



Global Environmental Change and Water Problems in the Water Environment:

Problems enveloping the
water environment

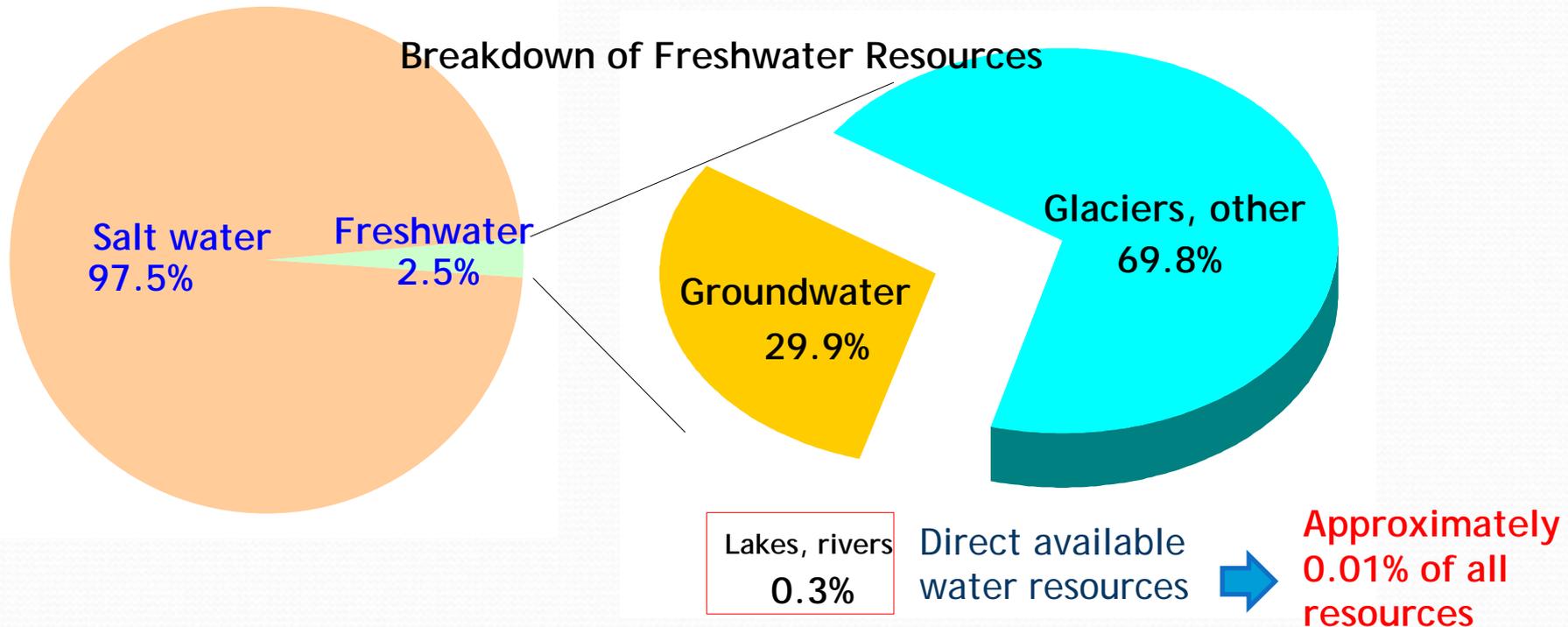
9 October 2009

Ministry of the Environment, Japan
Environmental Management Bureau
Water Environmental Division

Outline

1. Global Water Conditions
2. Global Warming & Water
3. Water Use in Japan
4. International Trends
5. Japan's Actions

Earth's Water



- Salt water accounts for 97.5% of the total water resources on earth; freshwater accounts for only the remaining 2.5%.
- Of the earth's freshwater resources, 0.3% of the water from rivers, lakes and marshes is available for direct use by humans.
- This is approximately 0.01% of all water resources on earth.

Present State of the World

Globally,

- Approximately 1.1 billion people are currently without access to safe water ()
() Less than 20 liters of water per day from a source more than one kilometer away is considered unsafe.
- Approximately 2.6 billion people live in areas without sanitary facilities.
- Every year, 1.8 million children die from water and hygiene related causes.

Source: UNDP 2006 Human Development Report



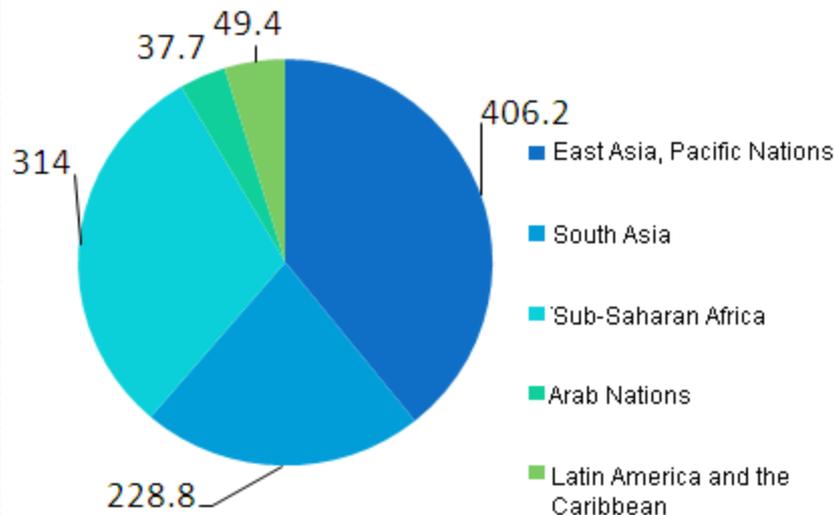
This is the most critical issue facing the human race today.

