



# **Future of Civil Engineering**

## **Basic Concept of JSCE on the Globalization**

The philosophy of JSCE on globalization is to create a sustainable world community through the utilization of best knowledge and achievements of civil engineering for the safe and comfortable living and welfare of people .

For this purpose, the civil engineers must act with the affection for mankind without being restricted by the circumstances imposed for various reasons.

# The Challenging Issues in Asia

## (1) Natural Disasters

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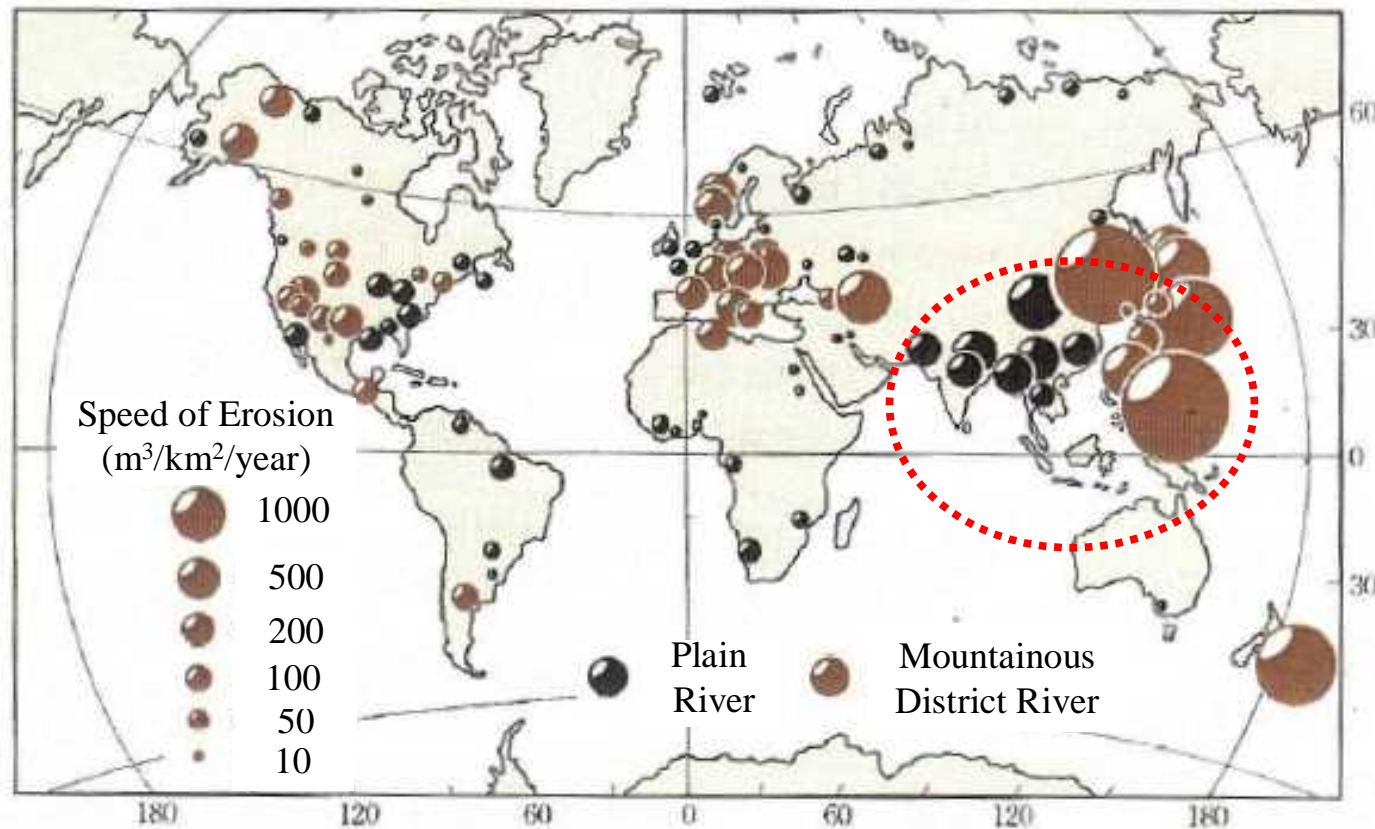
- ◆ Natural disasters such as earthquakes, floods and typhoons have been recently increasing and the number of casualties in Asia is the 90% of the total number all over the world.
  - Dense population in low land areas vulnerable to natural disasters
  - Insufficient infrastructures
  - Poverty
- ◆ Poverty is worsening disasters and disasters is aggravating poverty.

