

Flood Risk Management in Japan

-Structural & Non-Structural Measures-

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Outline

1. Overview of Asia-Pacific Water Forum (APWF)
2. Introduction to Meta-Guideline for Water and Climate change (2015)
3. Case Study: Flood Risk Reduction in Japan: Structural and Non-Structural Measures-
4. Conclusion

Asia-Pacific Water Forum (APWF)

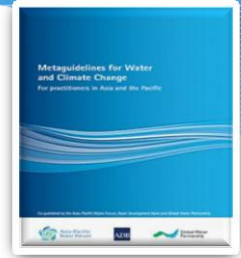


An independent, not-for-profit issue network of the water stakeholders in the Asia-Pacific region

- Established in 2006
- Objectives: to raise the priority of tackling water security issues highlighted in the development agenda in the Asia-Pacific region in order to improve people's livelihoods and the environment
- Partner organizations: ADB, UNESCAP, FAO, Singapore PUB, UNHABITAT, UNESCO, ICIMOD, IWMI, Global Water Partnership, GWP South Asia, GWP South East Asia, GWP CACENA, EC-IFAS, Korea Water Forum, International Water Centre (Australia), Pacific Community (Fiji), AIT, etc



Metaguideline for Water & Climate Change



■ A Continuation of the APWF **Framework Document on Water and Climate Change Adaptation (2012)**

- Introduced **the 5 key principles** and **corresponding actions**
- focused on *what* to do and *why* it should be done.

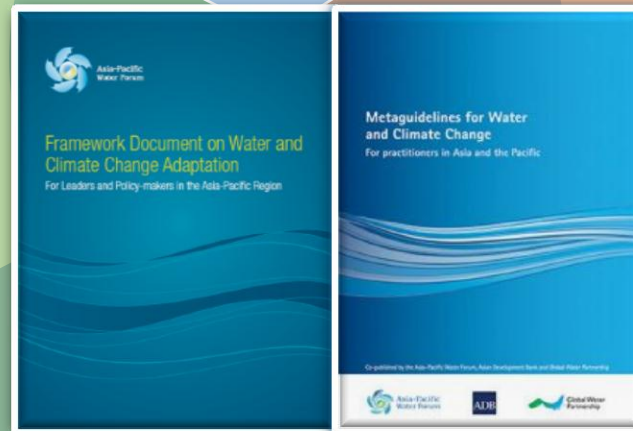
The Metaguidelines (August, 2015)

- Developed by the APWF, ADB, in collaboration with the GWP
- Addressed *how* the recommended actions can be implemented
- Focused on the *practical solutions*
- *Case studies* in the region related to the **key 5 principles**