1. Global Water Conditions

Asia: The Center of the World's Water and Sanitary Problems

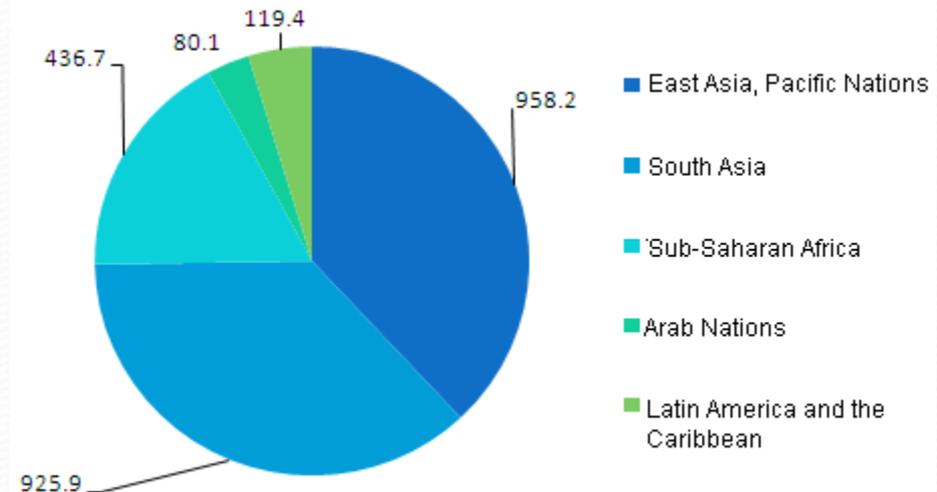
- Those without access to safe water and sanitary facilities are concentrated in **Asia**.

People without access to safe water (in millions) in 2004



Total 1.1 billion people
(600 million people in Asia (63%))

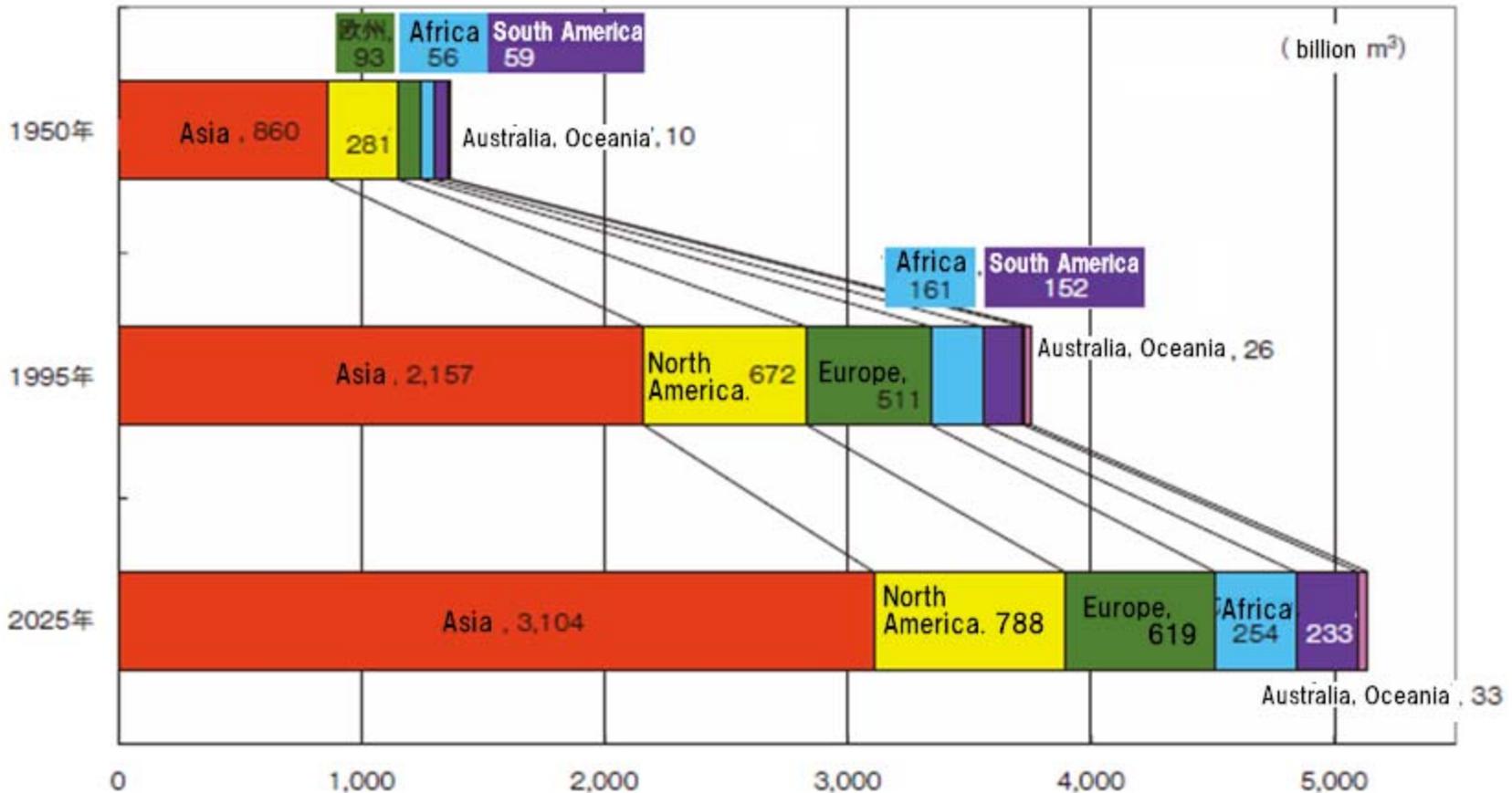
People living in unsanitary conditions (in millions) in 2004



