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**Proposal for Science Council of Asia Joint
Project 2007**

**Sustainable Water Resources
Management in Asia**

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1. Water issues in Asia (Background of Project)

- The 7th Goal of The United Nation Millennium Development Goals
- Rapid urbanization
- Six waves suffering to cities and pre-urban area in Asia
- Diversity

The UN Millennium Development Goals

Goal 1: Eradicate extreme poverty and hunger

- Reduce by half the proportion of people living on less than a dollar a day
- Reduce by half the proportion of people who suffer from hunger

Goal 2: Achieve universal primary education

- Ensure that all boys and girls complete a full course of primary education

Goal 3: Promote gender equality and empower women

- Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015

Goal 4: Reduce Child mortality

- Reduce by two thirds the mortality rate among children under five

Goal 5: Improve maternal health

- Reduce by three quarters the maternal mortality ratio

Goal 6: Combat HIV/AIDS, malaria and other diseases

- Halt and begin to reverse the spread of HIV/AIDS
- Halt and begin to reverse the incidence of malaria and other major diseases

Goal 7: Ensure environmental sustainability

- Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources
- Reduce by half the proportion of people without sustainable access to safe drinking water
- Achieve significant improvement in lives of at least 100 million slum dwellers, by 2020

Goal 8: Develop a global partnership for development

- Develop further an open trading and financial system that is rule-based, predictable and non-discriminatory, includes a commitment to good governance, development and poverty reduction— nationally and internationally
- Address the least developed countries' special needs. This includes tariff- and quota-free access for their exports; enhanced debt relief for heavily indebted poor countries; cancellation of official bilateral debt; and more generous official development assistance for countries committed to poverty reduction
- Address the special needs of landlocked and small island developing States
- Deal comprehensively with developing countries' debt problems through national and international measures to make debt sustainable in the long term
- In cooperation with the developing countries, develop decent and productive work for youth
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- In cooperation with the private sector, make available the benefits of new technologies— especially information and communications technologies



WATER, WATER, WATER

Urbanization



8 urban regions were over 10 millions
30 urban regions were over 5 millions

1985

(Prof.Okata, cSUR, UT,2008)



19 urban regions were over 10 millions
41 regions were over 5 millions

2000

(Prof.Okata, cSUR, UT,2008)



23 urban regions will be over 10 millions,
 60 regions will be over 5 millions,
 627 millions people will live in these 60 Megacities

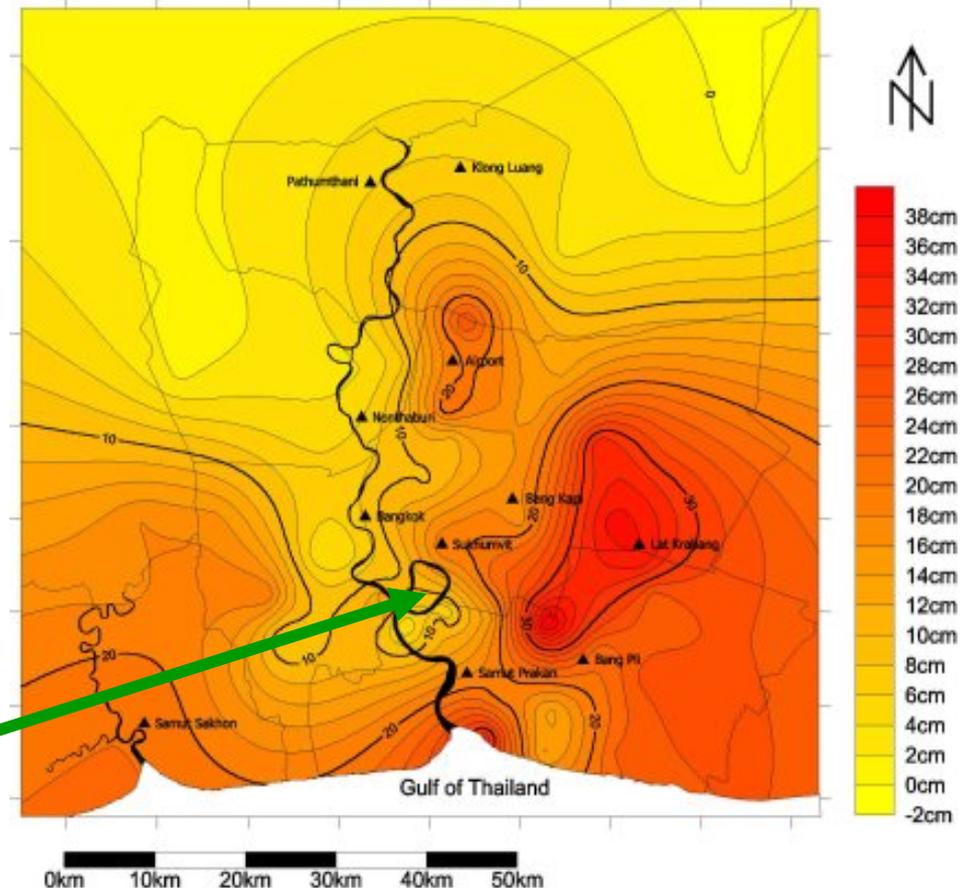
2015 :