5 Principles

Principle 1: Usable Knowledge

**Principle 5:
Financing**



**Principle 2:
No Regret
Investments**

**Principle 4:
Mitigation and
Adaptation**

**Principle 3:
Resilience**

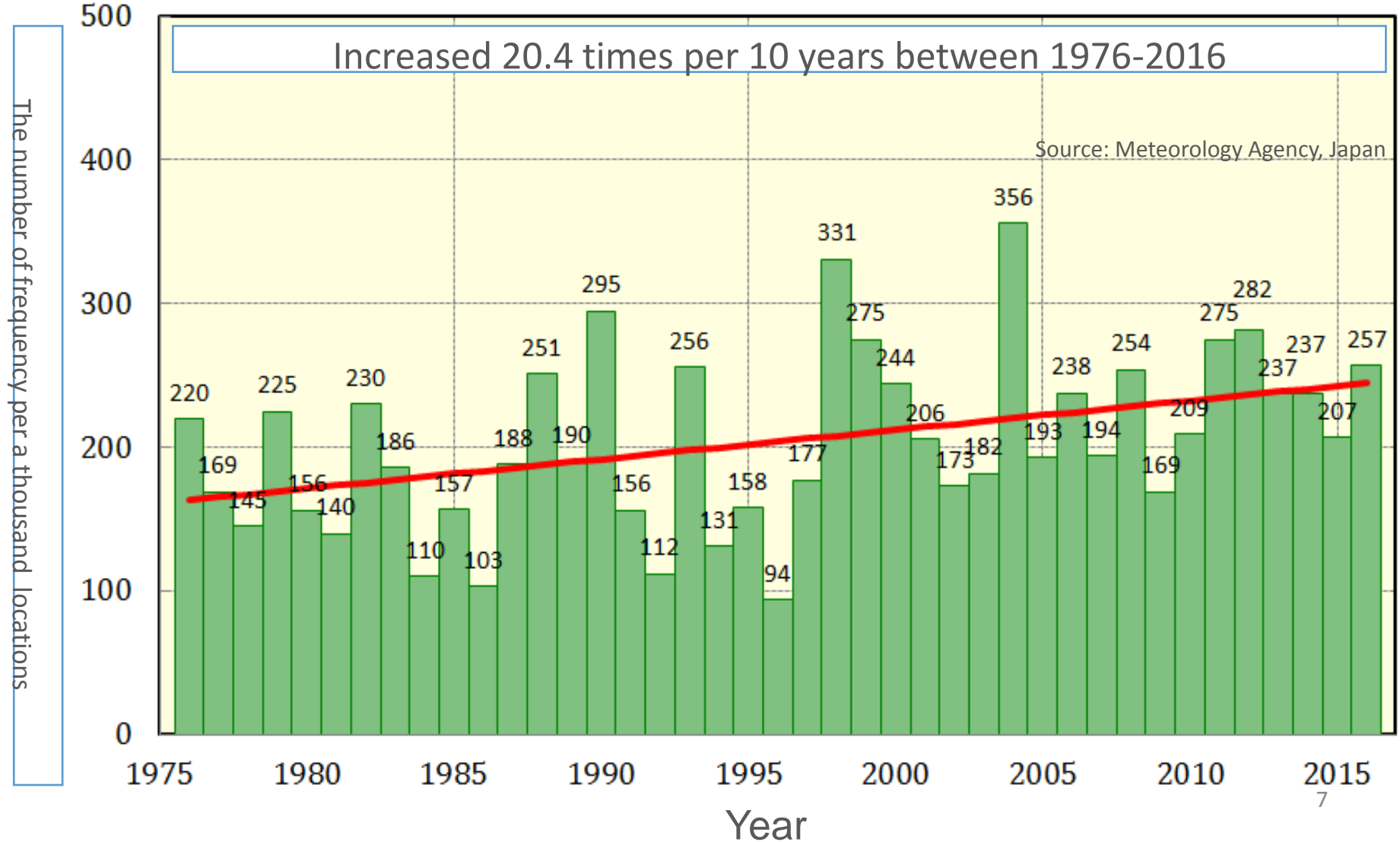
Flood Risk Management

- Case Study in Japan -

-Structural & Non-Structural Measures-

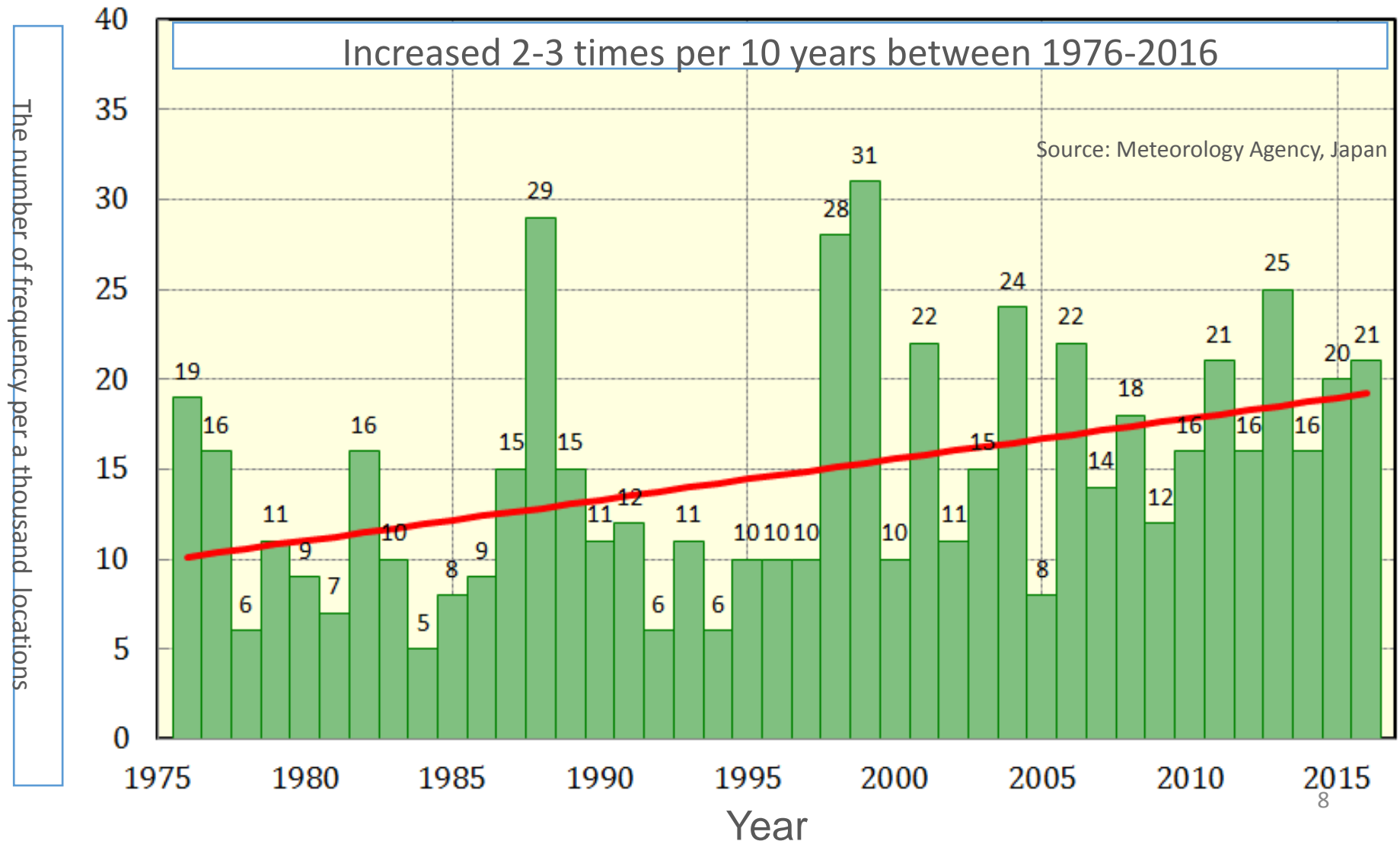
Annual precipitation more than 50mm has been increasing