Total 2.6 billion people
(About 1.9 billion people in Asia (74%))

Future Increase in Demand for Water in Asia

Outlook on water demand



(注) World Water Resources at the Beginning of the 21st Century, UNESCO, 2003をもとに国土交通省水資源部作成

Global Water Issues (Water Pollution and Shortages in China)



Wastewater from a dye factory in Hubei Province being discharged into the Yangtze River (2007)

Source: CHINA daily Website
http://chinadaily.com.cn/china/2007-04/15/content_850842.htm



Increased dry-up of the Yellow River due to water shortages (January 2007)

Source: <http://www.jxgdw.com/jxgd/news/gnxw/userobject1ai699737.html>

Global Water Issues (Reduction of the Aral Sea)



Figure 1 October 2003

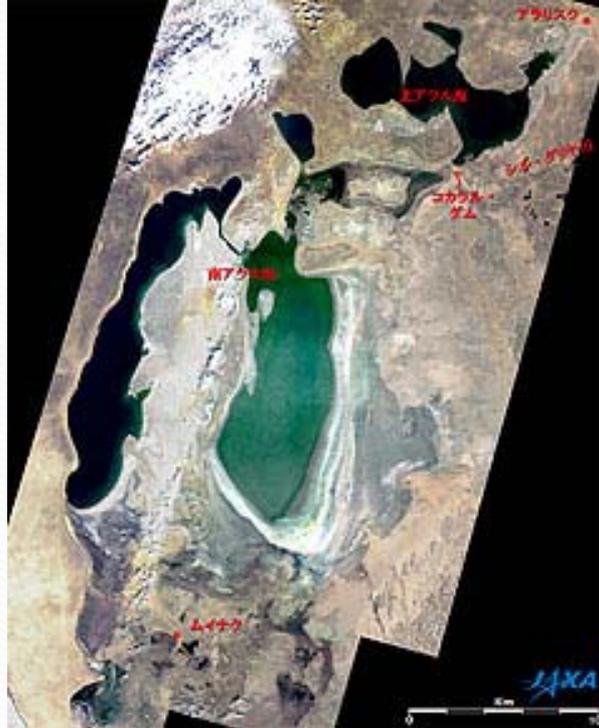


Figure 2 September 2006-October 2007

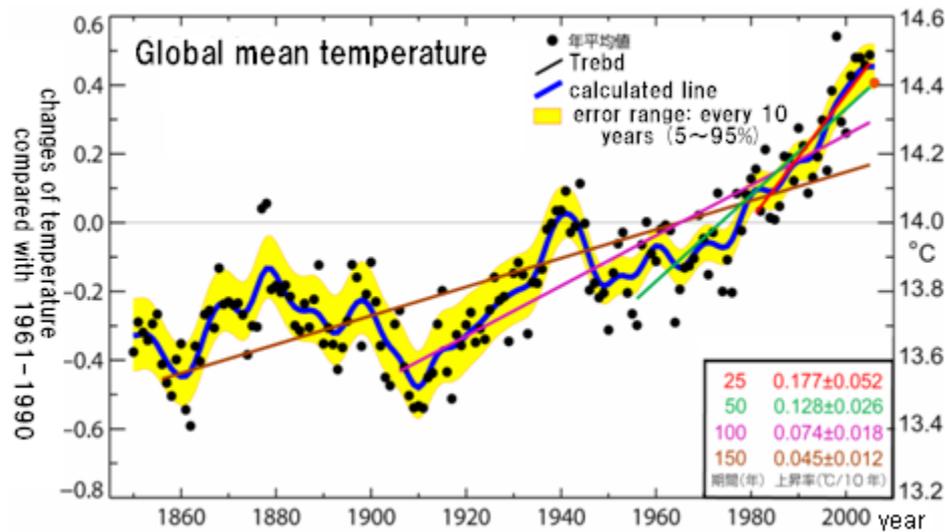


Figure 3 2009

Since the 1960s, water surface areas have undergone a drastic reduction as a result of large-scale irrigation to grow cotton and grain.

Rise in Average Temperatures

Average ground temperature
(deviation with average temperatures from 1961-1990)



Average Northern Hemisphere temperatures during the second half of the 20th century were likely the highest in at least the past 1,300 years.

(Source: IPCC Fourth Assessment Report)

The average global temperature has risen 0.74 in the past 100 years. The warming trend over the past 50 years is almost twice that for the last 100 years.