(Prof.Okata, cSUR, UT,2008)

Groundwater Problems (Land Subsidence)

- **Groundwater Depletion**
 - Water level drawdown
 - More difficulty in extracting water
- **Land Subsidence**
 - Damage to infrastructure
 - Flooding
 - Disturb/deteriorate drainage systems

**Total Land Subsidence
(1992-2000)**



Bangkok City Central Area

(Dr.Babel, AIT)

Natural disaster (extreme case)

Groundwater and well damage due to *Tsunami*

(Sri Lanka, December 2004)



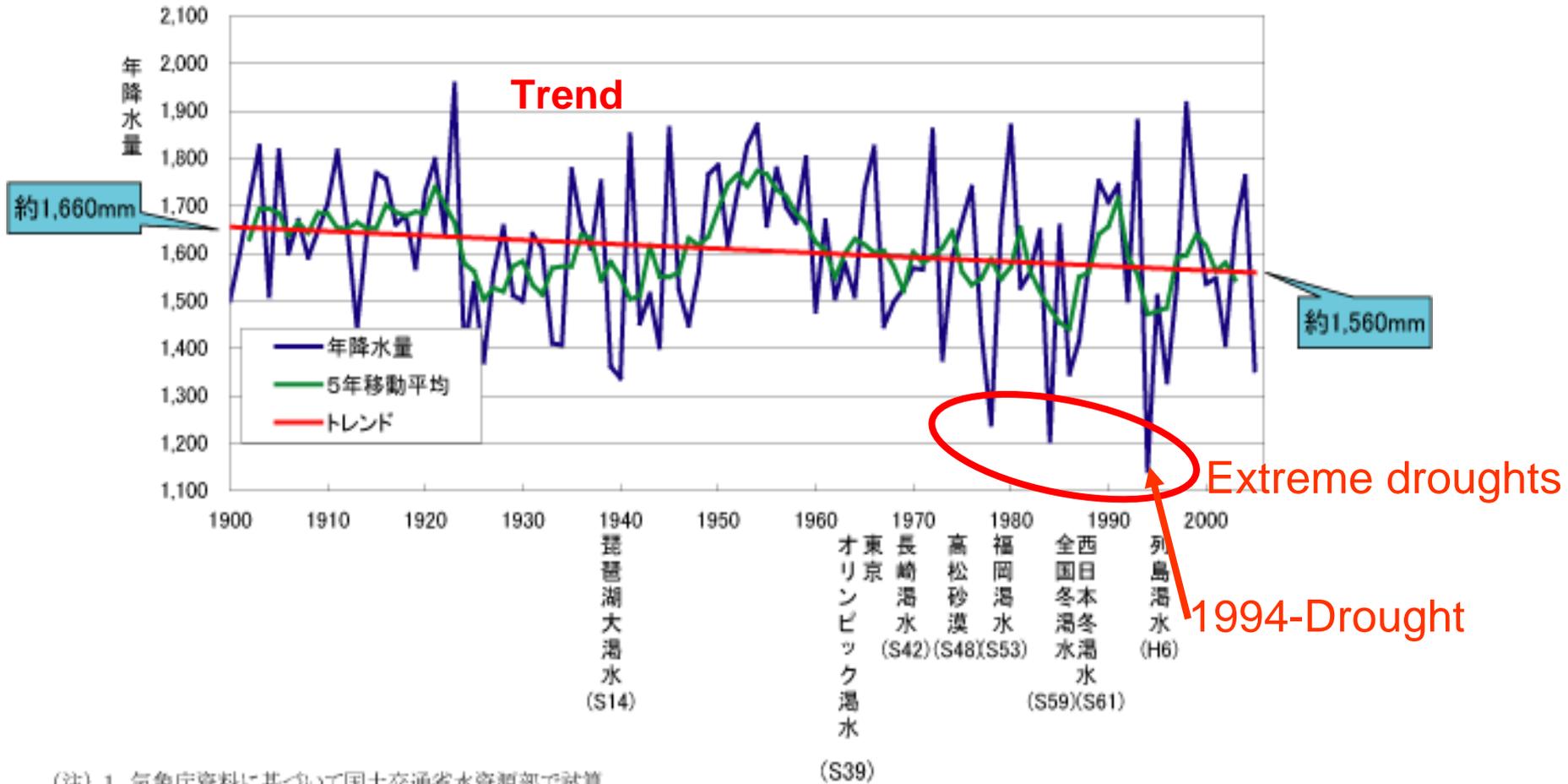
Earthquake (South Hyougo Pref. 1995)