# River Erosion in Asia and Its Effects

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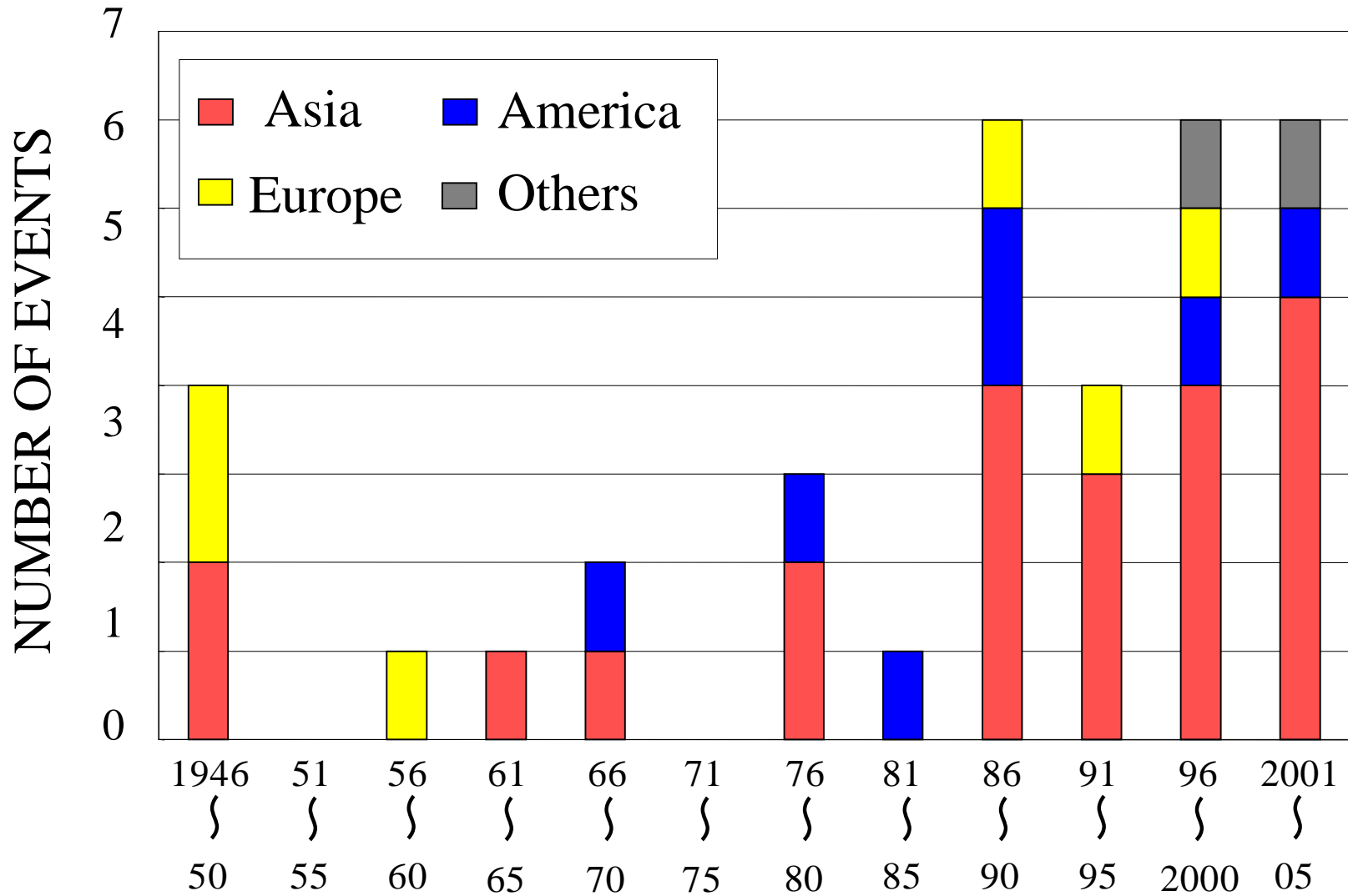
River erosion is affecting the occurrence of natural disasters and environment.

- Soft ground in alluvial plain vulnerable to earthquakes
- Environmental destruction, expansion of sea pollution