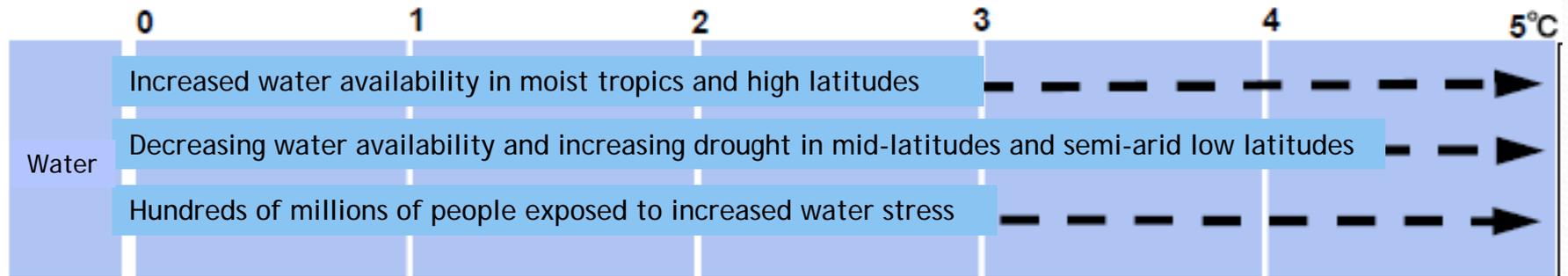
Global Warming and Water Stress

According to IPCC...

- Several hundred million people face serious water shortages due to global warming.
- It is estimated that an increase in the frequency of droughts and floods will have a negative impact on regional production, in particular, self-sufficient agricultural sectors in low-latitude regions.

Key impacts as a function of increasing global average temperature change
(Impacts will vary by extent of adaptation, rate of temperature change, and socio-economic pathway)

Global mean annual temperature change relative to 1980-1999 (°C)



Dotted black arrows indicate impacts continuing with increasing temperatures.

Current Existing Impacts



Source: The Asahi Shimbun (18 November 2006)

Increase in frequency of extreme weather in many parts of the world (heavy rains, droughts, heat waves, other).

Rise of annual averages of the global mean sea level in the 20th century by 17cm.

(Source: IPCC Fourth Assessment Report)

Since 2001, Australia has experienced worsening droughts due to rain shortages.



Water shortages have caused a sharp decrease in the supply of wheat, barley, rice, other.

Glacial Retreat

The Himalayas are facing glacial retreat as a result of global warming.

Percentage of glacial melt in river flow (ICIMOD)

- Indus River: 44.8%
- Ganges River: 9.1%
- Mekong River: 6.6%
- Yangtze River: 18.5%



Glacial retreat has potential to cause floods and shortages in water resources in the downstream.



Source: JAXA

<<Glacial retreat in the Himalayas>>

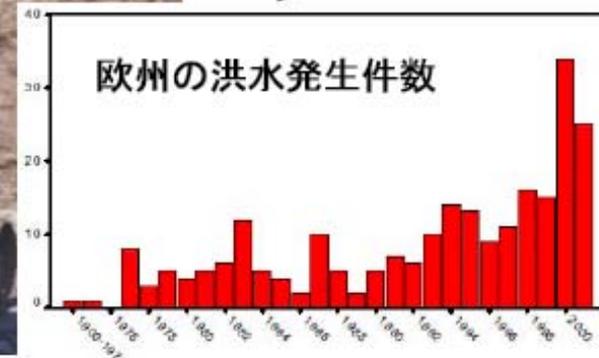


Increase in Frequency of Large-Scale Floods



Awaiting rescue on the in Müglitz River, a small tributary stream of the Elbe River (from the Ministry of the Interior of Saxony)

洪水の発生
件数も増加
している



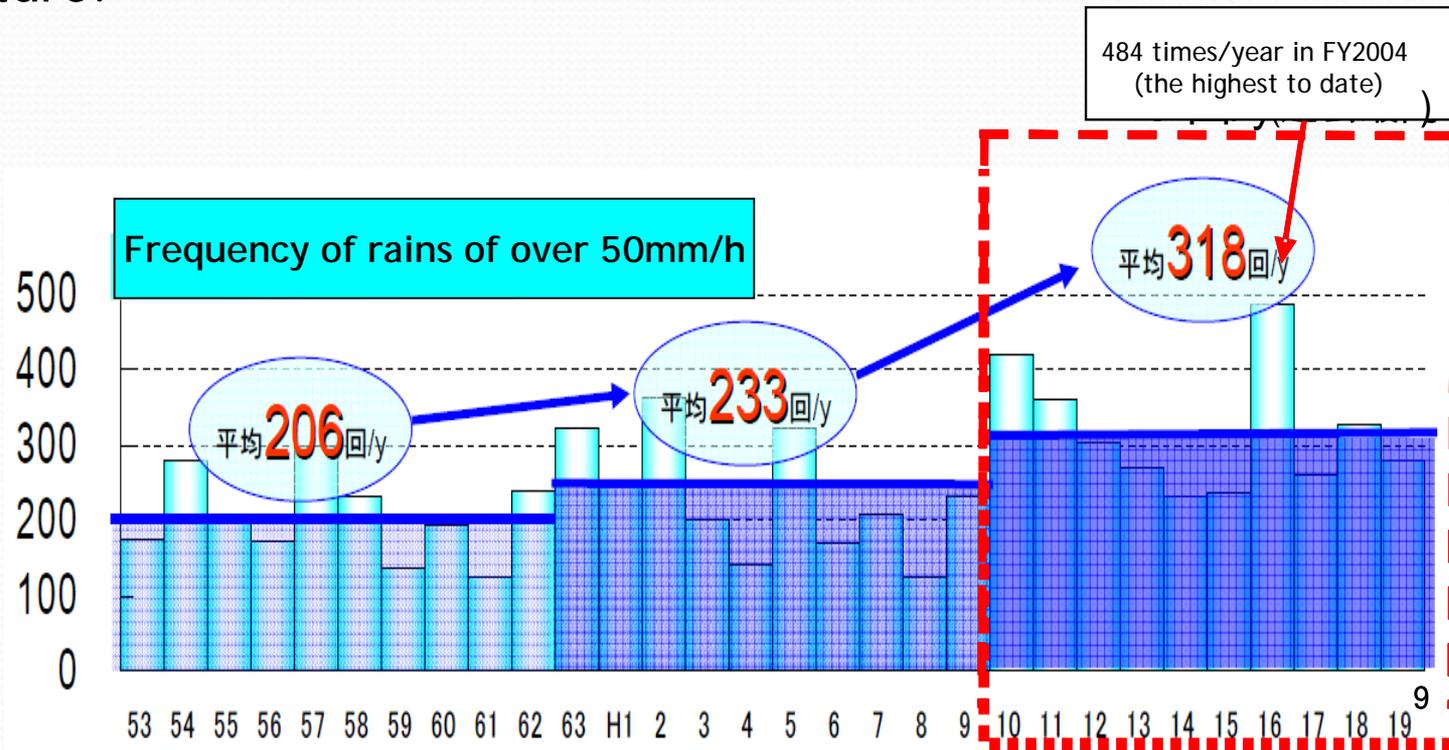
In the summer of 2002, a large-scale flood occurred in different areas of Europe. Twenty-seven people died in Austria, the Czech Republic, Germany and France. More than 230,000 people were evacuated, with damages estimated at 16 billion Euro (approximately 2.05 trillion yen*).

