Flood management under the climate variability and its future perspective in Japan

Tetsuya IKEDA

Public Works Research Institute (PWRI)

September 29, 2004, Amsterdam, The Netherlands

Wording

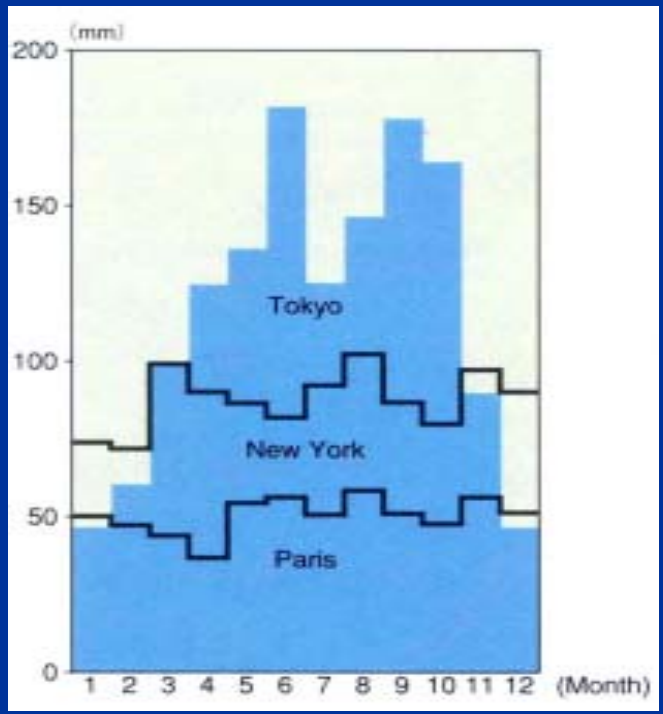
治水：Flood management
or Flood control

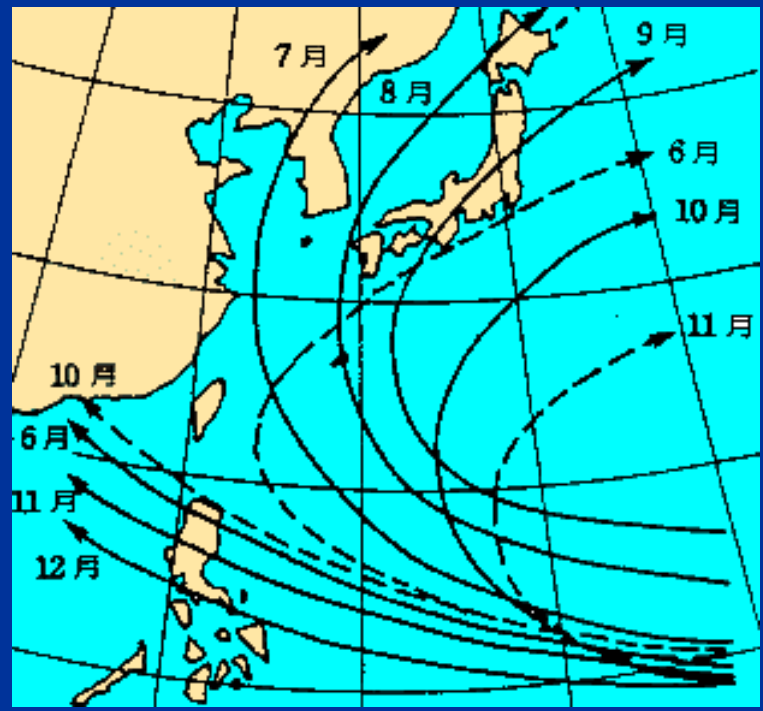
治政：Governing

政治：Politics

Words by a famous local lord - 16th Century
“Those who govern its sovereign wisely govern water wisely.”

Meteorology and climate





Precipitation is twice as much as that in western large cities. It concentrates from June to October.

Typhoons hit Japan in summer. This year, already 18 typhoons were born near Japan, 7 of which landed and hit the country.