Annual frequency, which we have more than 50mm rainfall in an hour



Torrential rains have been observed Frequently in Japan

Annual frequency, which we have more than 80mm rainfall in an hour





Average Annual Rainfall deviation in Japan

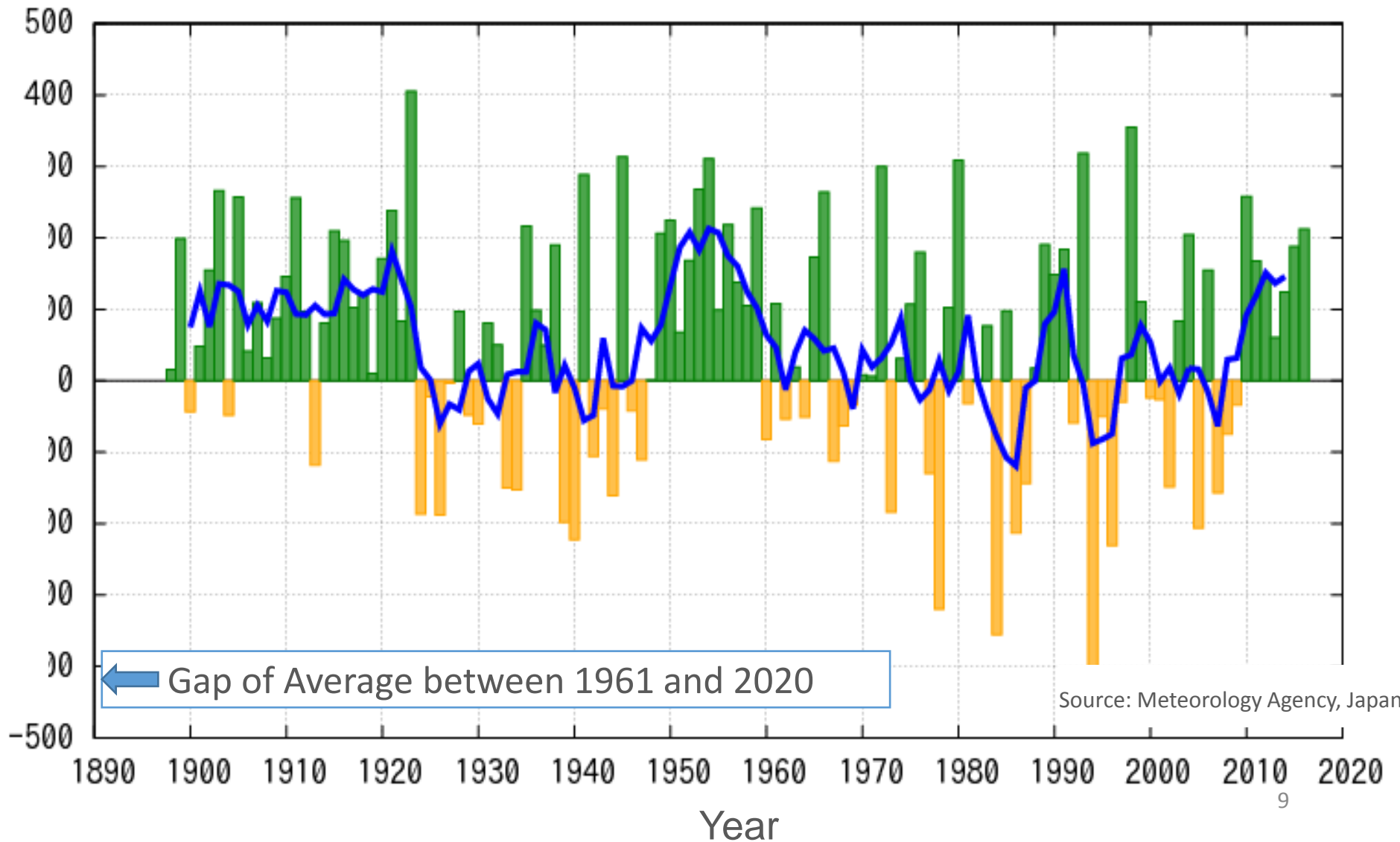
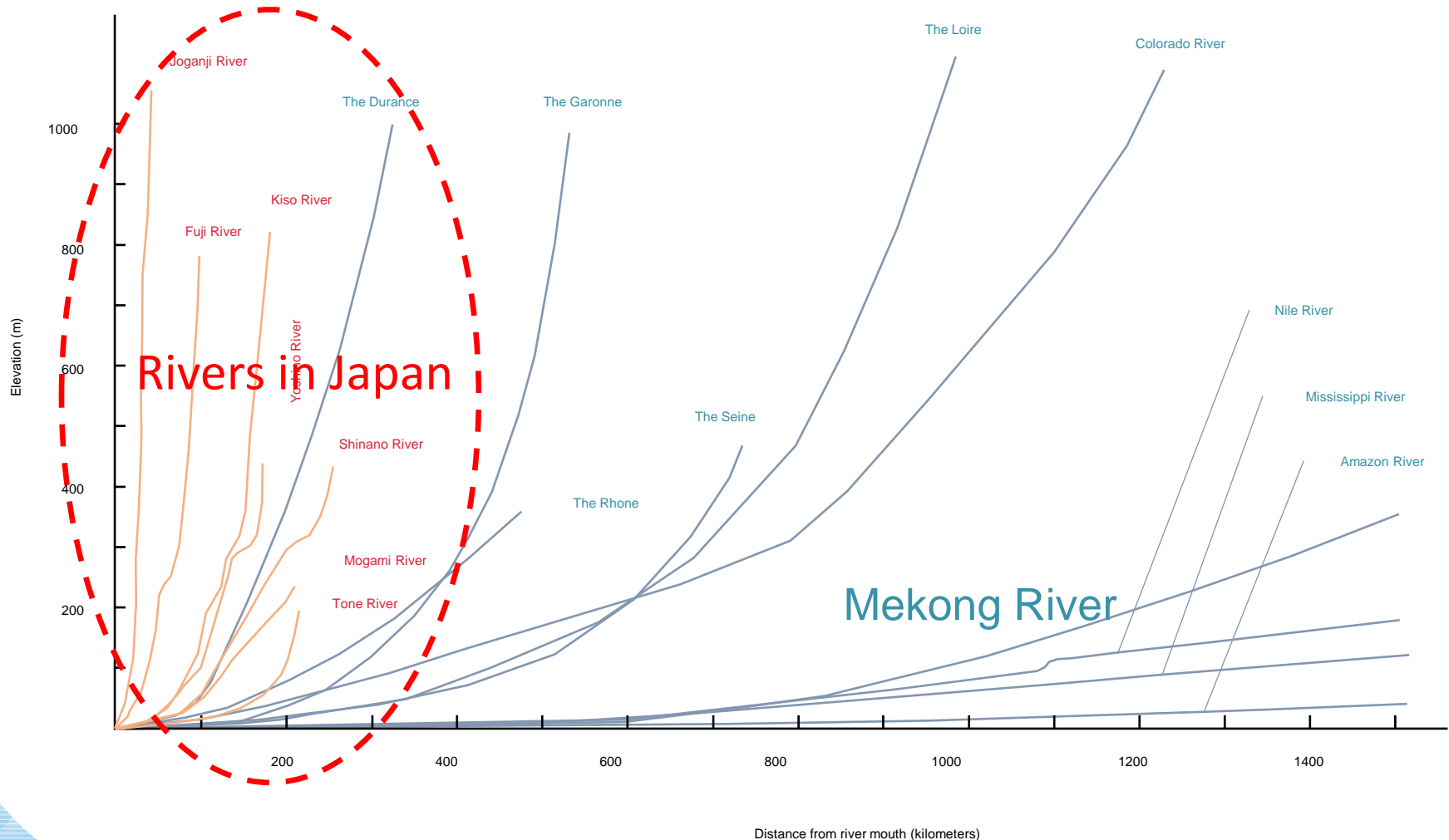
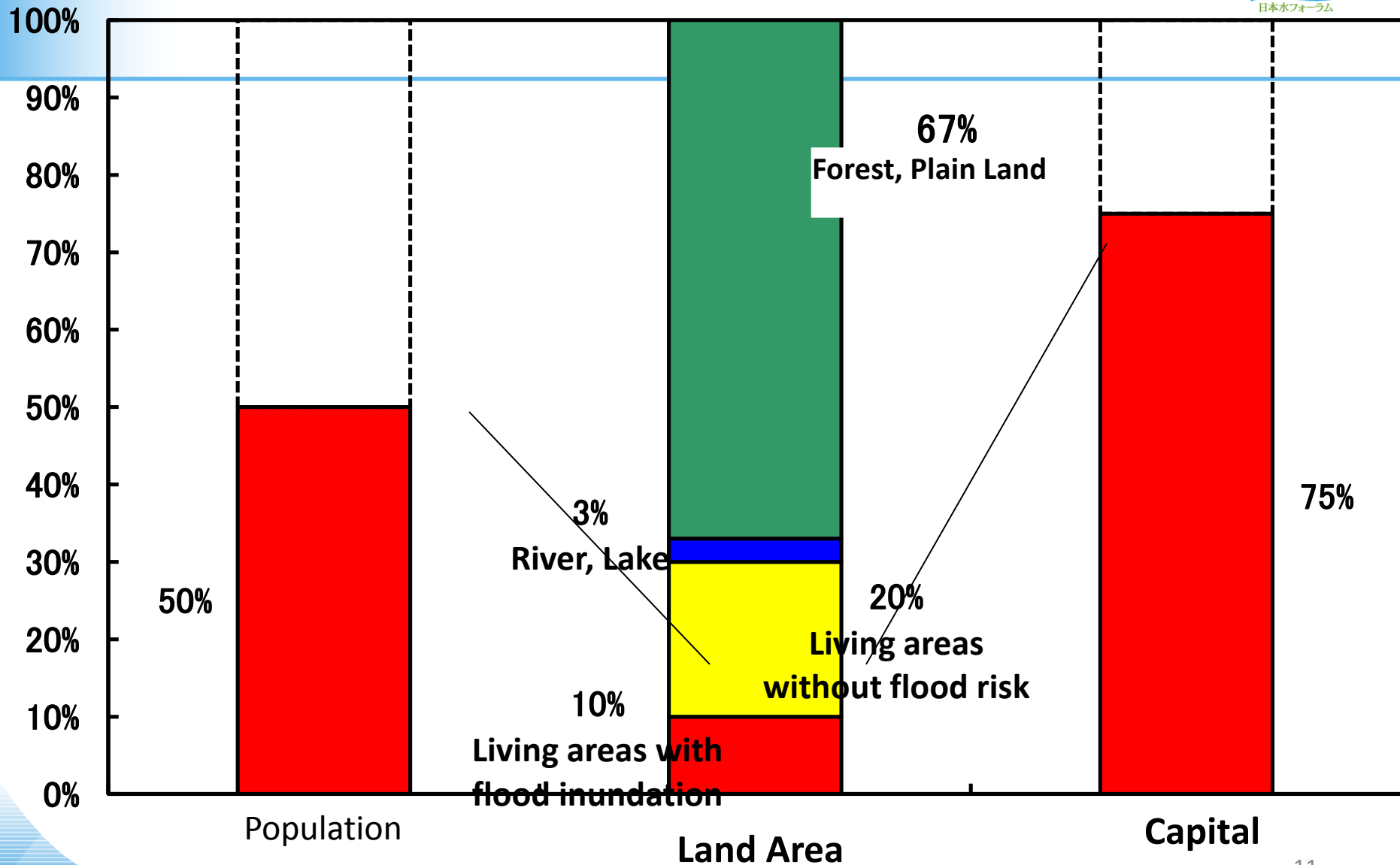