*1 Euro = 128 Yen (September 2003)

Flooding in Japan

Frequent occurrence of torrential rains in large cities

In recent years, rainfall of over 50mm per hour has increased in frequency. An increase in heavy rains and strong typhoons are a concern for the future.



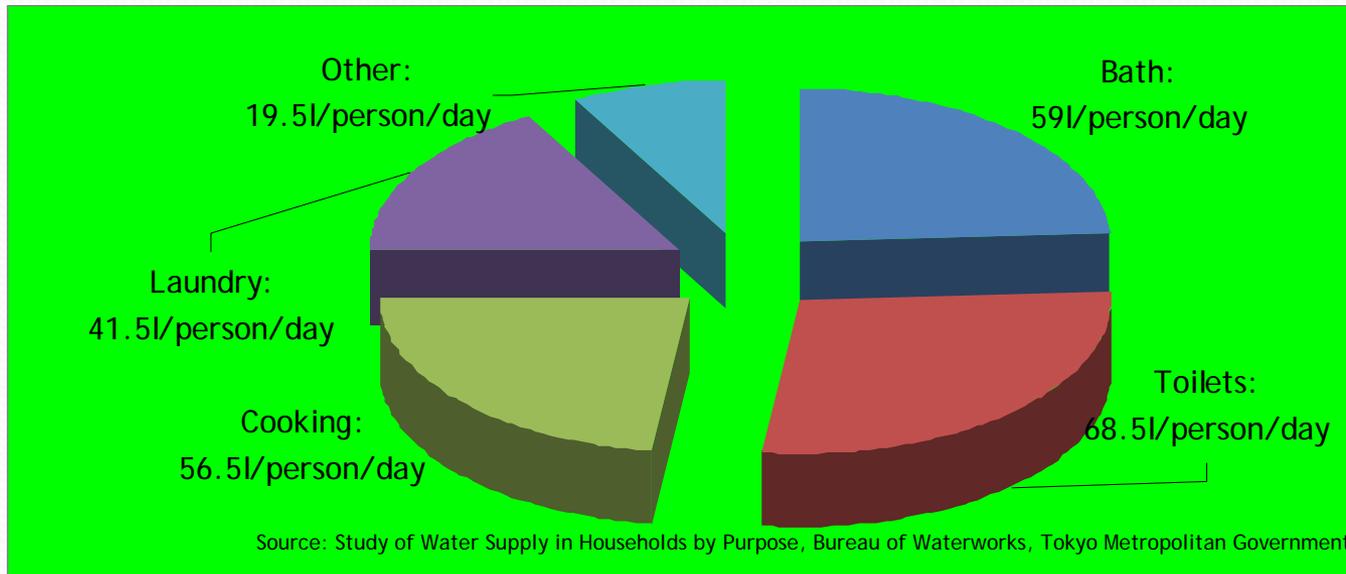
Total annual number of cases of the amount of rainfall an hour (Data from approximately 1,300 points in the national Automated Meteorological Data Acquisition System) (From materials from the Meteorological Agency)

Source: MLIT

Water Use in Japan

<Household Water>

- Households use approximately 245l/person/day (Of this, 2-3l is drinking water.)
- Most water is used for washing (baths, toilets, laundry)