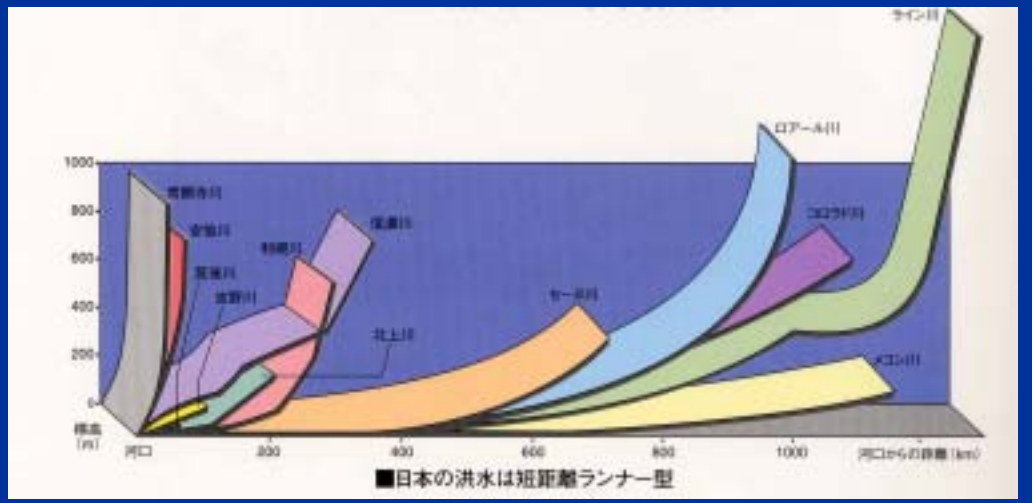
Topography

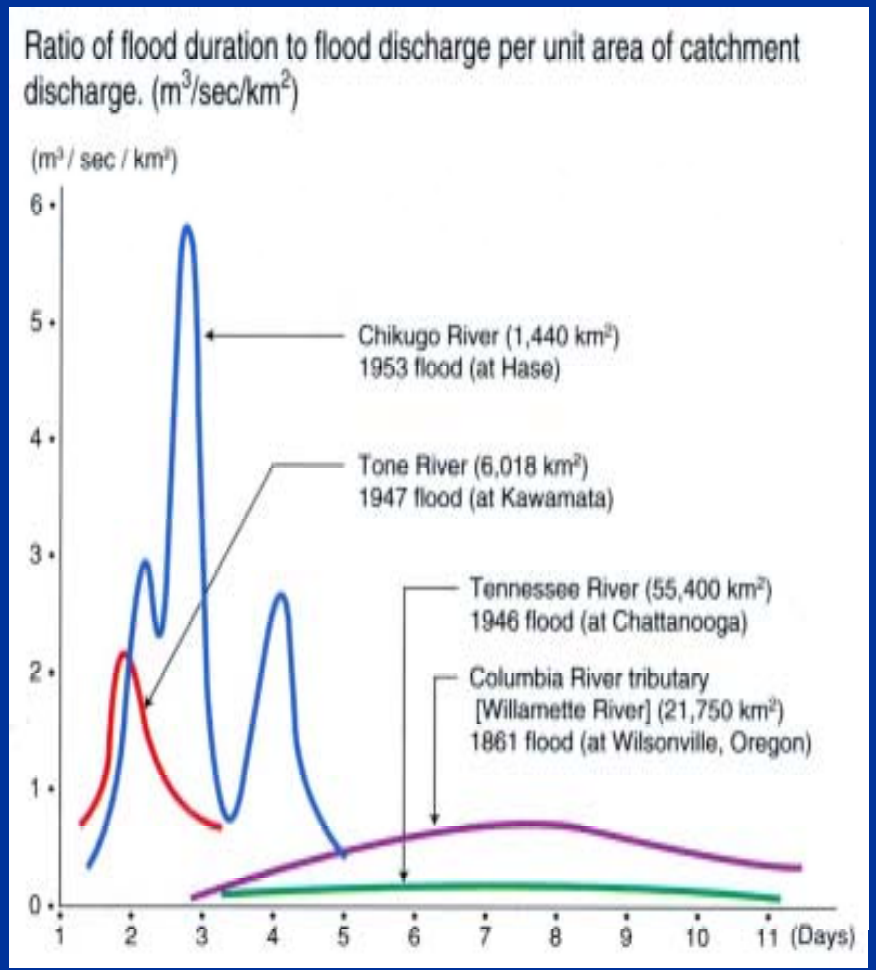
- Mostly mountainous,

- Dense concentration of population and property in the relatively small alluvial plains.

- Flash floods occur soon after intense rainfalls.

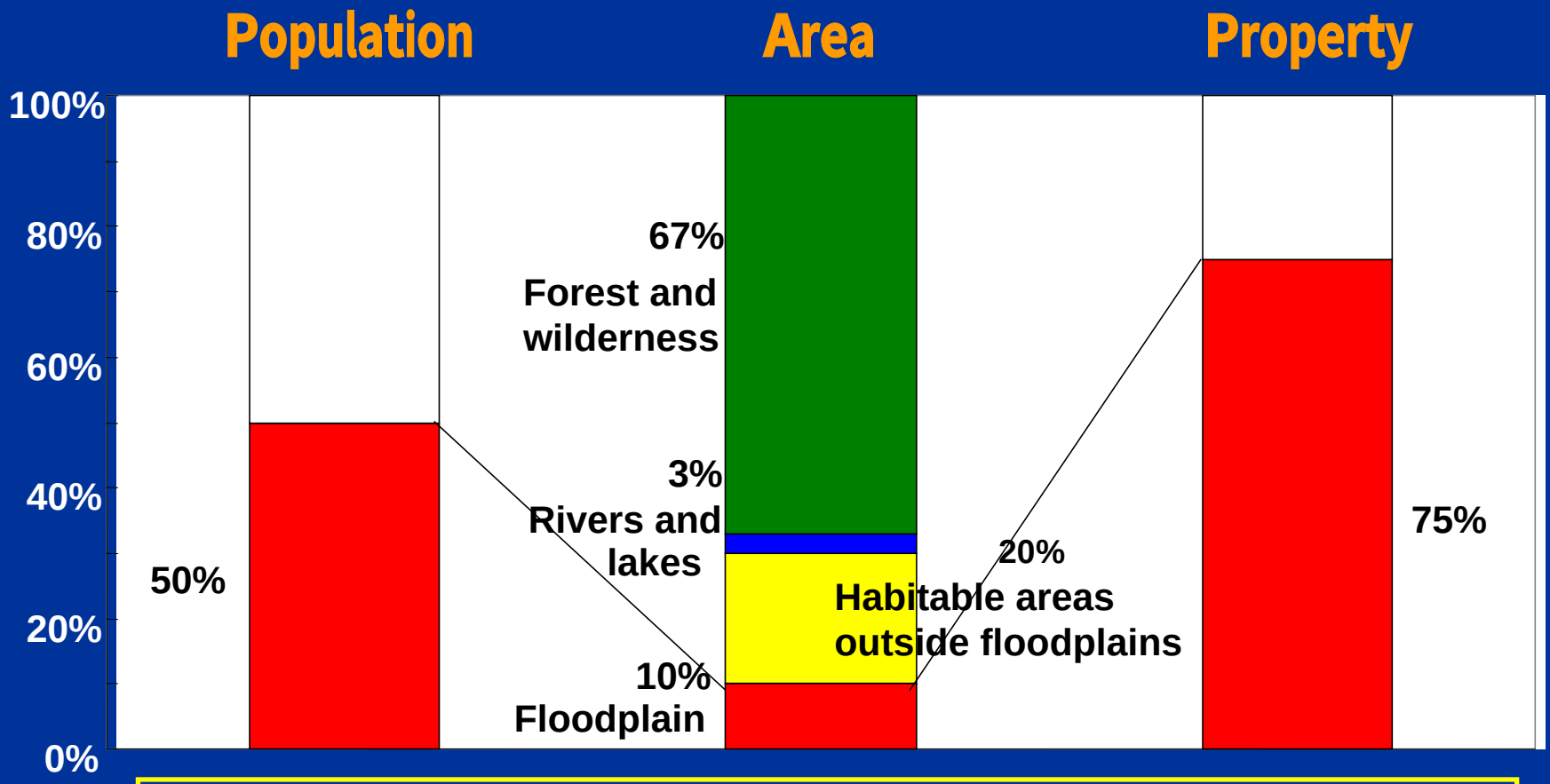
Characteristics of rivers





Generally, rivers in Japan are called as “Falls” or “Sprinters”: very short and steep, bringing about high concentration of floodwaters.