Figure: River inclination between Japan and the other countries

- Japan's steep topography and small river basin area makes easily increase water levels and cause floods.
- These characteristics and seasonal variation in rainfalls also make it difficult to meet the water demand



75% of Japan's total capital concentrates on the areas where has high risks of water-related disasters



Breached the levee of the Kinu River (Joso City, Ibaraki Prefecture, September 2015)



- Approximately 40 km² of land was flooded, 2 people were killed, and approximately 7,000 houses were inundated.

Basic Strategy for Climate Change Adaption Measures in Japan (2015)

Source: MLIT, 2015



Conventionally, Japan has taken measures in large river basins to withstand heavy rainfall with an annual exceedance probability of 0.5 to 1%.

< Impacts of Climate Change for the end of 21st Century >

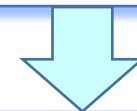
- (1) Precipitation by heavy rain will increase by 10.3-25.5% (nation-wide average)
- (2) Frequency of precipitation greater than 50mm per hour will Increase by 2.7 times

Probability of floods and storm surges that will be occurred greater than 0.5% to 1%



Focus on structural measures to prevent loss of life and property

Probability of large scale floods and storm surges will be low (about 0.1%) but will cause enormous damage if it happens



Focus on non-structural measures to protect lives and prevent drastic damage to social and economic activities



➤ stipulates measures to minimize flood damages.

- **Identify and disclose the potential inundation area** due to **rainwater flooding by the excess of drainage and storm surge**, in addition to the largest-scale of river flooding
- Mandatory by local municipalities to **develop their local disaster management plans**, including **the ways of information dissemination** about flood prediction, the evacuation facilities, and the **routes for evacuation**
- Mandatory by local municipalities to **conduct evacuation drills**
- Managers of the **underground shopping malls** need to develop risk management plan which **ensure evacuation routes** from the flood and inundation and implement evacuation drills

Basin-wide Comprehensive Flood Control Measures

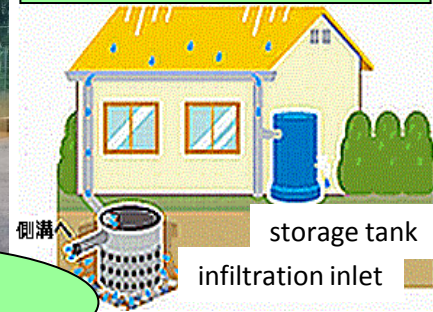
- Implement comprehensive flood control measures by combining improvement of rivers and drainage systems together with flood storage using parks, schoolyards, and retarding ponds, as well as infiltration of rainwater through infiltration inlet.

Structural measures: Source: MLIT, 2015

Storage in School yard



Infiltration inlet / Storage tank



Retention basin



During Rain Event

Basin

Conservation of land with rainwater detention function

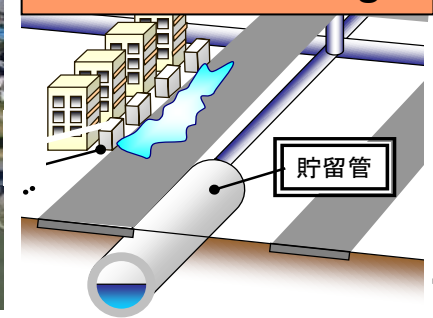


Basin-wide Flood Management

River

Stormwater drainage

Rainwater storage



River channel improvement



Flood control facility



Drainage facility

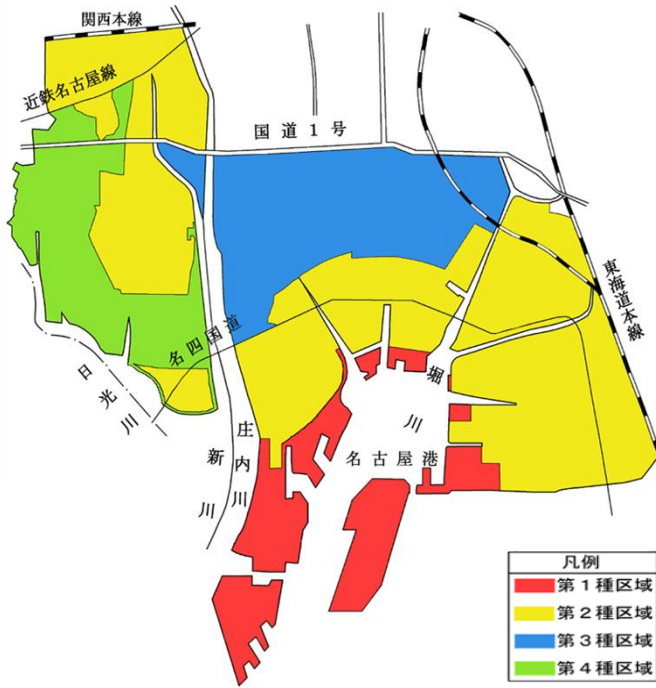


Better Land Use Planning to respond to the disaster risk

- Nagoya City designated a disaster hazard area based on the lessons learned from the past experiences about typhoon and storm surge.
- It regulated the height and structures of buildings, and the structures of buildings, etc.

• Nagoya City

Coastal Disaster Prevention Area



Reference surface of Nagoya Port (N.P.(+) 0m) =
Reference surface of Tokyo Port (T.P.) - 1.412m

Source: Ikeuchi, K (2015) New Climate Change Adaption Strategy for Water-related Disaster Management in Japan, MLIT, Japan

• Overview of Regulation

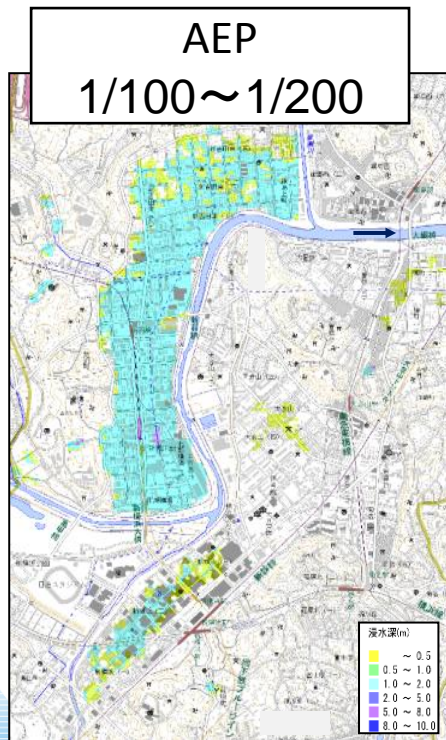
District	Height of 1 st Floor	Restriction on Structures
Category I District	>N.P.(+) 4m	Wooden building prohibited
Category II District	>N.P.(+) 1m	Buildings must be at least two-story (One or more rooms on second floor or above) Exception granted if one of the followings applies. 1) At least one room in the building has floor height of N·P(+) 3.5m or higher 2) Two-story building or higher exists within the same land property 3) Evacuation shelter / equipment exists within the floor area of 100m ² or less
Category III District	>N.P.(+) 1m	None
Category IV District	>N.P.(+) 1m	Buildings must be at least two-story (One or more rooms on second floor or above) Exception granted if one of the followings applies. 1) At least one room in the building has floor height of N·P(+) 3.5m or higher 2) Two-story building or higher exists within the same land property