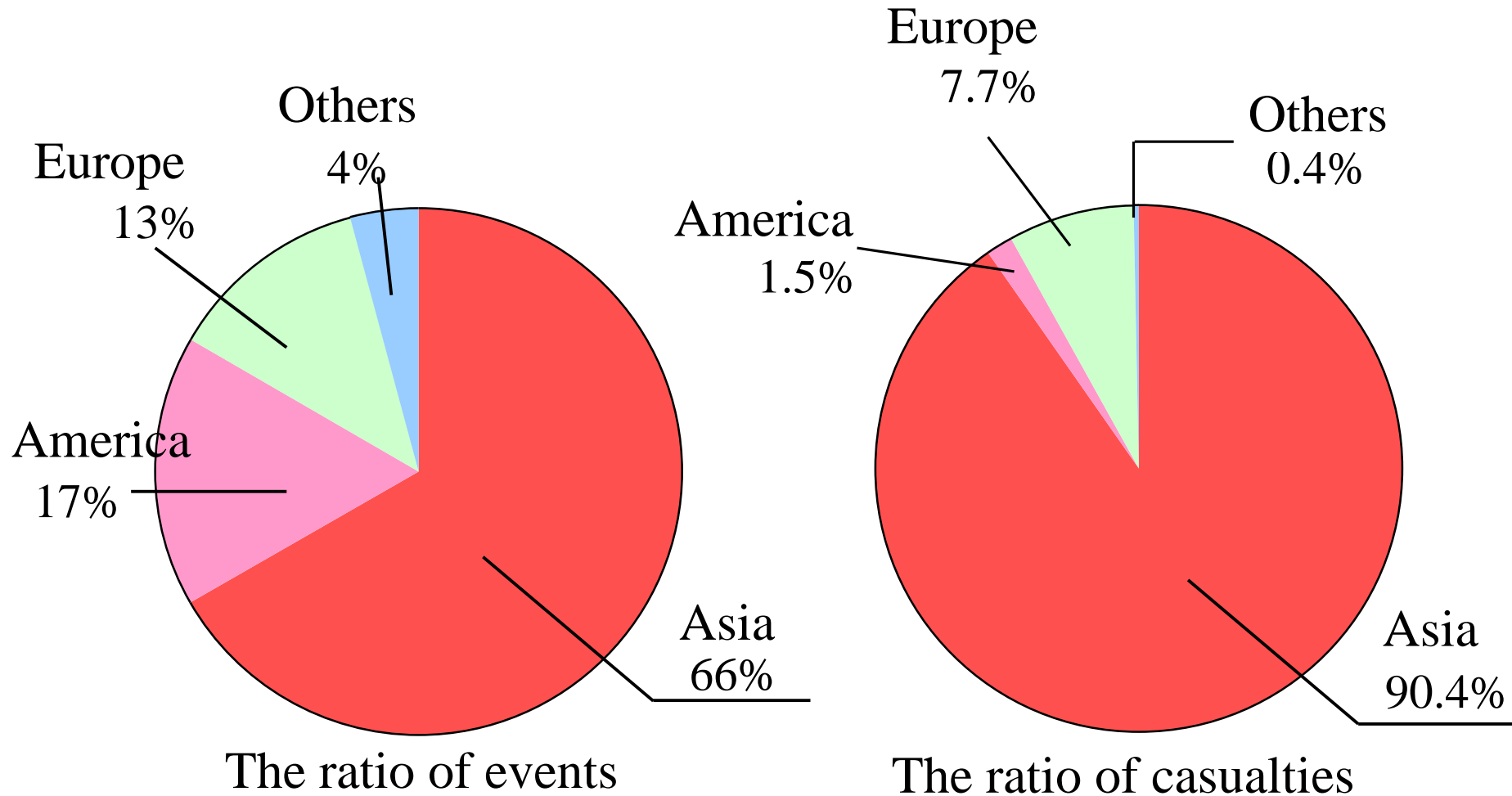


River Erosion Speed

# Damaging Earthquakes and Tsunamis in the World in the Last Half Century (Events with more than 1000 casualties)



# Regional Ratio of Earthquake, tsunami and Casualties (1986 ~ 2005 Events with More than 1000 Casualties)



Total number of events: 26

The number of casualties : 548,206



# Recent Damaging Earthquakes and Tsunami



2004 Sumatra Tsunami