Land use



High proportion of population (50%) and property (75%) is concentrated in relatively small (10%) and vulnerable flood plains.

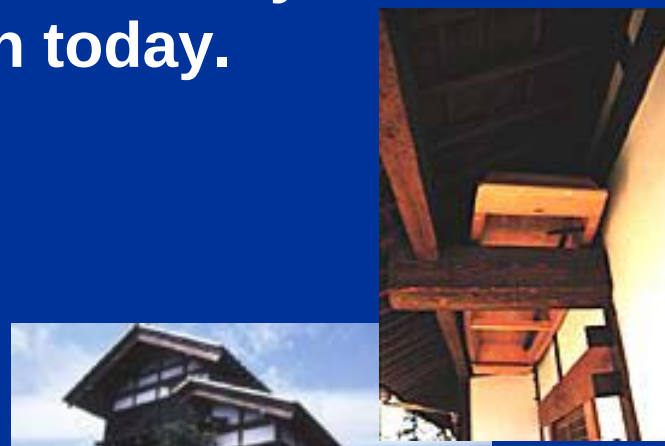
Flood management before modernization (~ 1850's)

- Floods had been a long serious concern due to its natural and social conditions.

- Thus indigenous technologies & adaptive lifestyles were developed earlier and still effective even today.

Traditional groin to encounter against flood and strengthen bank with soil and sediment

Riverside forest to decelerate flood and prevent mud flow intrusion

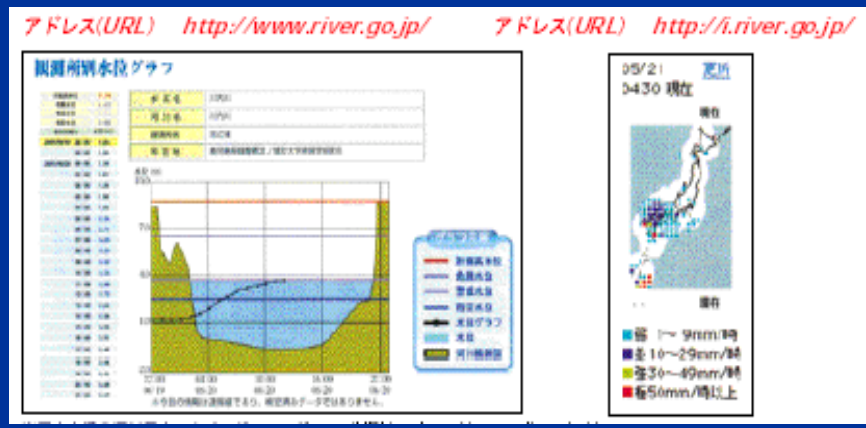


Adaptive lifestyle: elevated houses and evacuation boats

Today's flood management

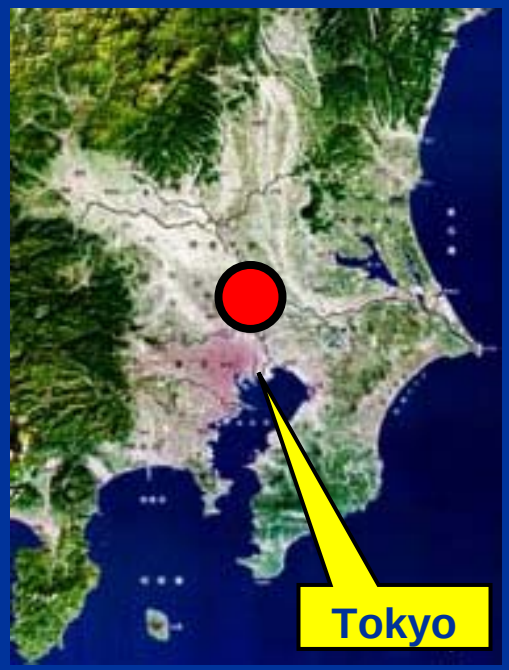
- MLIT is primarily responsible for Class A Rivers (109 systems dominating 70% of national land).
- Flood control works conducted by MLIT under the River Law.
- Flood Fighting Law: prescribing "Flood Fighting Brigades", flood warning & hazard mapping.

Flood info via Web/ mobile



Flood fighting exercise

Flood : Typhoon Kathleen (1947)



