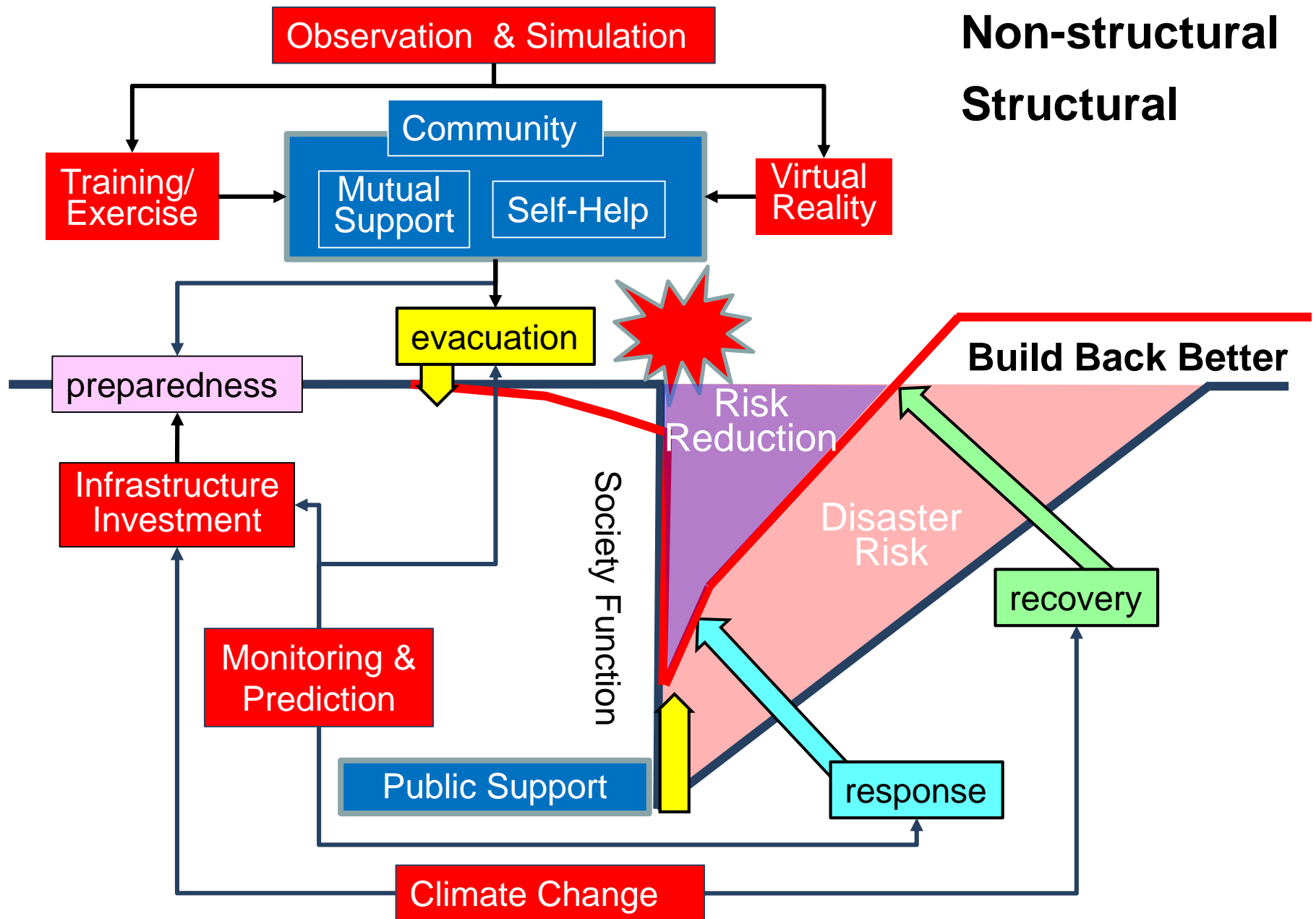


Inundated Houses



Infrastructure Investment Effect:
170Billion USD

Our Challenges



Proactive Planning and Action
Self-help and Mutual Support

People

Nation

Sovereign

Land & Sea

Multi-stakeholder
Platform

Infrastructure

G. Jellinek: 『Allgemeine Staatslehre』, 1900