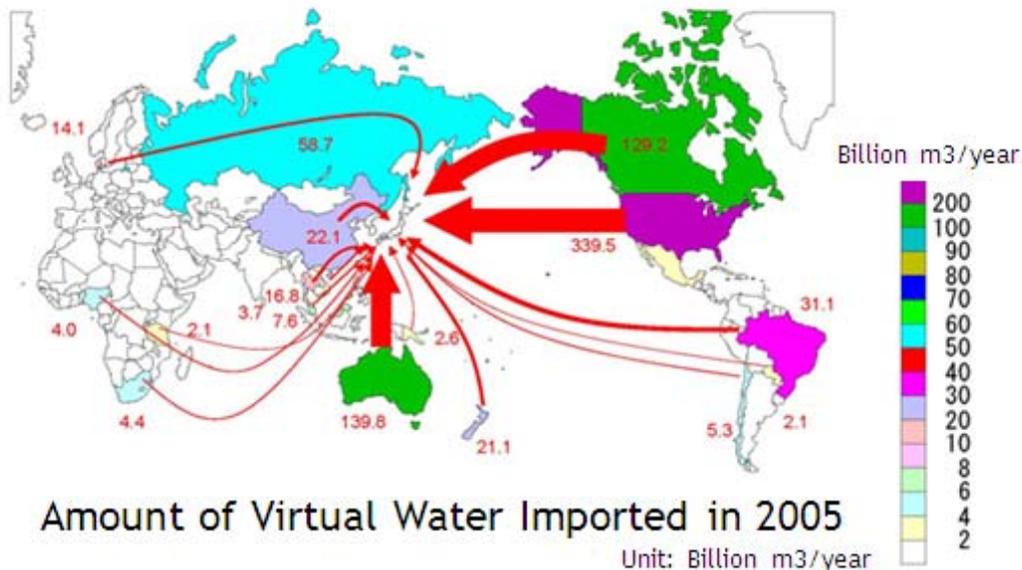
<Water for City Activities>

- Water for businesses and commercial use such as in restaurants and hotels, other

The average amount of water used per person per day, including water for city activities, is **307l/person/day**.

Water Use in Japan (Reliance on the world's water)

- Is Japan immune to water stress?
- Country that **consumes the world's water** through food imports



Japan's self-sufficiency rate (calorie base) is about 40%.

Dependent on water imported from overseas

Japan imported about 80 billion m³ of virtual water from overseas in 2005. The majority originated in food.

This is equal to the annual amount of water used in Japan.

出所：輸入量 工業製品 通商白書（2005年）
農畜産物 JETRO貿易統計（2005年）、財務省貿易統計（2005年）
水消費原単位 工業製品 三宅らによる2000年工業統計の値を使用
農産物 佐藤による2000年の日本の単位収量からの値を使用
丸太 木材需給表等より算定した値を使用

Effective Use of Water

Use of rainwater and recycled water

This is the use of water of relatively low quality in comparison to tap water, such as recycled water from sewage and rainwater for various uses including in restroom toilets, air cooling/conditioning, and sprinkling.



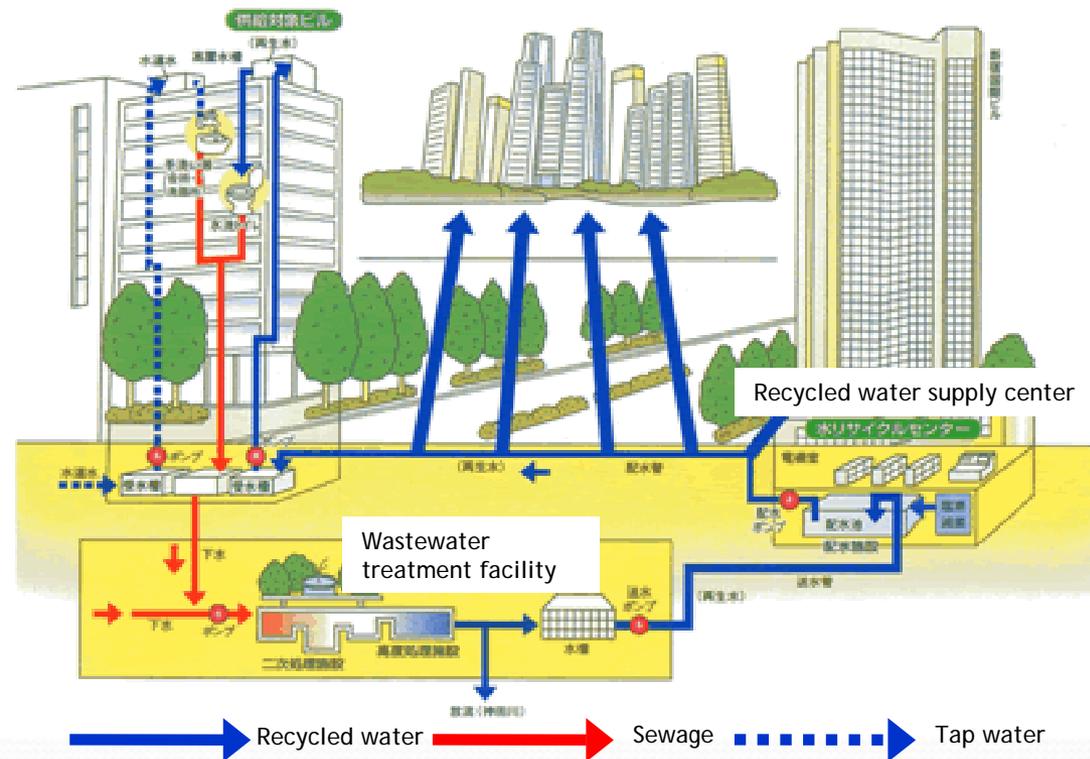
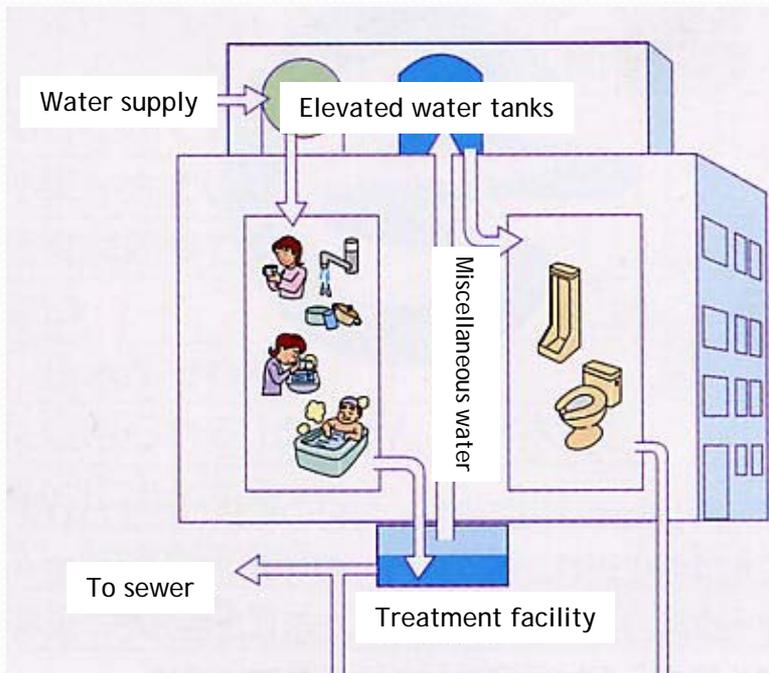
Effects of the use of rainwater and recycled water