Deaths: 1,100

Injured: 2,420

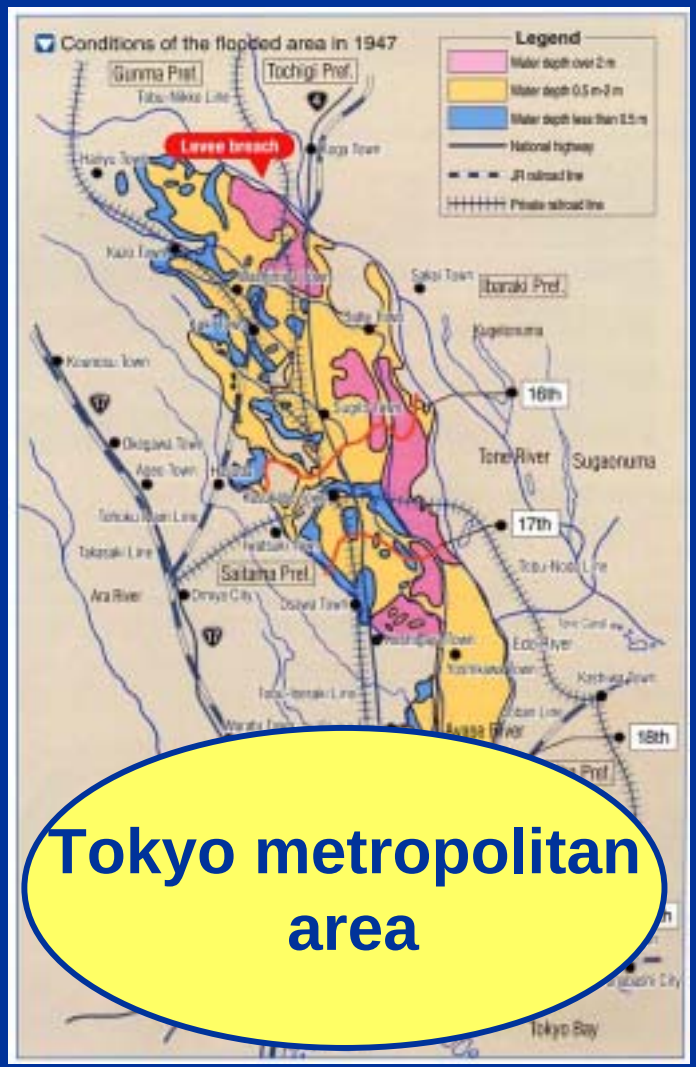
Affected: 1.6 million

Inundated houses: 303,000

Damage: US$ 60 million

(Estimated damage US$ 140 billion if same size flood occurs today)

Floodwater down to Tokyo



Tokyo metropolitan area

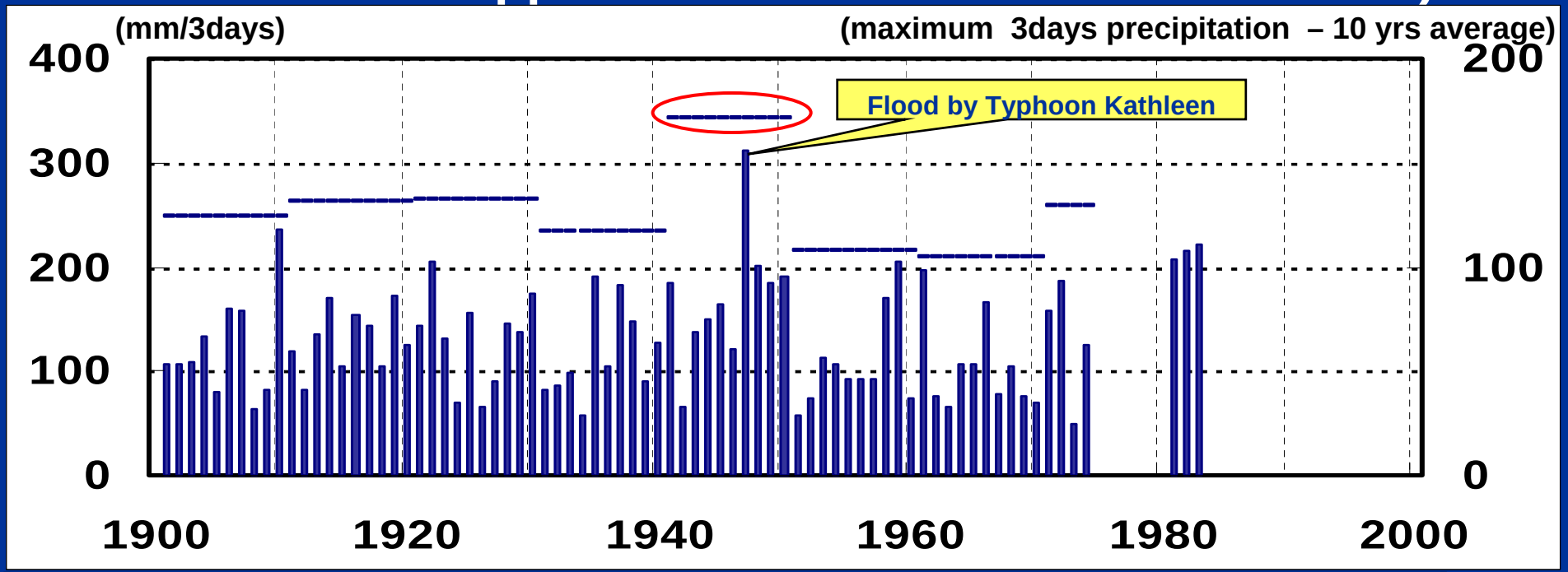
Floodwater rushed 70km down to Tokyo in 2 days, directly hit & heavily damaged.

- Importance of flood management seriously recognized

- Flood control policies accelerated

Precipitation in Tone river basin

(Yearly maximum 3 days precipitation upper Tone river basin from Kurihashi)