Identification of Potential inundation area by large scale flood and storm surge (Mandatory)

➤ **Develop hazard-maps and disseminate them to the public**

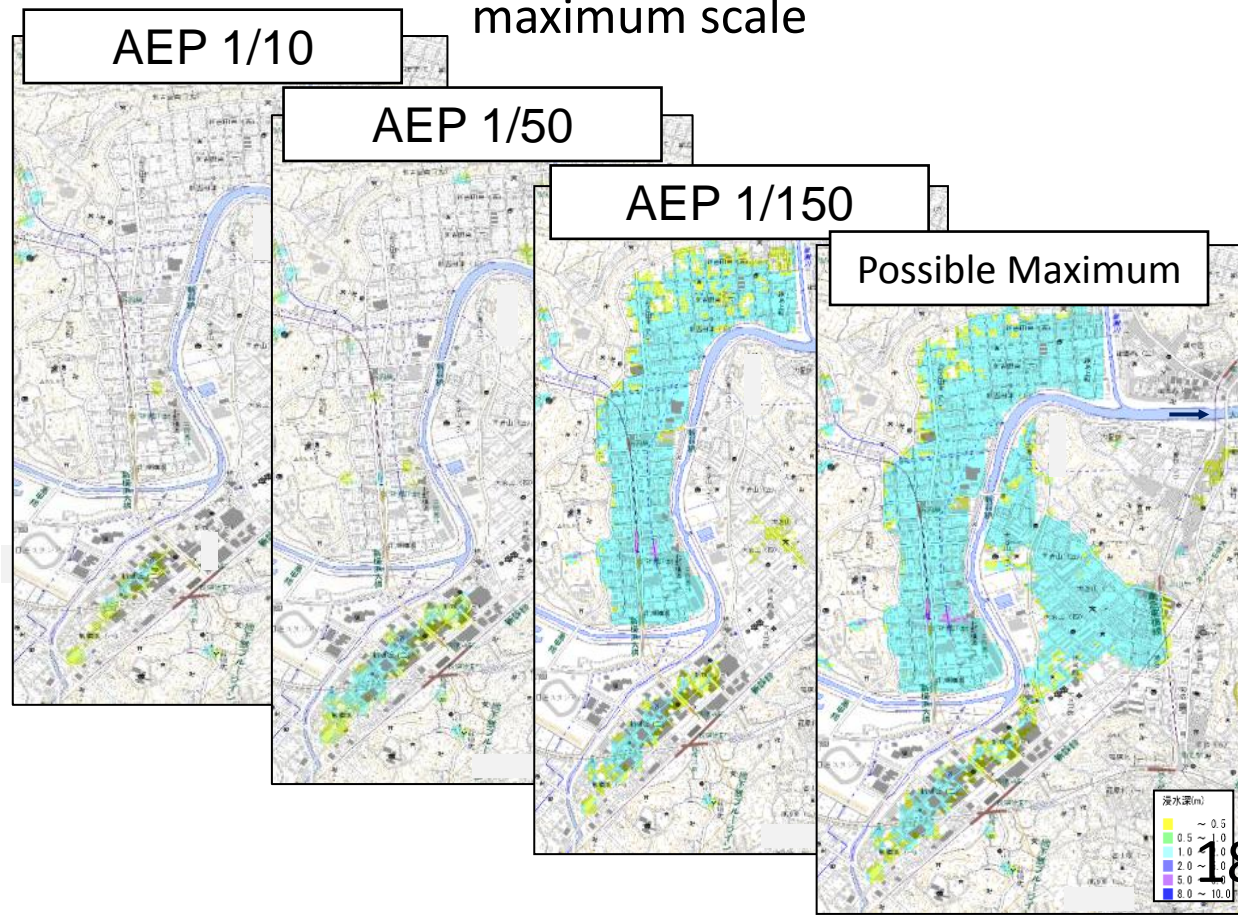
Until 2015

design rainfall the flood control plan is based on



From 2015

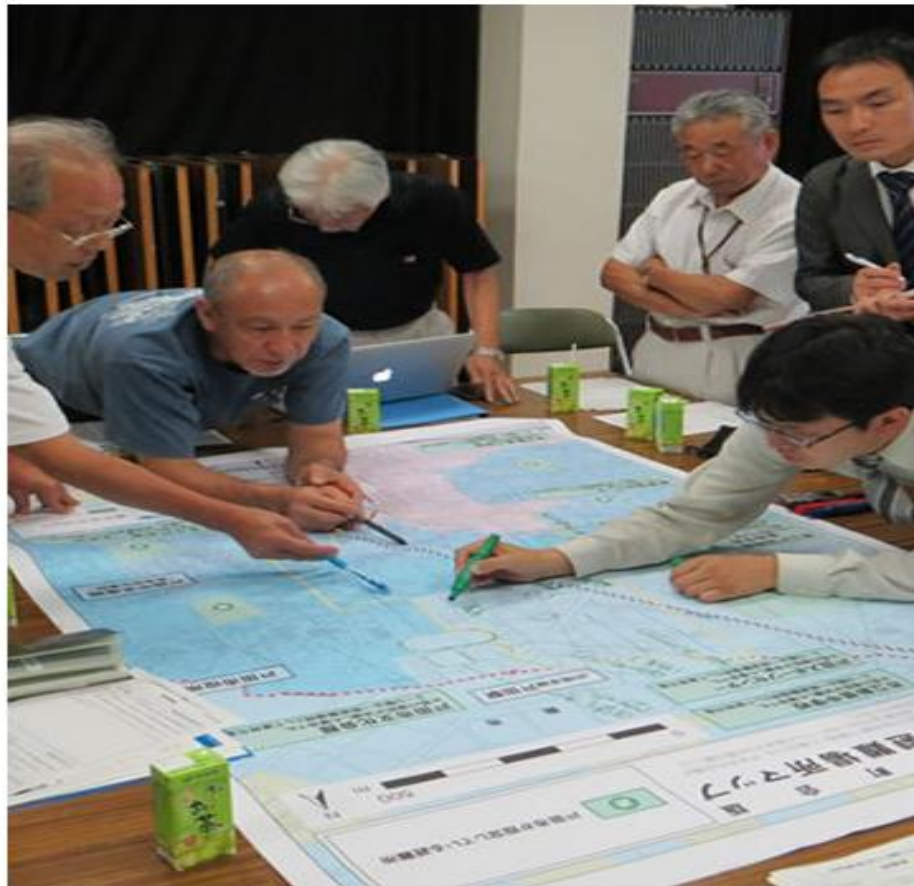
Show Rainfall of multiple magnitude up to possible maximum scale