2004 Niigata Earthquake



2004 Sumatra Tsunami

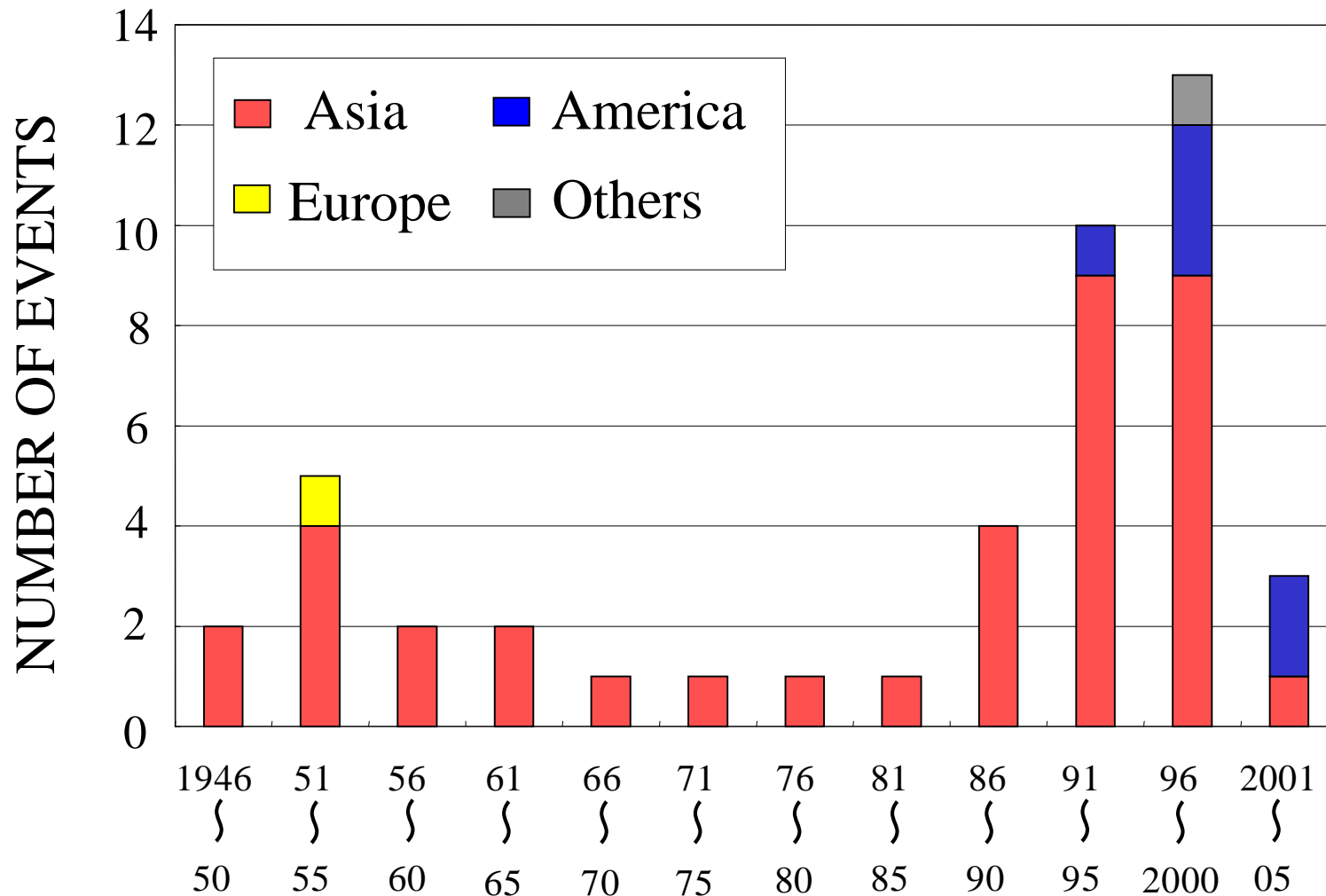


2005 Pakistan Earthquake

# Damaging Storms and Floods

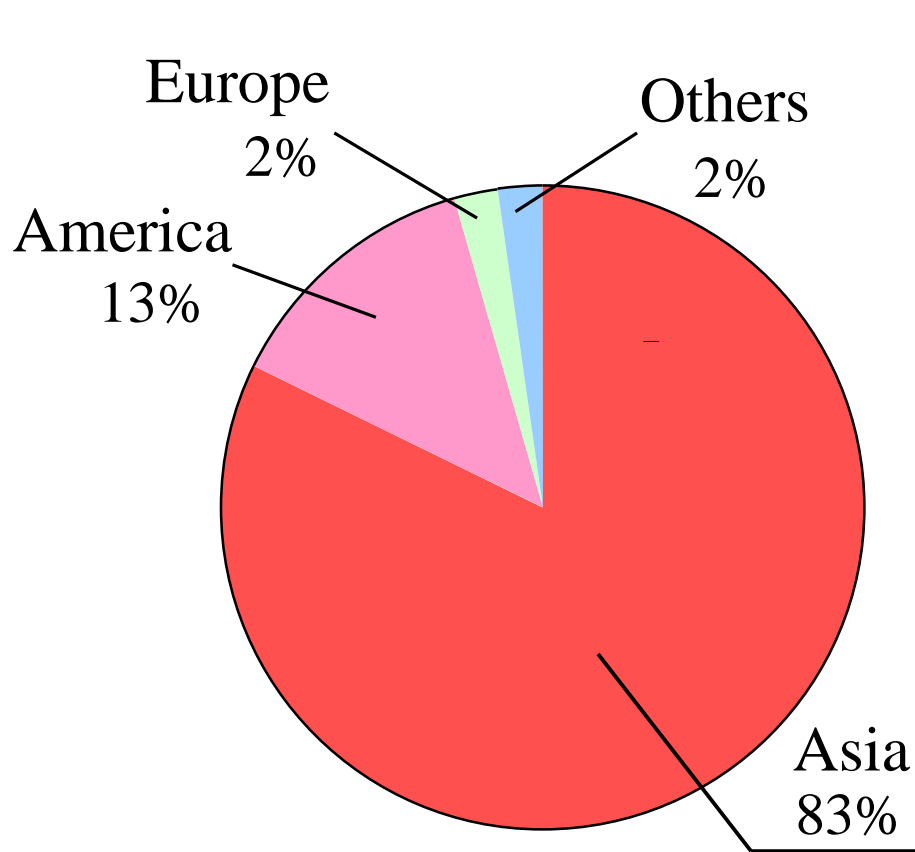
in the World during the Last Half Century

(Events with casualties more than 1000 casualties)



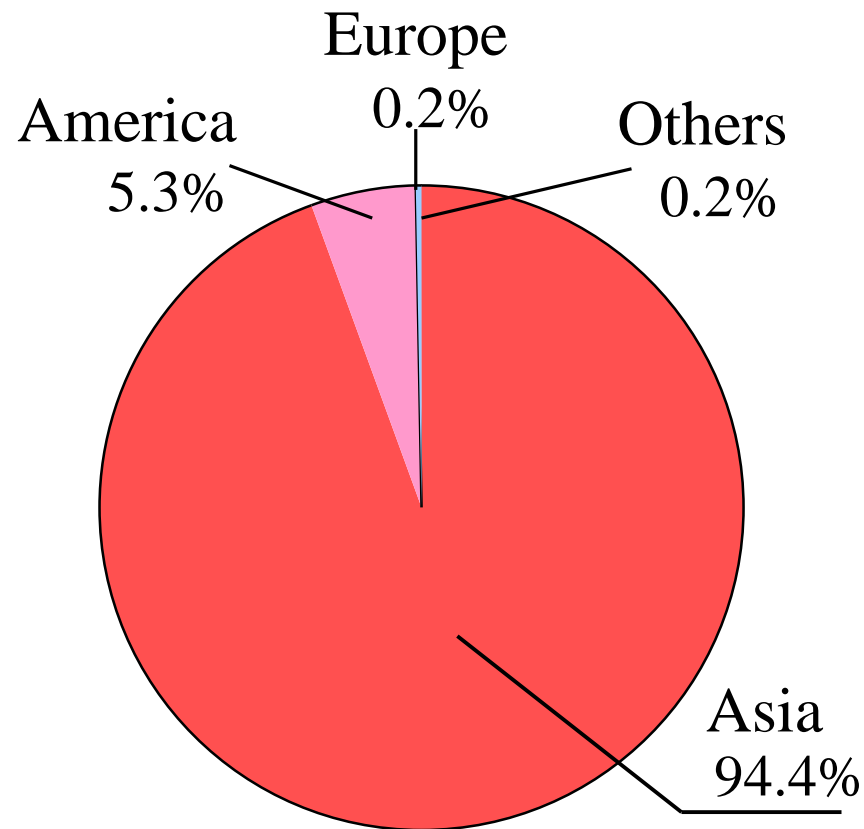
# Regional Ratio of Storm and Flood and Associated Casualties