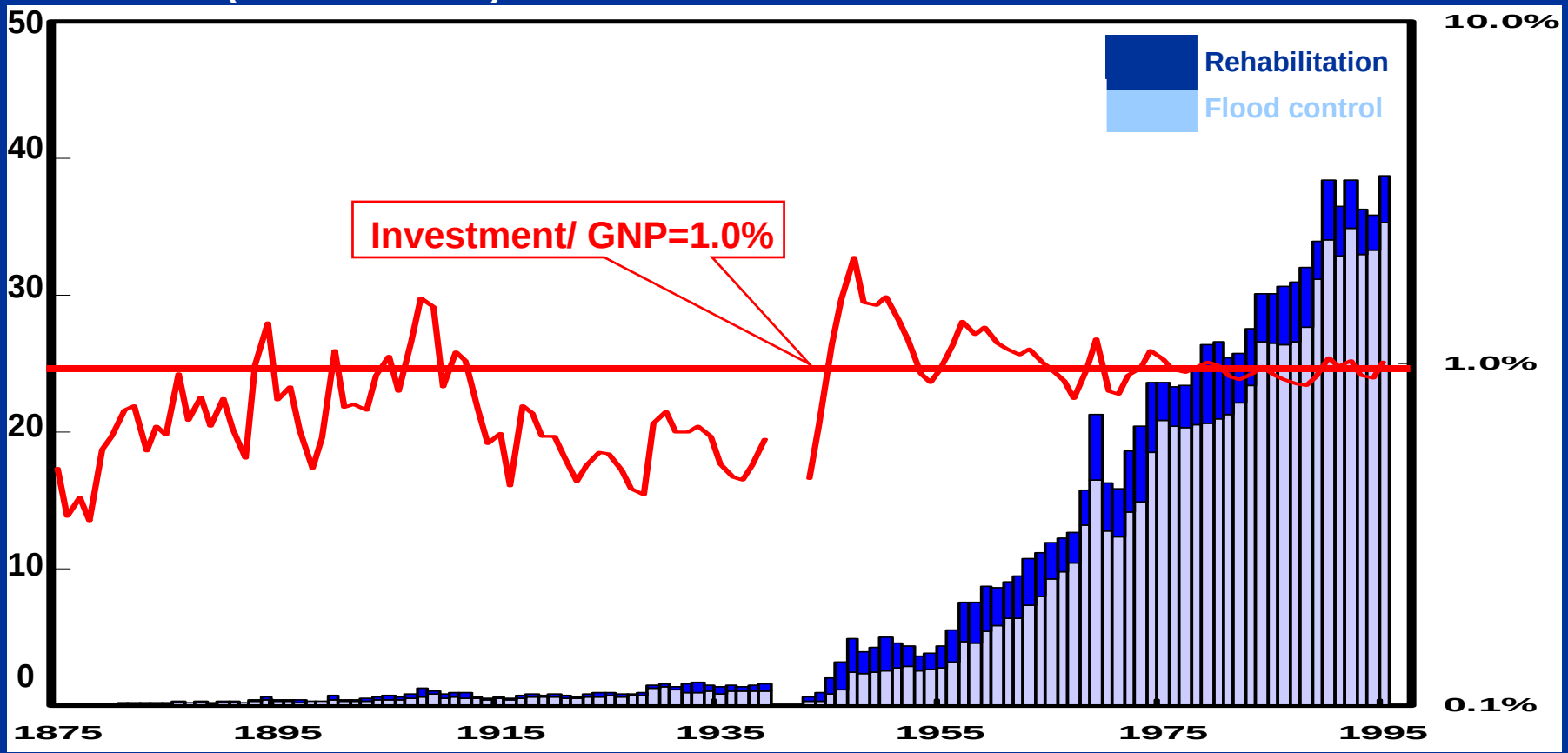


Decade	1901 -10	1911 -20	1921 - 30	1931 - 40	1941 - 50	1951 - 60	1961 - 70	1971 - 74	1975 -
(mm)	124	131	132	117	171	108	105	130	N.A

Trend of 10 years average shows too much rain in the worst decade: 1941-1950 (30-60% more than the other decades).

Long-term investment on flood control works

100 billion JPY (US$ 0.9 billion)

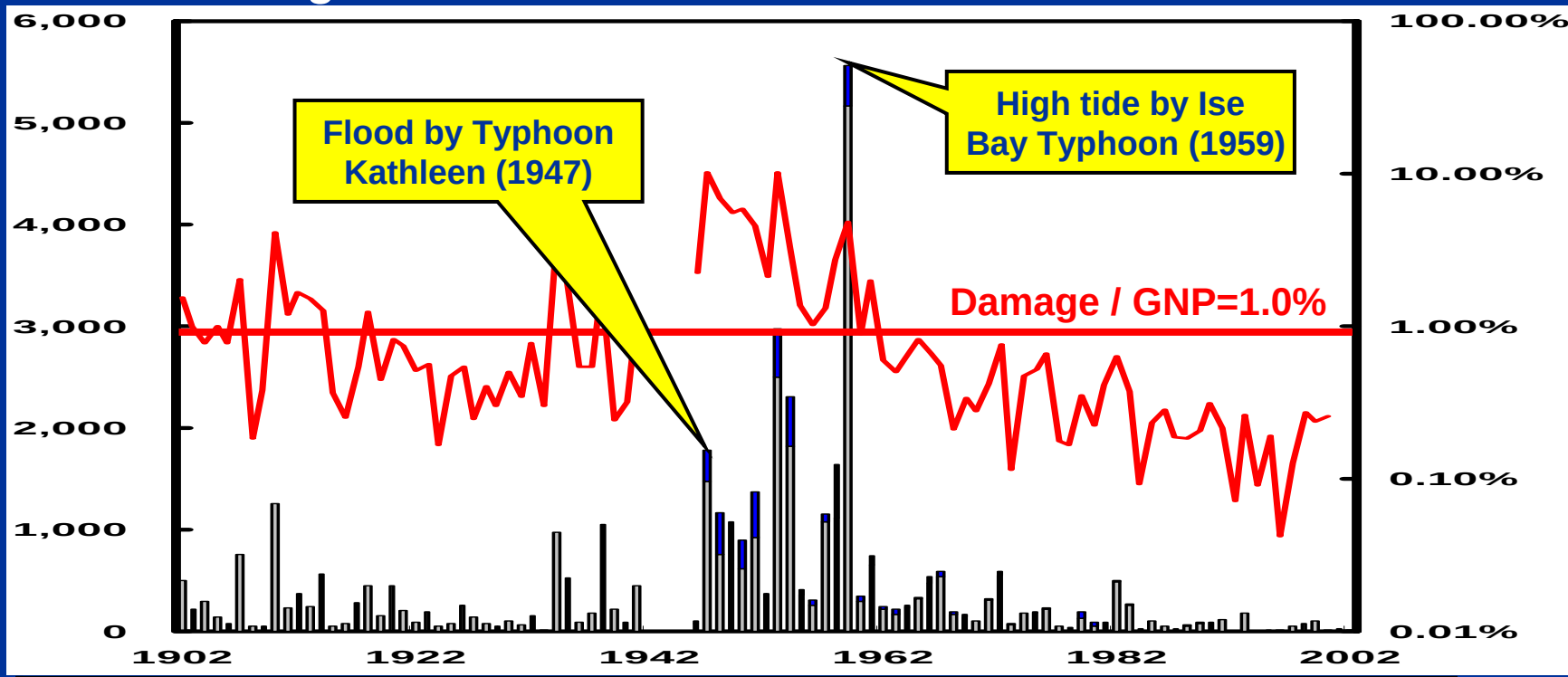


Long-term and continuous investment is key for flood disaster mitigation and sustainable development.