Effective use of limited water resources, including reductions in the amount of tap water used and improvement in people's views towards water savings, to form a society that can effectively deal with water shortages.

Improvement of the water environment by decreasing sewage.

Wastewater Recycling Systems

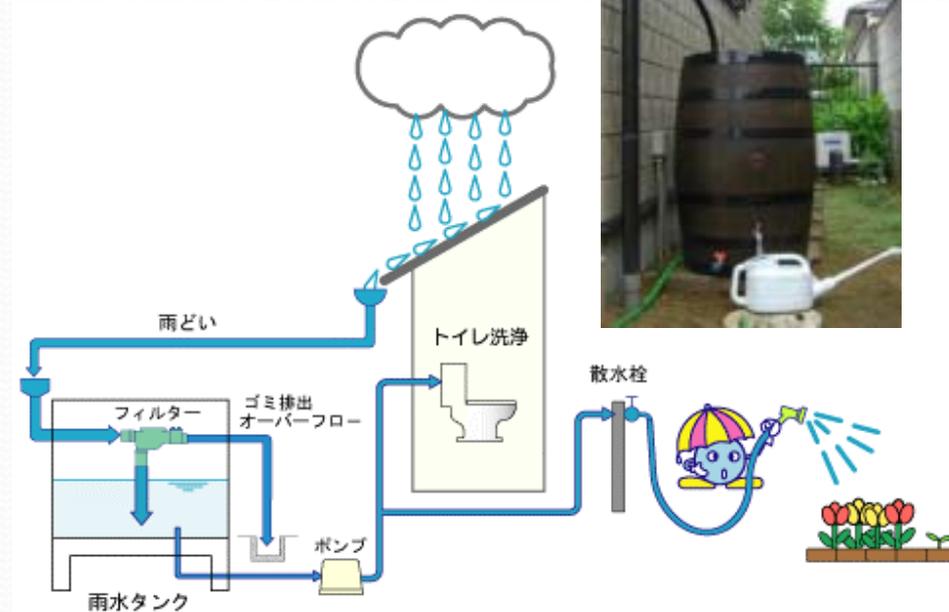
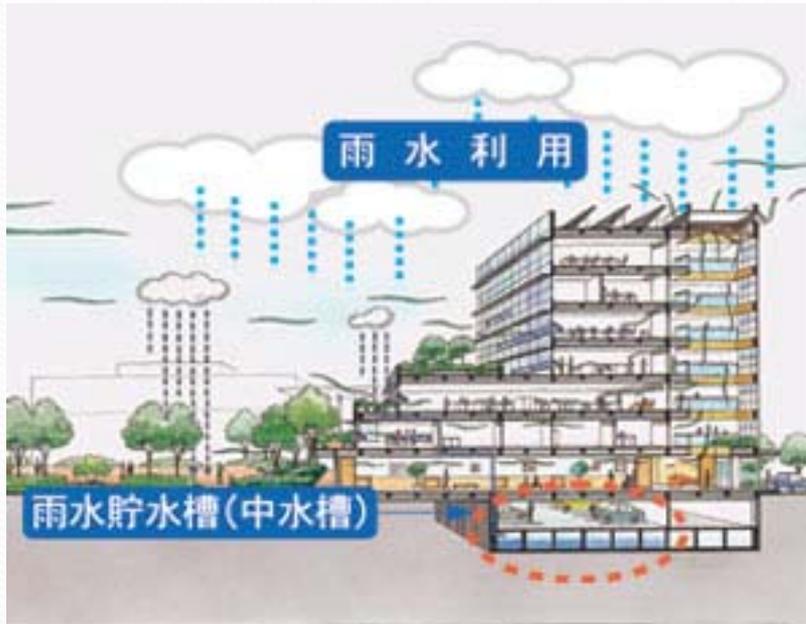
- “Individual circulation systems” where wastewater is purified and recycled in a single building
- “District circulation systems” where buildings in designated districts jointly operate waterworks
- “Wide-area circulation systems” where treated wastewater from sewage treatment plants are supplied and used over large areas



Rainwater Utilization Systems

Systems that use rainwater for miscellaneous water. This system may be used together with wastewater recycling.