(1986 ~ 2005, Events with More than 1000 Casualties)



The ratio of events

Number of events: 45



The ratios of casualties

Number of casualties: 246,600



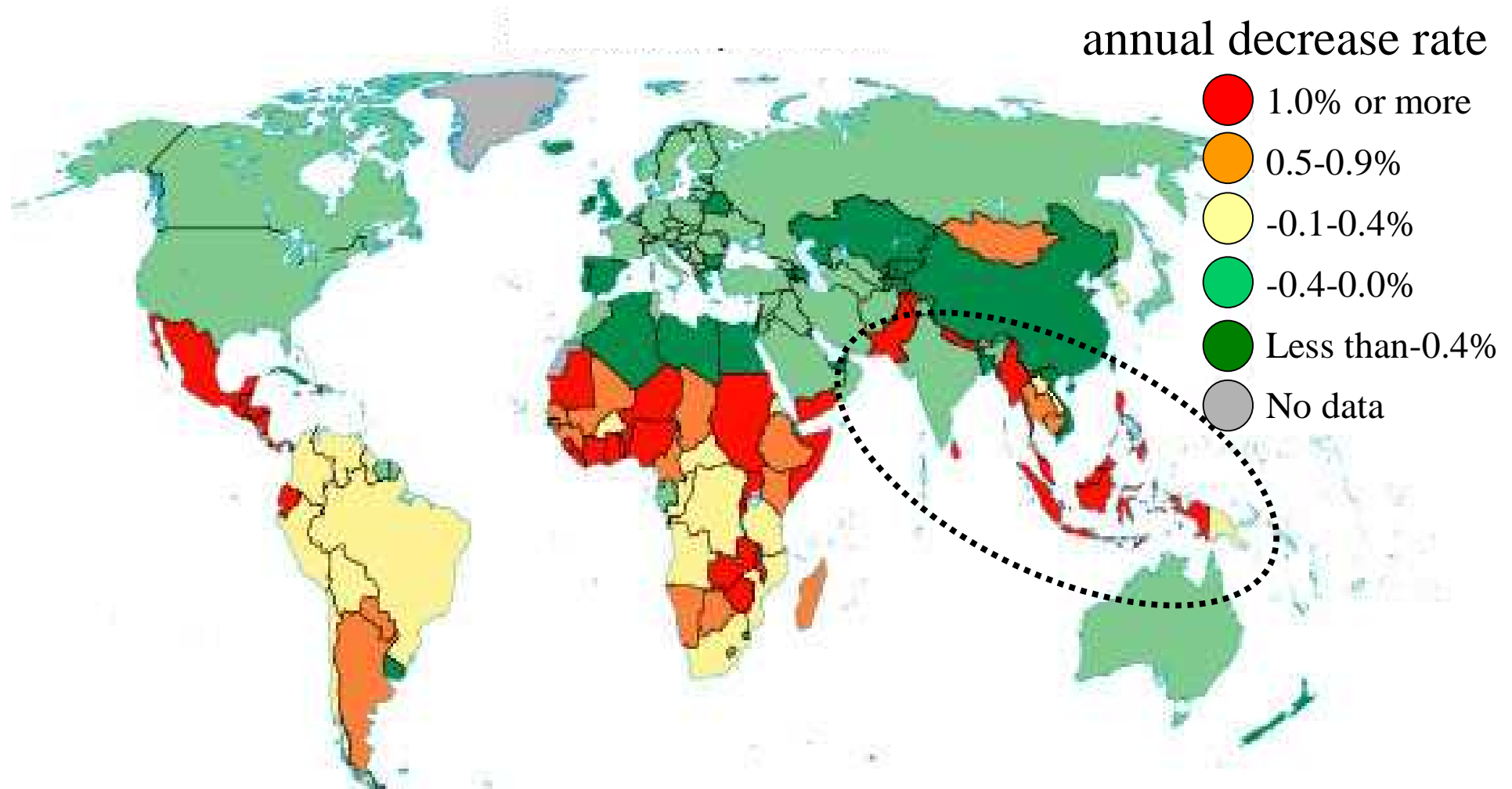
# The Challenging Issues in Asia

## (2) Environment

- ◆ Environmental Destruction
  - Environment adversely affected by deforestation, desertification and population increase.
  - The waste is increasing due to population increase and changes of life style.

# Deforestation in the World (1990 ~ 2000)

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**Forests decrease in size in many Asian countries, such as Indonesia, Myanmar, Pakistan, and Nepal.**