Damages of Water Supply Ducts in Kobe City

Increasing extreme cases of annual precipitation

Trend of annual precipitation of Japan (1900年～2004)



- (注) 1. 気象庁資料に基づいて国土交通省水資源部で試算。
 2. 全国51地点の算術平均値。
 3. トレンドは回帰直線による。
 4. 各年の観測地点数は、欠測等により必ずしも51地点ではない。

※気象庁資料に基づき国土交通省水資源部で試算

Some adaptation options for water supply and demand (the list is not exhaustive) by 4th-IPCC-AR(WGII)

Demand-side

Improvement of water-use efficiency by recycling water

Reduction in water demand for irrigation by changing the cropping calendar, crop mix, irrigation method, and area planted

Reduction in water demand for irrigation by importing agricultural products, i.e., virtual water

Promotion of indigenous practices for sustainable water use

Expanded use of water markets to reallocate water to highly valued uses

Expanded use of economic incentives including metering and pricing to encourage water conservation

Source: IPCC the 4th Assessment Report 2007 WGII Chapter 3, p197, Table 3.5

Supply-side

Prospecting and extraction of groundwater

Increasing storage capacity by building reservoirs and dams

Desalination of sea water

Expansion of rain-water storage

Removal of invasive non-native vegetation from riparian areas

Water transfer

Source: IPCC the 4th Assessment Report 2007 WGII Chapter 3, p197, Table 3.5.

Water system in Asia experiences six major waves simultaneously:

- Increasing urban population*
- Climate change and Disasters*

- Rapid economic growth and centralization*
- Unprecedented technological development*
- Social and cultural fragmentation*
- Surge of economic globalization*

Diversity of water issues in Asia;

the socio-economic environment in Asia region shows geographically various phases on

- population density,
- climate (rainfall, temperature, humidity, ...),
- sanitary condition, and
- infrastructural measures against disasters (tsunami, earthquake, flooding, drought,)

This diversity on water in different areas in Asia should be considered for conducting this Joint Project.

Various Atmospheric Temperature in the World



(Original data source: 2007-Chronological Scientific Tables, National Astronomical Observatory, Japan) Red:Asia area

Locally specific solutions are required.

2. Problems to be solved:

- (1) How to develop and allocate a future water resource in watersheds (rational beneficial use, recycling, reuse of wastewater, seawater desalination)
- (2) How to accommodate the multiple functions of water in urban area (need of co-existence between human and ecosystems)
- (3) How to construct, maintain and upgrade the infrastructures (water/wastewater systems, irrigation system, industry water supply)
- (4) How to conserve water quality of all water resources and environment (river, lake, reservoir, groundwater, coastal water)

3. Proposal for Joint Project on Sustainable Water Resources Management

Objectives

To propose policy options for sustainable water resources and environment management in Asia based on innovative science and technology. (as academia)

Approach

Joint Project will:

- 1) exchange information and facts on water issues
- 2) do comparison-study on water quantity and quality
- 3) survey the **innovative science and technology** for each water beneficial use
- 4) **identify the gap** between the humanities/social sciences and natural science /technology or the gap between policy making and academic knowledge on water
- 5) propose policy options for sustainable water management from a general viewpoint and also a **site-specific viewpoint for Asia**

Thank you

謝 謝