Socio-economic damage due to water disasters: floods & high tides

Death and missing

Damage / GNP



Average	1902-1942	1946-1959	1960-2002
Death & missing	276	1509	177
Damage (US$ billion)	1.3	11.0	6.3
Damage/ GDP	0.92%	4.43%	0.38%

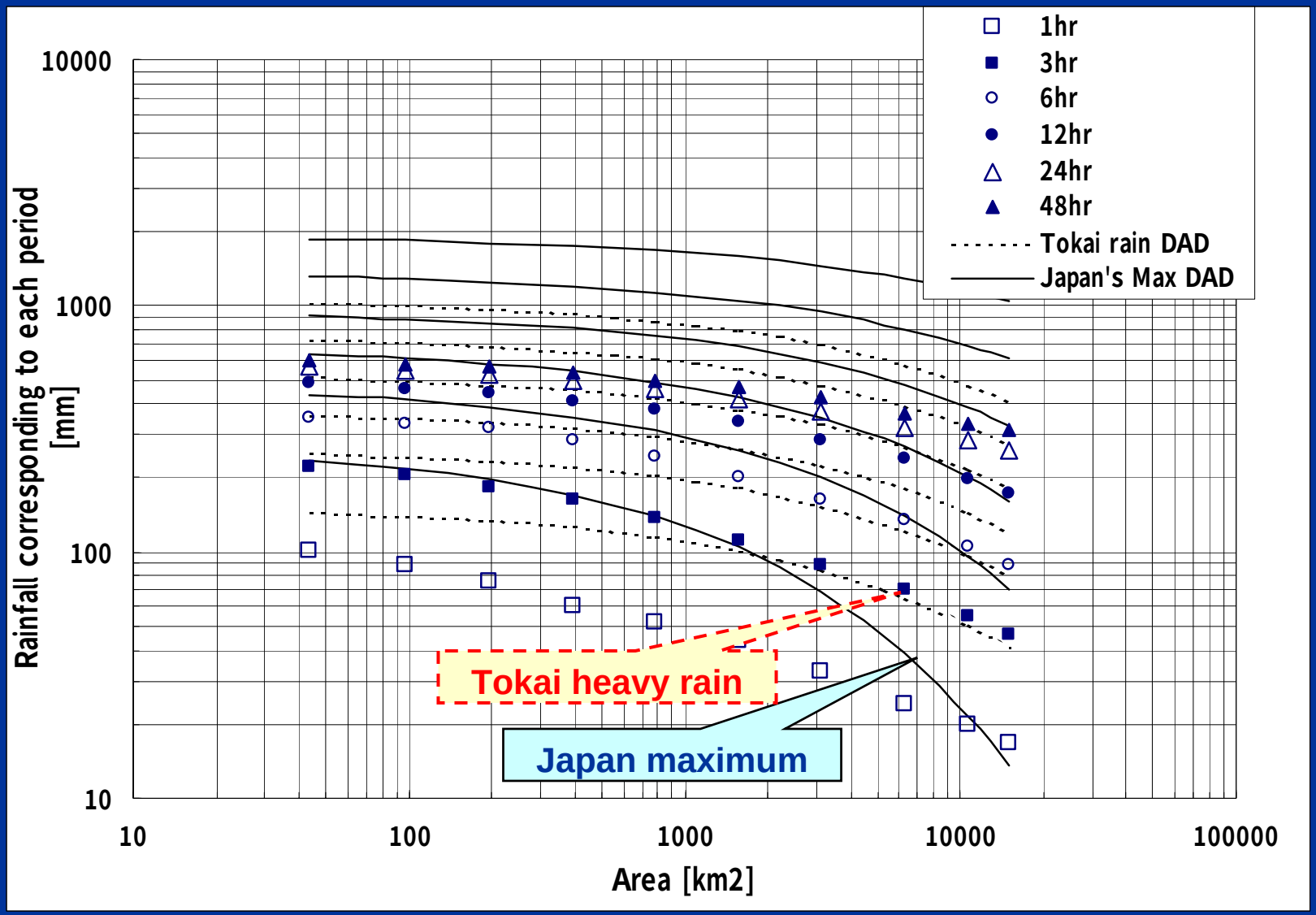
Recent extreme floods
- Tokai heavy rain -