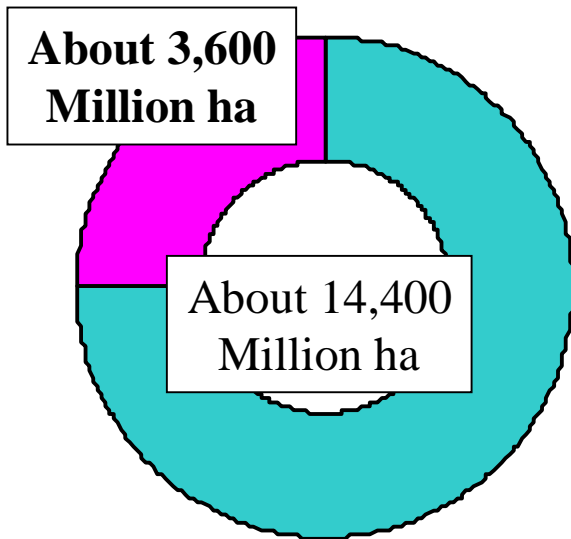
Source: World Bank

# Expansion of Desertification

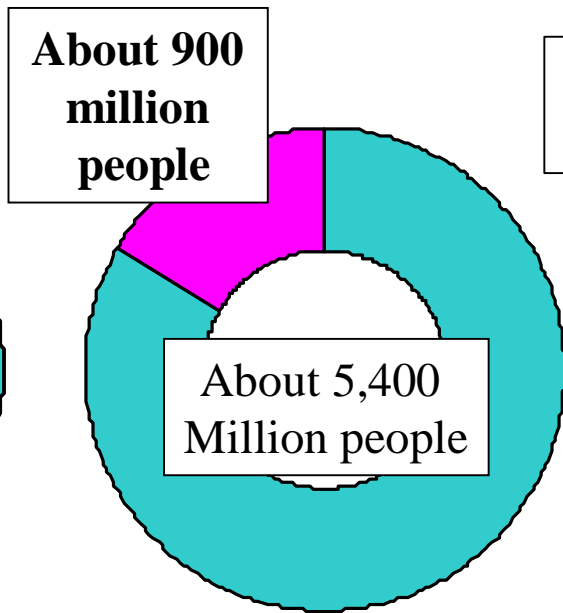
Area of the land influenced by desertification

Population influenced by desertification

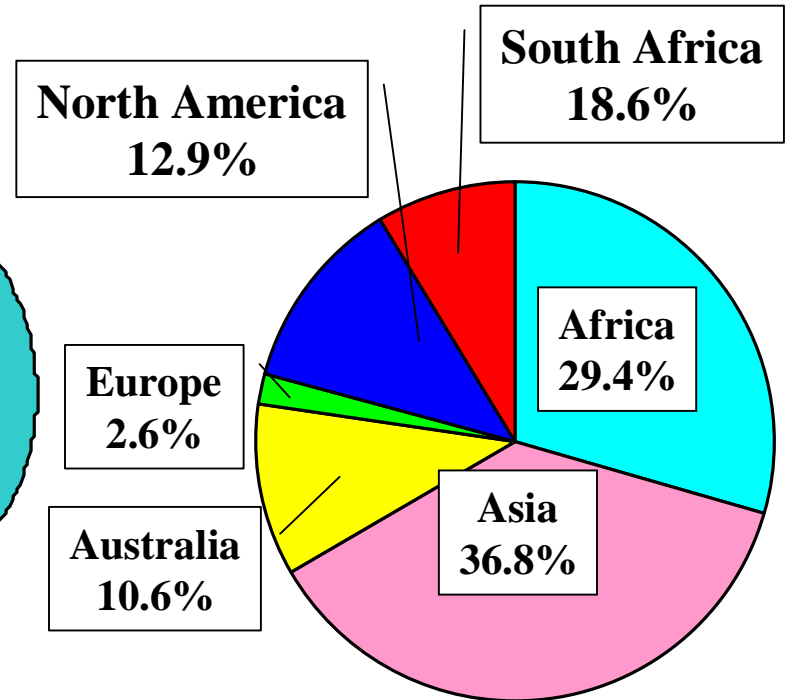
The regional ratio of the desertification