This system can be used for household rainwater tanks, as well as in large-scale buildings.



Fukuoka City

Miscellaneous water systems are required in order to construct large-scale buildings.

Constructed buildings with a total area of more than 5,000m² (3,000m² in the promotional area) are required to install wastewater reclamation systems for washing water (flushing, rinsing, etc.).

The city provides a subsidy for interest and property taxes in individual circulation systems.

さらに増え続ける
再生水利用施設

アイランドシティ地区
福岡タワー
千早駅 (JR)マランメッセ福岡
福岡ドーム
香椎地区
福岡市校舎本庁舎
アクロス福岡
キャナルシティ博多
福岡市の市街地状況
シーサイドももち地区
都心ウォーターフロント地区
天神・渡辺通り地区
博多駅周辺地区

258 suppliers and 4,600m³ of water supplied (daily average) at the end of FY2003

Management of Miscellaneous Water

Preventing damage to people's health

Operational and maintenance standards

Watering, landscaping, and cleaning

pH level	Between 5.8–8.6
Odor	Not unpleasant
Color	Clear, nearly colorless
Coliform	Not detected
Turbidity	2 NTU or under

Washing water for flush toilets

pH level	Between 5.8–8.6
Odor	Not unpleasant
Color	Clear, nearly colorless
Coliform	Not detected

3. Water Use in Japan

Water quality standards for the usage of recycled wastewater and standards for facilities					
	Places where standards apply	Washing water	Sprinkling water	Landscaping water	Recreational water
Bacillus coli	Exit point of wastewater recycling facilities	Not detected ¹⁾	Not detected ¹⁾	Refer to remarks ¹⁾	Not detected ¹⁾
Turbidity		(Management target value) 2 degrees or less	(Management target value) 2 degrees or less	(Management target value) 2 degrees or less	2 degrees or less
pH		5.8-8.6	5.8-8.6	5.8-8.6	5.8-8.6
External		Not unpleasant	Not unpleasant	Not unpleasant	Not unpleasant
Color		-- ²⁾	-- ²⁾	Less than 40 degrees ²⁾	Less than 10 degrees ²⁾
Odor		Not unpleasant ³⁾	Not unpleasant ³⁾	Not unpleasant ³⁾	Not unpleasant ³⁾

Source: Manual on standards for recycled water from treated wastewater, MLIT (April 2005)

MDGs (Millennium Development Goals)

The declaration adopted at the UN Millennium Summit organised in New York in September 2000 and the international developmental goals that have been adopted at key international conferences and summits organised in the 1990s were integrated and brought together under one framework.

Eight targets have been set to be achieved by 2015.

- By 2015, reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation.

1st Asia-Pacific Water Forum

(December 2007, Beppu, Japan)

Message from Beppu (Excerpt)

- Recognition of people's basic right to safe drinking water and basic sanitation as a fundamental aspect of human security.
- Reduce by half the number of people who do not have access to safe drinking water by 2015 and aim to reduce that number to zero by 2025.
- Accord the highest priority to water and sanitation in all national economic and development plans and agendas and increase substantially the allocation of resources to water and sanitation sectors.

G8 Hokkaido Toyako Summit

Leaders Statement (8 July 2008)

- **Water and Sanitation (Summary)**

47.

Good water cycle management is crucial in order to address the issue of water...we will promote integrated water management and the concept of 'Good Water Governance,' with particular focus on Sub-Saharan Africa and Asia-Pacific, by taking necessary actions such as strengthening of trans-boundary basin organizations, sharing of water-related expertise and technology with developing countries, support for capacity building for water-related initiatives, promotion of data collection and utilization, and adaptation to climate change.

5th World Water Forum

Ministerial Declaration (22 March 2009)

(Excerpt)

Recognize the need to achieve water security. To this end it is vital to increase adaptation of water management to all global changes and improve cooperation at all levels.

Recognize, in particular, the specific challenges facing different parts of the world, especially Africa, in meeting the MDGs and attaining an acceptable level of water security for socio-economic development.

Integrated Water Resource Management

IWRM is the process that promotes the coordinated and systematic development and management of water, land and related resources. Its purpose is to maximise the resultant economic and social benefits in an equitable manner without compromising the sustainability of ecosystems.

Perception of water as an integral part of the ecosystem

Water/land resources, water volume/quality, surface and groundwater, other

Perception of water as an integral part of water-related fields

Rivers, waterworks and sewerage, agricultural water, industrial water, environmental water, other

Perception of the importance of various stakeholders

National and local governments, NGOs, local residents, other

Water Environment Partnership in Asia (WEPA)

Development of a water environment platform, such as an information database, capacity improvement of policymakers and development of human resources in order to improve governance to protect the water environment in the Asian monsoon region.

Partner Countries

Asian Monsoon Region
11 countries



Cambodia, China, Indonesia, Laos, Malaysia, Myanmar, Philippines, Korea, Thailand, Vietnam, Japan

Main activities in FY2008

International forum

- 3rd International Forum (Malaysia)
23-24 October 2008
108 participants from 14 countries



Bilateral meetings

- Cambodia 25-26 September 2008
- Malaysia 22 October 2008



Bilateral meetings in Cambodia

Annual meeting

- 4th Annual Meeting (Malaysia)
24 October 2008

Information dissemination

- 5th World Water Forum (Turkey)
16-22 March 2009



Development/expansion
of database <http://www.wepa-db.net/>



Thank you for your attention.