During flood

Before flood

Affecting 580,000 people,
and economic loss: US$ 8 billion

DAD curves of Tokai heavy rain



Niigata-Fukushima heavy rain

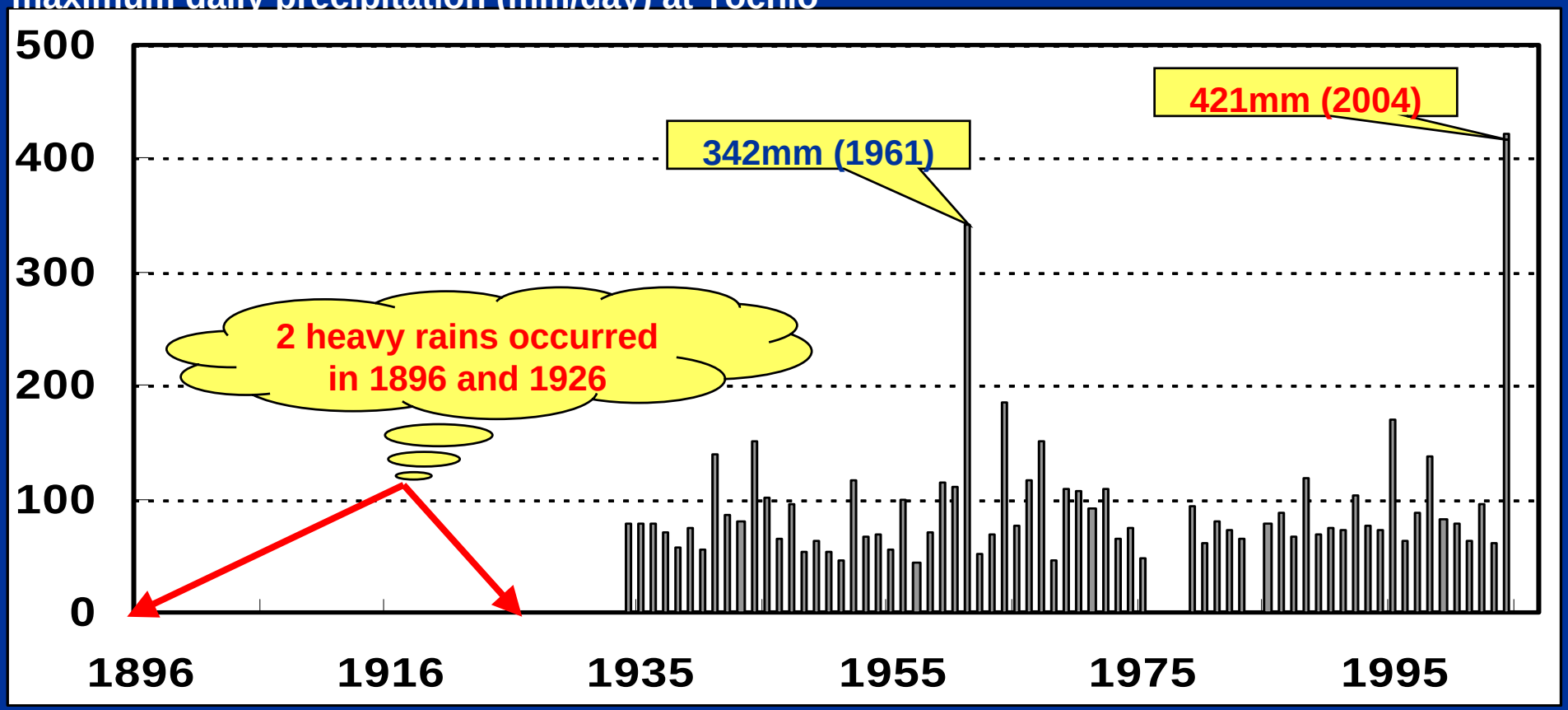
Sanjo city (Source: Asahi Koyo Co Ltd.)

Sanjo city

Nakanoshima town

Precipitation of Niigata-Fukushima heavy rain

maximum daily precipitation (mm/day) at Tochio



2004 rain was catastrophic and 15 deaths were reported (most of them were over 60), but other heavy rains occurred in 1896, 1926 and 1961.

Discussion

- Recent extreme floods were within climate variability, or considered as impacts of climate change?
- History in Niigata indicates:
  - 2004 rain was “record-breaking” in fact, however,
  - Same-scale rains occurred in 1896, 1926 and 1961.
  - Just having spent “happy days”, subsequently increased vulnerability and fostered a “false sense of safety”?
- Relatively too much rain in the Tone river in the 1940s, but who can say “It never happens?”

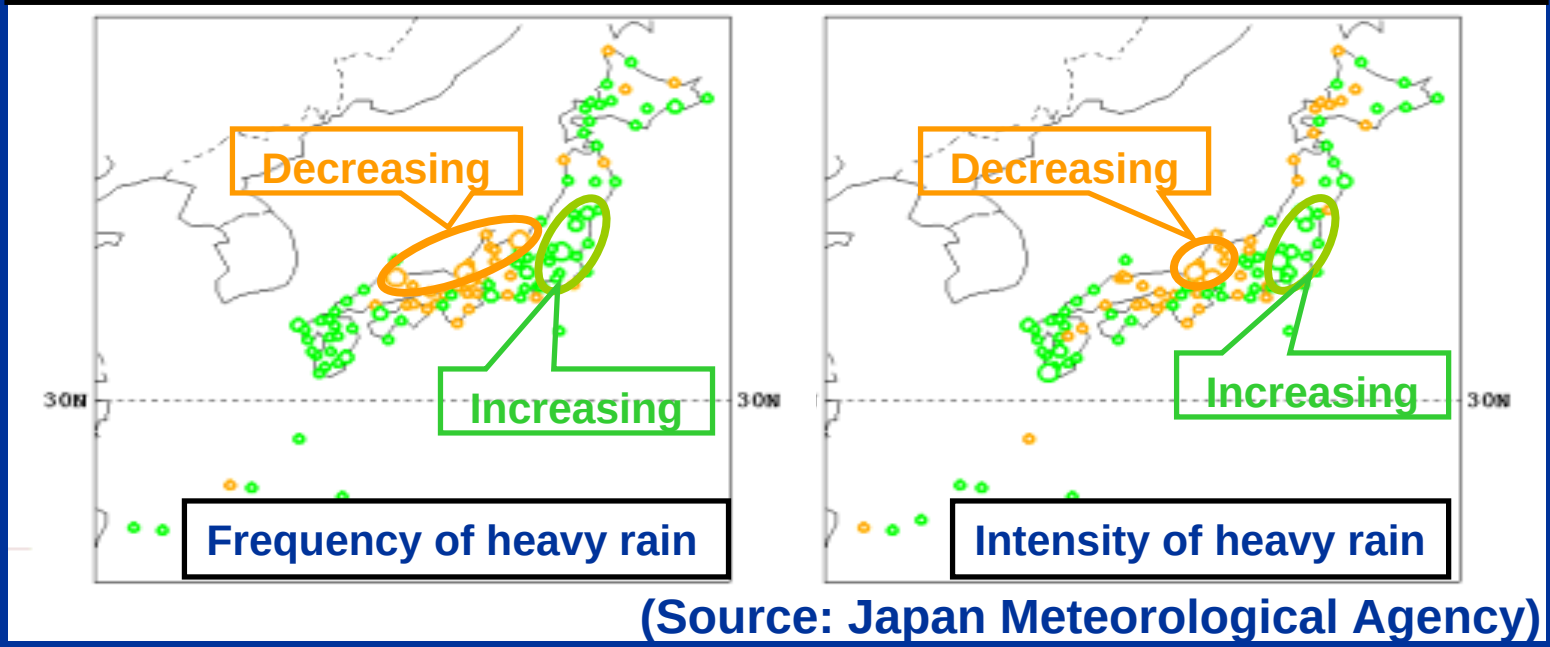
→ Managing extreme floods under the climate variability of today will help deal with the climate change in the future.