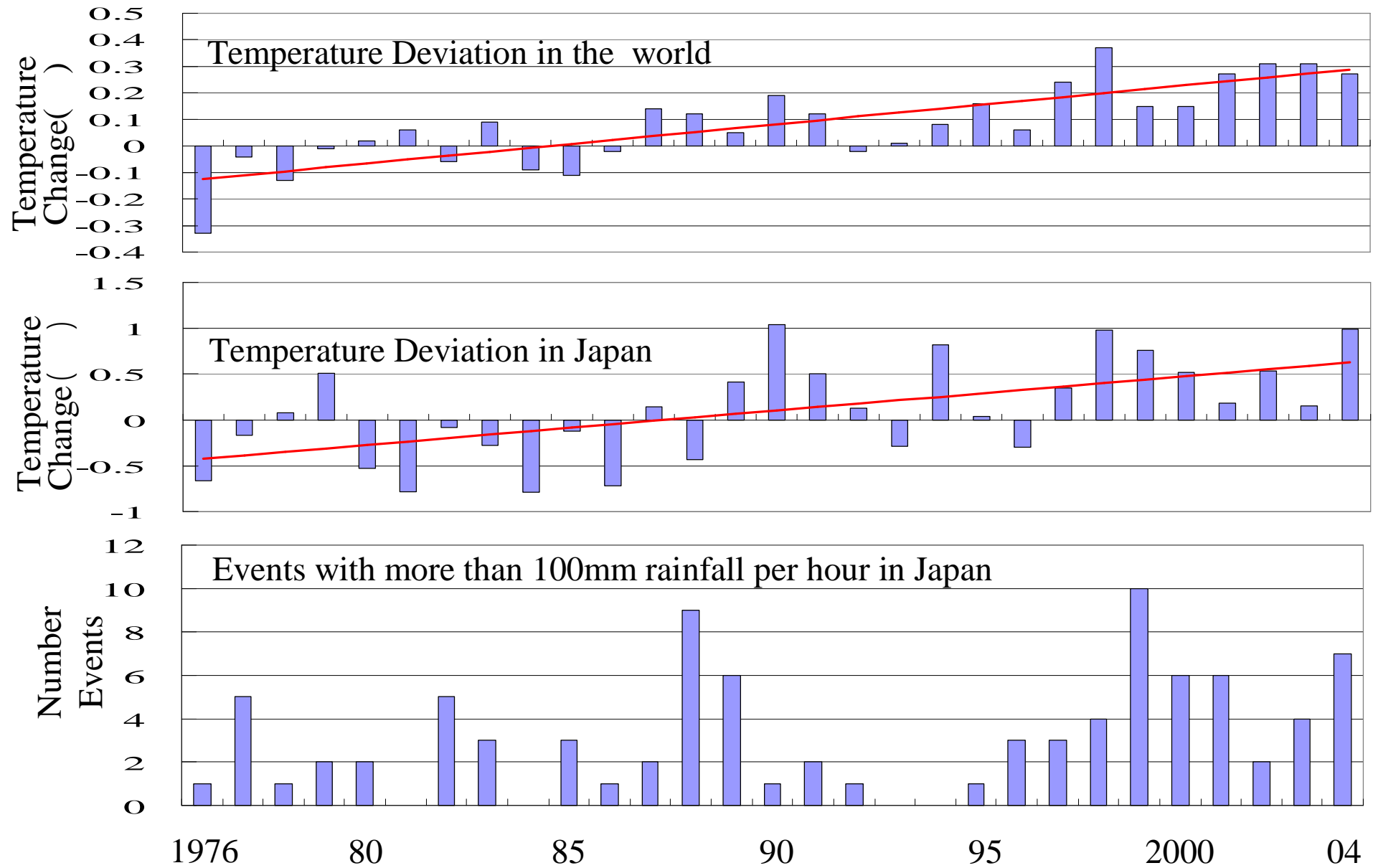
1/4 of the land in the world



1/6 of world population



# Temperature Change in the World and Japan, 12 and Rainfalls



# Flood Damage in Asia (2004)

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Japan



India (AP/WWP)



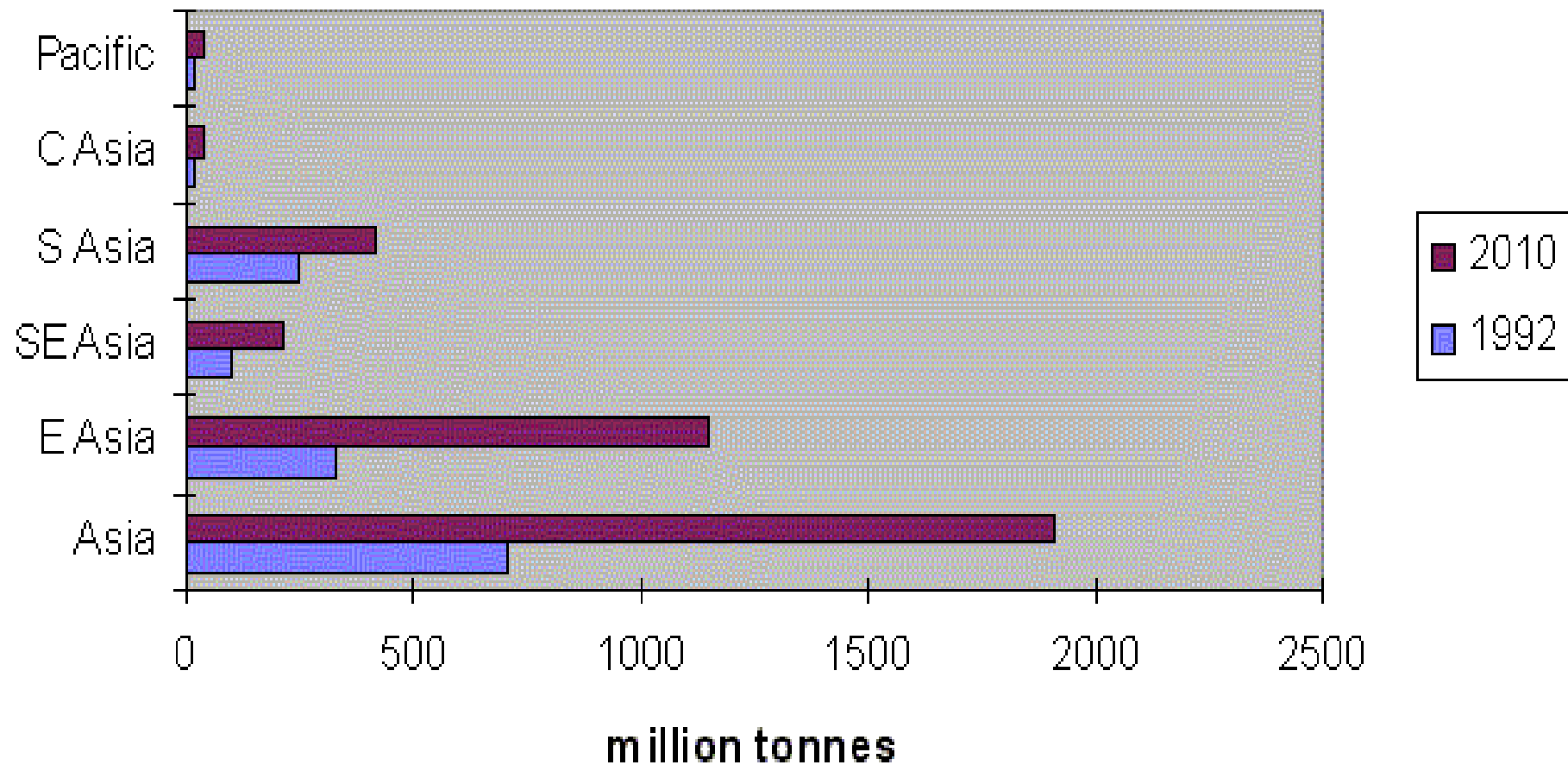
Philippines (AFP)



China (EPA)

# Amount of Solid Waste in the Asian Region 14

The drastic increase of population in the Asian region is increasing the amount of solid waste.