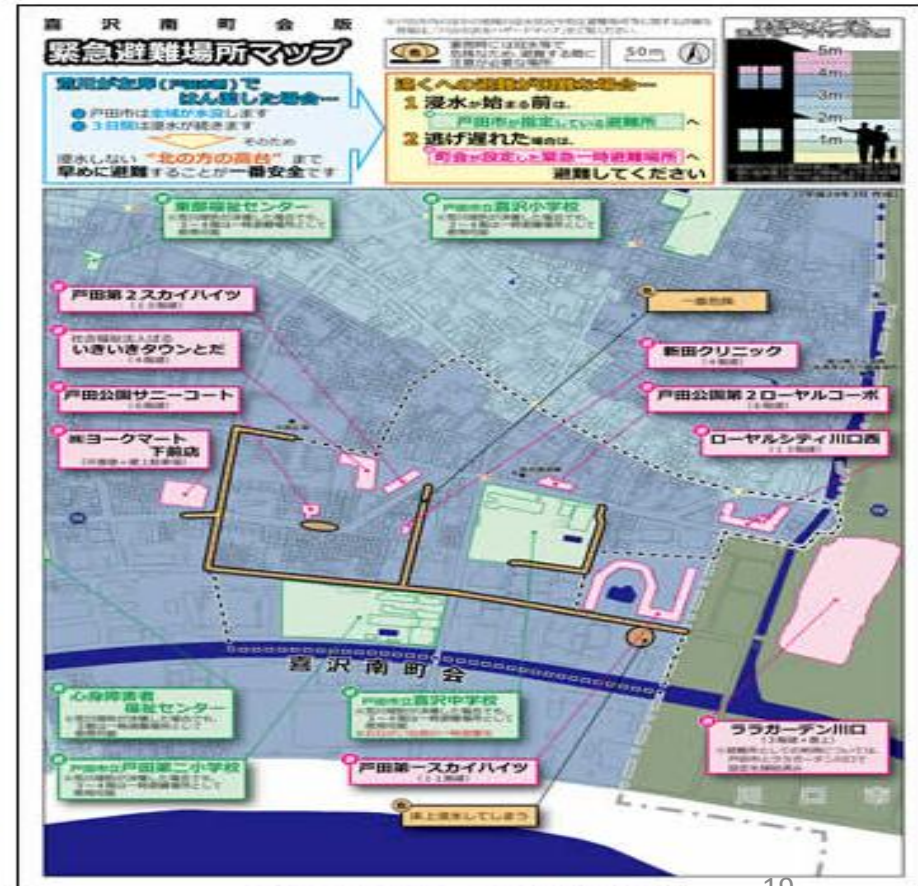
※ Figures do not necessarily represent actual rivers.

Hazard Mapping Development by local residents

- Local Government in Okayama City encouraged to develop it by community with financial support about printing of hazard map
- Exchange information and experience and identify the way of disaster risk reduction through their daily life



緊急一時避難場所を選んでいる様子



設定した緊急一時避難場所の例
(H23年度喜沢南町会)

Development of information collection system by residents & taxi drivers, etc, collaborating with local government and private companies



The screenshot shows a mobile application interface for flood information. It features a main menu on the left with options like 'Current flood status', 'Rain and flood status', 'Registration', and 'Change registration info'. The main content area is divided into four panels: 'Current rain status', 'Current flood status', 'Flood status notification', and 'Flood status notification'. Each panel contains maps and text-based information. A small illustration of a person is at the bottom right, with the text 'Flood information provision'.



The advertisement features a cartoon character in a kimono looking surprised. The text reads '河川防災24時' (River Disaster 24 Hours) and 'これは一大事やごさる!' (This is a big deal!). It encourages users to contact the Ina River Disaster Relief Center if they notice unusual conditions in the Ina River area. The contact information provided is '災害専用フリーダイヤル 0120-131-850'.

Taxi Drivers also takes the roles of reporters about the flood risk

Example of Ina River Area in Kobe

Report to web by mobiles, etc, and share the information about the inundation among the residents and local government



The screenshot shows a weather website interface for Nagoya. It features a map of the city with various icons indicating weather conditions and flood risks. A pop-up window titled '減災レポート' (Disaster Report) is visible, showing a photo of a flooded area and text describing the incident. The date on the map is '2009年10月08日'.

Example of Nagoya City

Flood Risk Information in Town : Improved the understanding

Signs of the expected inundation depth and evacuation sites are posted at many locations in towns to enhance understanding about the risk and the ways of evacuation.