→ Need to develop assessment studies and prediction research to establish adaptive societies.

Contribution to the Dialogue on Water and Climate

- Establishing the "Exploratory Committee in East Asia" and its input to the WWF3 (**Nagoya case study**)
- Development of **assessment studies & prediction** on the impacts of climate change.

Trend of frequency and intensity of heavy rain (1961-2001)



(Source: Japan Meteorological Agency)

Future courses

- Need to progress **studies and research** (assessment and prediction) by maximizing the available data and knowledge base.

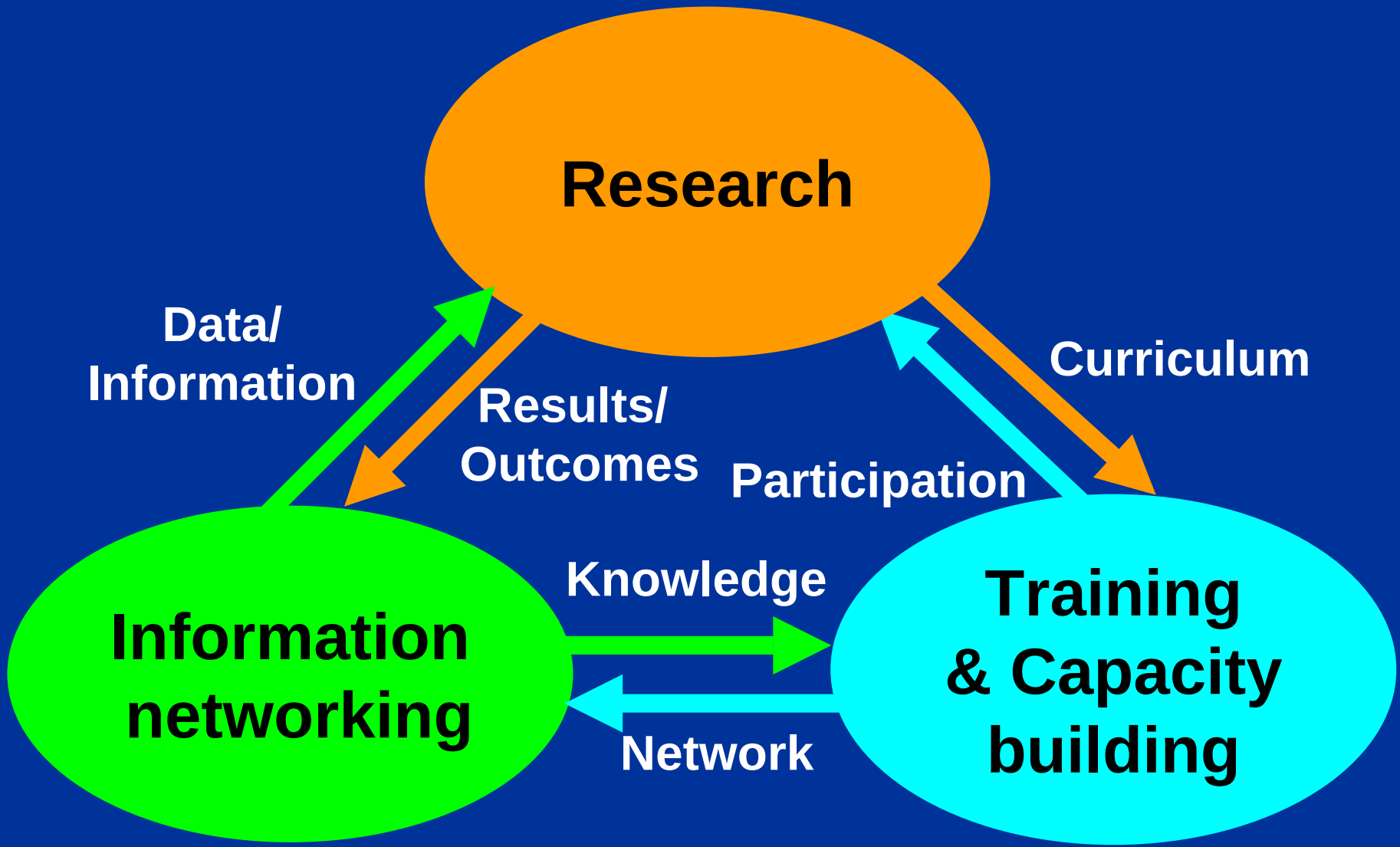
- Further need to **promote interactive dialogues** in the field of flood and climate and to **enhance risk communication** with the general public.

- A new **initiative to establish an international centre** on water-related hazards is expected to become a central platform for further progress.

Framework of the Centre

- Proposed to establish within PWRI as a global centre under the auspices of UNESCO in autumn 2005
- Theme: **Water hazard and risk management**
- Activities:
  - **Research**: WWAP, IFI/P and climate change etc.
  - **Training**: Flood hazard mapping etc.
  - **Information networking**: through NL, Web…
- Partnership with UNESCO-IHP network, UNESCO-IHE & other global/regional institutes, UN entities and other key organizations of the world.

Pillar Activities of the Centre



Summary

- Recent extreme floods are **record-breaking**, but any sufficient evidence yet to be found to relate to climate change.
- Just spending **"happy days"** without serious catastrophes, consequently increasing vulnerability.
- Flood management under current variability will help deal with future change: Need to make **societies adaptive** to the climate variability of today and of the future.
- More efforts needed to progress **assessment, prediction, and risk communication**: The new centre expected as a platform for further progress.

Thank you very much for your attention.

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