Source : ESCAP (1995)



# **Roles and Contributions of Civil Engineers of Japan for Natural Disaster Mitigation and Environmental Protection**

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- ◆ Transferring Technologies for Natural Disasters Mitigation of Japan to Asian Countries
  - Earthquake resistant technology, Tsunami warning system
  
- ◆ Transferring Environmental Protection Technology to Asian Countries
  - Waste disposal, Measures against ground and water pollution, abandoned mines
  
- ◆ Education for Natural Disaster Mitigation and Support for Reconstruction and Restoration from Natural Disasters
  - Activities by student members and NPO: Engineers Without Borders-Japan



# Support and Assistance for Restoration and Reconstruction in Sumatra by JSCE 16

## Reconstruction in Sumatra by JSCE



### 1. Aceh Province

- Investigation and Recommendations for Coastal Roadway Construction
- Proposal of Tsunami Warning System
- Educational Activities for Natural Disaster Mitigation

### 2. Medan

- Educational Activities for Natural Disaster Mitigation
- International Seminar on Earthquake and Tsunami

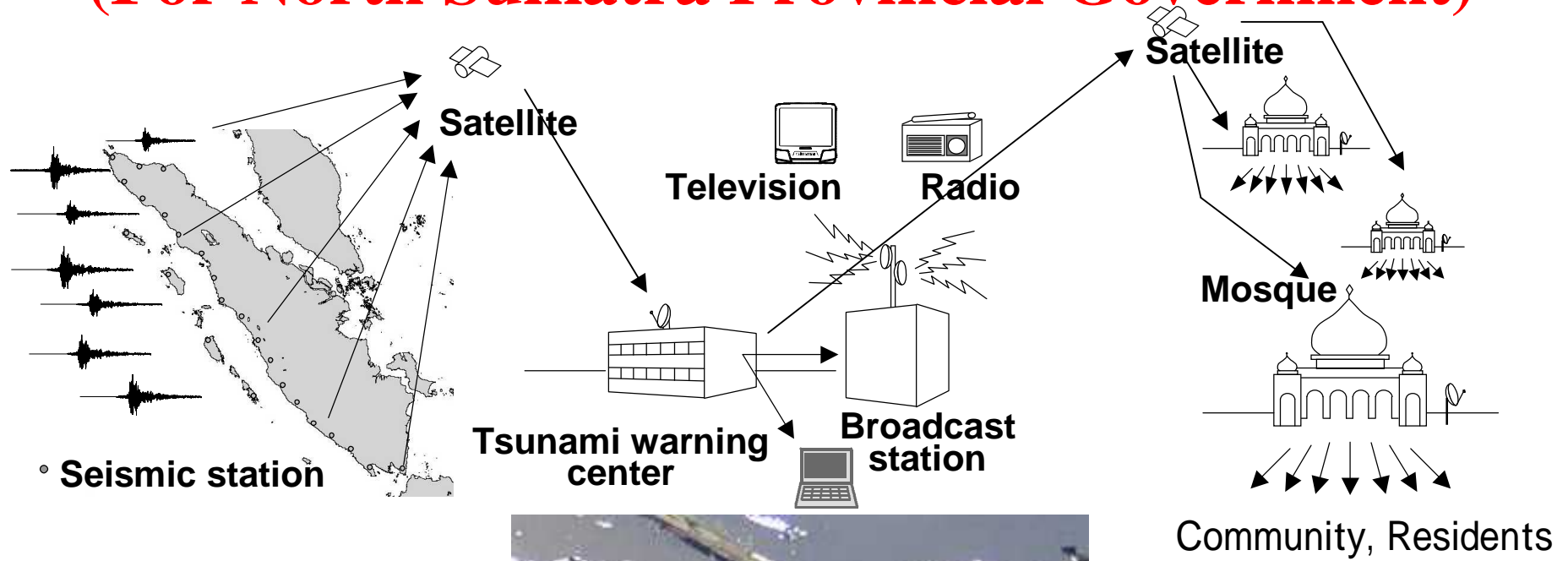
### 3. Nias Island

- Recommendations for Bridge Reconstruction
- Training for Geotechnical Exploration

# Plan for Regional Tsunami Warning System by JSCE

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## (For North Sumatra Provincial Government)





# Education of Children in Banda Aceh for Natural Disaster Mitigation by JSCE's Student Members 18



Lecture by student members



Question and Answer after The Lecture



Welcome Ceremony by Students



Lecture in Tent



# Technical Support for Restoration and Reconstruction Works in Indonesia and Pakistan



Tilted and Sunk Pier of Bridge due to Liquefaction(Indonesia)



Displaced Bridge Girder due to Earthquake Motion(Pakistan)



Seminar for Engineers(Indonesia)



Discussion with Engineers for Restoration(Pakistan)

# What JSCE's Members Are Going to Do for Natural Disaster Mitigation in Future?

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## JSCE's Roles

(1) Investigation and Analysis on Natural Disaster

(2) Research and Development

**(3) Direct Contribution to People and Community**

Technical Supports for Restoration and Reconstruction to the Affected Area

Continuous Education on Natural Disaster Mitigation

Application and Spread of Technologies for Natural Disaster Mitigation