Potential Inundation Area (Kita-Ward, Tokyo (Arakawa River))



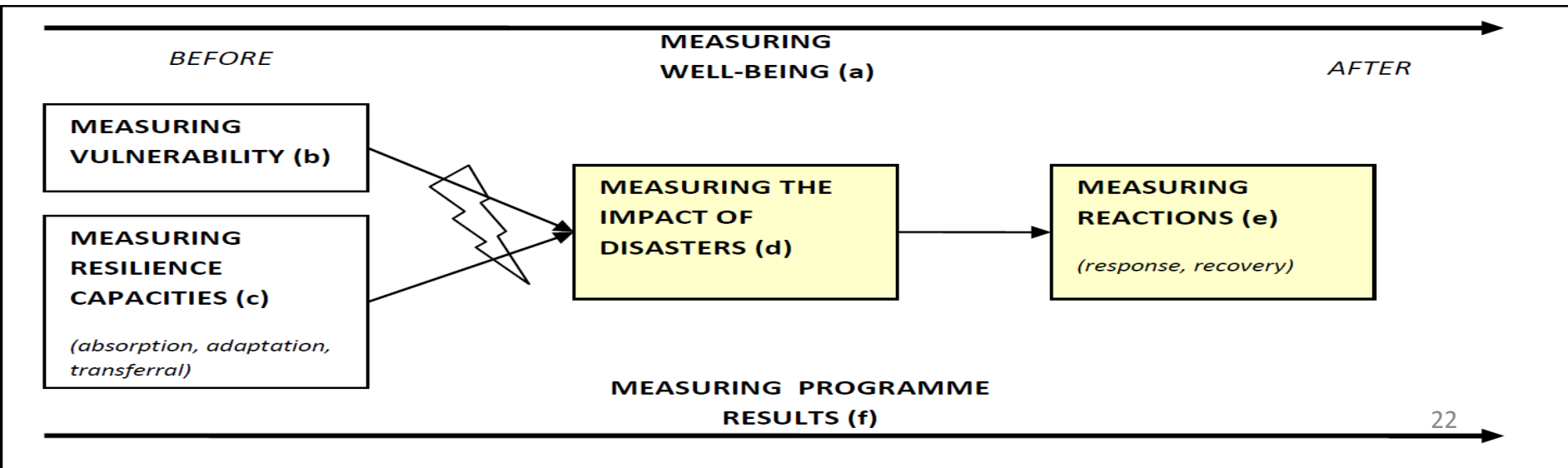
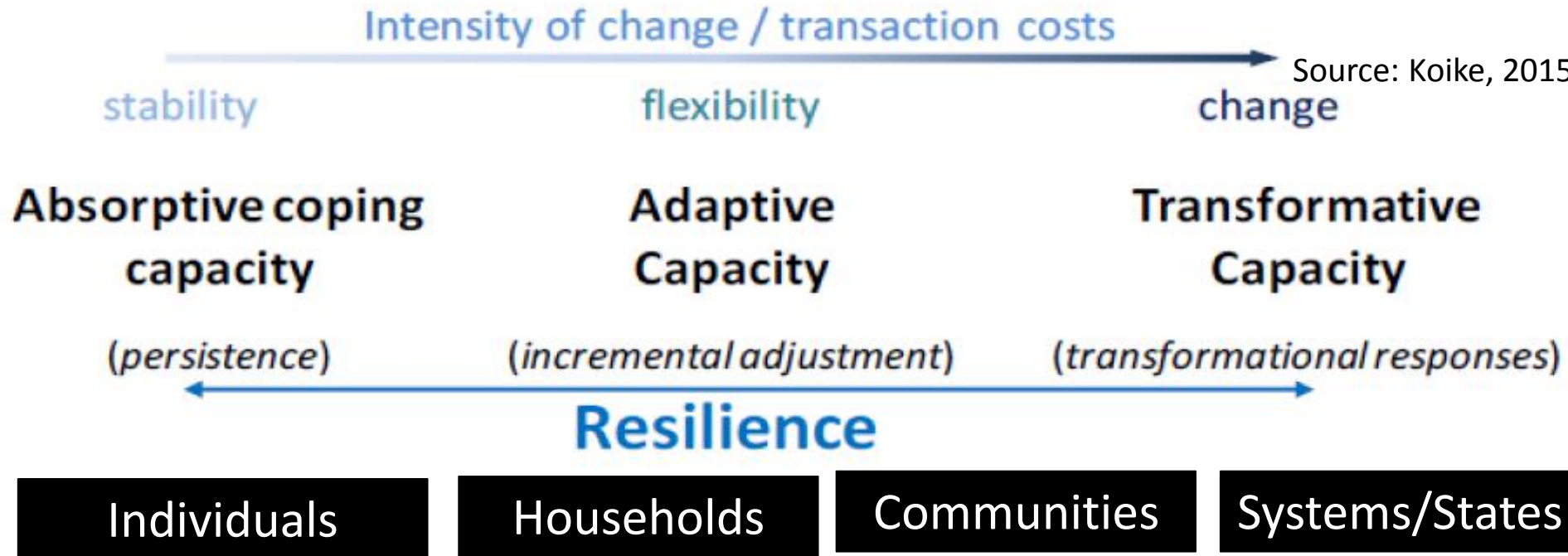
Evacuation Information (Mitsuke City, Niigata Prefecture)



Source: Ikeuchi, K (2015) New Climate Change Adaption Strategy for Water-related Disaster Management in Japan, MLIT, Japan

Disaster risk management is ongoing process to enhance resilience

Source: Koike, 2015



Conclusion: No One Size Fits All

Necessity to work with the 5 principles to progress simultaneously to fit your own situations



Collaboration for Results

Thank you

◆ Japan Water Forum

◆ Asia-Pacific Water Forum

◆ **Metaguideline for Water & Climate Change (2015)**

<http://www.adb.org/sites/default/files/publication/172958/metaguidelines-water-climate-change.pdf>



◆ **Framework Document on Water and Climate Change Adaptation (2012)** <http://www.apwf.org/doc/Framework.pdf>

