Policies for the Creation of a Safe and Secure Society in the Light of Increasing Natural Disasters around the World

by
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Natural Disasters in the World during Recent 5 Years (2003～)
The number of events with more than 1000 Death Toll: 14
Death toll: 635,507

- **2003 Iran・Bam EQ. (43,200)**
- **2003 North of Algeria EQ. (2,266)**
- **2004 Caribbean Sea Hurricane (3,000)**
- **2004 Haiti Flood (2,665)**
- **2004 India and Bangladesh, Flood (2,000)**
- **2005 India, Flood and Landslide (1,503)**
- **2005 North of Pakistan EQ. (74,651)**
- **2005 Hurricane Katrina (2,541)**
- **2005 Hurricane Wilma (1,597)**
- **2006 Middle of Java Island EQ. (44,300)**
- **2008 Wenchuan EQ. (87,419)**
- **2008 Myanmar Cyclone (133,655)**
- **2008 Sumatra EQ. and Tsunami (229,866)**
- **2005 India and Bangladesh, Storm (4,049)**
- **2004 Sumatra EQ. and Tsunami (229,866)**
- **2005 Hurricane Wilma (1,597)**
- **2005 Hurricane Katrina (2,541)**

**Legend:**
- Red dot: Earthquake and Tsunami
- Blue dot: Storm and Flood
Earthquake and Tsunami Disasters in the world in Recent 5 Years (2003~)

2004 Sumatra Earthquake and Tsunami (M=9.1, Dead:225,000)

2005 Northern Pakistan Earthquake (M=7.6, Dead:75,000)

2006 Java Earthquake (M=6.3, Dead:44,300)

2008 Wenchuan Earthquake (M=7.9, Dead:87,000)
Earthquake Disasters in Japan in Recent 5 Years (2003~)

2004 Niigata Earthquake (M=6.8, Dead:68)

2007 Noto Earthquake (M=6.9, Dead:1)

2007 Off Coast of Niigata Earthquake (M=6.8, Dead:15)

2008 Iwate-Miyagi Earthquake (M=7.2, Dead:23)
Storm and Flood Disasters in The World in Recent 5 Years (2003~)

Hurricane Katrina (2005, U.S.A, Dead: 2,541)

Cyclone (2007, Bangladesh, Dead: 4,123)

Cyclone (2008, Myanmar, Dead: 133,655)

Typhoon No.23 (2004, Japan, Dead: 198)
Damaging Earthquakes and Tsunamis in the World during Last 60 Years
(Events with more than 1,000 Death Toll)
Number of Earthquakes with Magnitudes more than 7 and 6 during Last 60 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Events (above M7.0)</th>
<th>Number of Events (above M6.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>150</td>
<td>80</td>
</tr>
<tr>
<td>1951</td>
<td>50</td>
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<tr>
<td>1956</td>
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<td>1961</td>
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<td>1991</td>
<td>130</td>
<td>110</td>
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<td>1996</td>
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<td>120</td>
</tr>
<tr>
<td>2001</td>
<td>150</td>
<td>130</td>
</tr>
<tr>
<td>2005</td>
<td>160</td>
<td>140</td>
</tr>
</tbody>
</table>
Damaging Storms and Floods in the World during 60 Years
(Events with more than 1,000 Death Toll)
Temperature Change of Air and Sea Water in the World during Last 40 Years

(a) Air Temperature

(b) Sea Water Temperature
(a) Mean Temperature in Japan

(b) Mean Temperature in Tokyo

(c) Number of Heavy Rains with 100mm/hour

(Japan Meteorological Agency)
Regional Ratio of The Numbers of Natural Disasters (1986~)
(Events with more than 1000 death toll)

Number of Events: 59

Number of Death: 1,027,011
Increase of Natural Disasters due to the Changes of Natural and Social Environments

Change of Natural Environment
- Global Warming
- Heat Island of Urbanized Area
- Deforestation
- Desertification
- Erosion by River and Seashore

Increase of Hazards due to Change of Natural Environment
- Heavy Rain and Snow
- Huge Typhoon, Hurricane and Cyclone
- Drought
- High Temperature
- High Wave and Storm Surge

Change of Social Environment
- Congestion of Urban Area
- Depopulation of Rural Area
- Human Habitation on Fragile Ground
- Lack of Cooperation and Communication among Societies
- Budget Deficit of Central and Rural Governments
- Poverty and Low Governance

Scale and frequency of natural disasters are increasing.

- Measures against unexpected natural phenomena and external forces largely exceeding design level
- Implementation of both software and hardware measures
Measures against Huge Natural Disasters with Low Probability

Natural Disaster Mitigation by Combination of Hardware and Software Measures

Moderates Disasters with Medium Probability

Huge Disasters with Low Probability

Reinforcement of Hardware Measures

Software Measures
Request for Advisory from Minister of Land, Infrastructure and Transport to SCJ President

— Policies on Infrastructure Development for Disaster Mitigation under Global Increase of Natural Hazards and Vulnerability of Social Circumstances —

Subjects:
1. Forecast of future natural hazards resulting from the changes of global environments.
2. Evaluation of hazards in national land-use and social structures, and evaluation of vulnerability of existing infrastructures.
3. Proposals of basic policies and measures for improvement of national land-utilization plan and for development of infrastructures.
Policies and Measures Recommended by SCJ President（1）

(1) Paradigm shift from short-period view of efficiency of economics to long-term view of creation of safe and secure society

(2) Stable and long-term tax spending for measures of improvement of land-utilization and social systems, and reinforcement of infrastructures

(3) Reforms of the national land-utilization plan by decentralization of population and properties, particularly, by establishment of back-up systems to secure the capital function of Tokyo

(4) Improvement of both software and hardware measures against huge natural disasters with low probability of occurrence
Policies and Measures Recommended by SCJ President (2)

(5) **Unified and synthesized policies** among ministries, governmental offices and concerned authorities

(6) **Creation of disaster-awareness society** by education of people and by transfer of knowledge and experiences of past disasters to next generations

(7) **Encouragement of NPO and NGO’s activities** for natural disaster preparedness, and for rescue and recovery operation

(8) **International cooperation and assistance** in developing countries under the consideration of the characteristics of disasters, cultures and histories
NPO: Engineers without Borders, Japan

Public Sectors
- Ministry of Foreign Affairs
- JICA, JBIC and others

(1) Technical Supports for Restoration and Reconstruction to the Affected Area
(2) Education on Natural Disaster Mitigation
(3) Transfer of Technologies and Knowledge for Natural Disaster Mitigation

Japan Society of Civil Engineers

Architectural Institute of Japan

NPO Engineers without Borders, Japan

Senior volunteer Engineers

Private Sectors
- Construction Companies
- Construction Consultants

Support

Joining

Support
International Cooperation and Assistance for Natural Disaster Mitigation Jointly by EWOB, J and Engineering Societies (JSCE and AIJ)

- Education on natural disaster mitigation
- Construction of monuments on the tsunami height and education
- Technical training of local engineers on soil survey
- Recommendations on policies for reconstruction and disaster mitigation to the president of Indonesia and governors
International Cooperation and Assistances on Natural Disaster Mitigation (2) Jointly by 7 Academic Societies (JSCE, AIJ, JGS, JAEE, SSJ, CPIJ, AJG) (in Sichuan of China)

Seminar on reconstruction

Damaged Building

Proposal of retrofitting of a damaged building

Technical discussions on Restoration of slope failure

Support for establishment of a research center for earthquake disaster mitigation in Sichuan
National Movement for Natural Disaster Mitigation by Public Works, Community Cooperation and Individual Efforts

Public Works
Construction of Country and Region with High Natural Disaster Resistance
- National strategy
- Reinforcement of Infrastructures
- Rescue and Firefighting
- Restoration and Reconstruction, etc.

Community Cooperation
Construction of Community with High Natural Disaster Resistance
- Planning regional measures
- Education and Training
- Firefighting and rescue
- Care of Refugees, etc.

Individual Efforts
To make Home and Family Natural Disaster Resistance
- Retrofitting of Houses
- Fixing of Furniture
- Education
- Stock of Water and Food

Civic Organizations
Companys
School
NPO, NGO
Central Governments
Prefectural and Municipal Government
Public Organizations
Citizens
Families
Participation of SCJ and Societies of Scientists and Engineers to the National Movement

Public Works
Construction of Country and Region with High Natural Disaster Resistance
• National strategy
• Reinforcement of Infrastructures
• Rescue and Firefighting
• Restoration and Reconstruction, etc.

• Recommendations on Policies
• Request for Advisory

Science Council of Japan

Societies and Associations for Engineers and Scientists (JSCE, AIJ etc.)

• Education of Children and parents
• Technical Advices

Community Cooperation
Construction of Community with High Natural Disaster Resistance
• Planning regional measures
• Education and Training
• Firefighting and rescue
• Care of Refugees, etc.

Individual Efforts
Natural Disaster Resistant Home and Family
• Retrofitting of Houses
• Fixing of Furniture
• Education
• Stock of Water and Food

Participation of SCJ and Societies of Scientists and Engineers to the National Movement

Public Works
Construction of Country and Region with High Natural Disaster Resistance
• National strategy
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