The Future Perspectives in Capacity Building by Science and Technology

Submitted by: Chinese Taipei
The Future Perspectives in Capacity Building by Science and Technology

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Outline

- Tendency of natural disasters in APEC region
- Chinese Taipei’s experience to share
- Future work
- Summary
Tendency of Natural Disasters in APEC region

Global trend of natural disasters in occurrence and victims

Source: Annual Disaster Statistical Review: Numbers and Trends 2008, CRED, Brussels
Top 10 spots by number of reported events in 2008

Seven are APEC member economies!!!

Percent share by disaster sub-group by continents in 2008

Source: Annual Disaster Statistical Review: Numbers and Trends 2008, CRED, Brussels
Percent share of victims by disaster sub-group by continents in 2008

Source: Annual Disaster Statistical Review: Numbers and Trends 2008, CRED, Brussels

Percent share of economic damages by disaster sub-group by continents in 2008

Source: Annual Disaster Statistical Review: Numbers and Trends 2008, CRED, Brussels
Map of vulnerability and physical exposure to cyclones

Tropical cyclone risk

Data sources:
- Université Catholique de Louvain : EM-DAT: The OFDA/CRED International Disaster Database (victims)
- Carbon Dioxide Information/Analysis Center: A Global Geographic Information System Data Base of Storm Occurrences and Other Climatic Phenomena Affecting Coastal Zones
- CIESIN, IFPRI, WRI - Grided Population of the World (GPW), Version 2 (population)

Compilation and computation by UNEP/GRID-Geneva

Sources: PREVIEW Global Cyclone Asymmetric Windspeed Profiles, UNEP/GRID-Europe.
Chinese Taipei’s Experience to Share
-Disaster Reduction Research

Disaster reduction research

Supporting Research and Technology development

|   | 3-stage program on disaster reduction | 1982-1997 | USD 2.46 million dollars | 1982-1997 [15years] | 1000 researchers |
|---|--------------------------------------|-----------|--------------------------|----------------------|--|---|
| 3 | Program for enhancing innovation and Implementation of disaster reduction | 2007-2010 | USD 34.1 million dollars | 2007-2010 [4years] | 223 projects | 17 units participated |
**Topics, projects and investment for disaster reduction research in recent years**

*Sustainable Development Research Committee (1999~2006)*

<table>
<thead>
<tr>
<th>Topics</th>
<th>Projects</th>
<th>Researchers</th>
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</thead>
<tbody>
<tr>
<td>Meteorology</td>
<td>334</td>
<td>total 1,317</td>
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<tr>
<td>Flood</td>
<td>291</td>
<td>projects</td>
</tr>
<tr>
<td>Slope land</td>
<td>278</td>
<td></td>
</tr>
<tr>
<td>Earthquake</td>
<td>76</td>
<td>2,823</td>
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<tr>
<td>System and Socio-</td>
<td>338</td>
<td>researchers</td>
</tr>
<tr>
<td>Economical</td>
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**Capital investment in 2009: **17.7 million $USD

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**Improvement of forecasting on typhoons**

*Application and Implementation*

**Typhoon Rainfall forecasting**

**Dropsonde Observation**

**Aerosonde (unmanned plane)**

Successfully get the typhoon information by flying through typhoon center (Typhoon Longwang 2005)

*Improve typhoon track forecast*
Inundation potential map

Application and Implementation

- Base on precipitation
- Simulate inundation potential of Tainan

<table>
<thead>
<tr>
<th>Level</th>
<th>Average depth</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0.5 m ~ 1.0m</td>
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<tr>
<td></td>
<td>1.0 m ~ 1.5m</td>
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<tr>
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<td>1.5 m</td>
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</tbody>
</table>

Hazard map for debris flow

Application and Implementation

Debris flow hazardous streams
Hazard map for debris flow
Improvement of framework and mechanism

Laws for Disaster
• Disaster Protection and Response Act (2000.07)
• Coverage of four stages of disaster management
• Emphasis on the priority of law enforcement

Administrative Framework
• Central Government Level
• County Level (25)
• Township Level (309)

Plans for Disaster Reduction & Emergency Response
• Basic Plan (Towards All-Hazard Approach)
• Operational Plan
• Regional Plan

Science and Technology Development with implementation
• National Science & Technology Program for Hazard Mitigation (1999-2006)
• National Science & Technology Center for Disaster Reduction (2003.7)

Empowering the Local-level’s Capability for Disaster Reduction
Application and Implementation

• 4-year project (2004-2007)
• Local university teams to help local governments

Local university teams with universities
To help
Local governments County/ City

To Improve
Regional Disaster Mitigation Plan

Capacity and Capability of mitigation and response

Scopes of work
- Meteorology
- Flood
- Landslide
- Earthquake
- Man-made disaster
- Disaster management
- Information system

Teamwork

Review
Applications of Formosat-2 satellite images

Other Important Achievements

- South Asia tsunami
- Antarctic ice shelf collapse
- 2008 Sichuan earthquake

2009.5.28 Strong Earthquake in Central America

QPESUMS severe weather monitoring system

Other Important Achievements

Data analysis
Storm analysis
Storm tracking
Rainfall estimate
Historical case ...

Doppler radar stations

Quantitative Precipitation Estimation and Segregation Using Multiple Sensors
Achievements through science and technology

1. Legislation
   Specific Law will help to conduct all necessary measures, policies and plans for reduction, preparedness, response and recovery.

2. Teamwork
   Cooperation and collaboration from inter- and intra-government sectors will be the solid foundation to implement plans and response.

3. Bottom-up
   Local government and community need the empowerment from central government and require a well-defined regional plan.

4. Technology
   Academic supports and research results with practical concerns and fulfilled implementation will provide the best reference of policy making.

Future works
Impacts and adaptation strategy of global warming

Future work

Promotion of earthquake early warning and monitoring

Future work

Long-term

Time scale

Post-event

month

week

day

Earthquake precursor Monitoring

Earthquake occurred

0sec

10sec

20sec

30sec

Earthquake early warning

Pre-disaster preparedness

Earthquake Early Warning

Emergency Response

Enhance monitoring for high potential areas

Activate emergency responses before earthquakes induce casualty and loss
Summary

- Continually Supporting Disaster reduction R&D development
  - Enhancing regional cooperation and collaboration on disaster risk reduction
  - Impact and adaptation research of climate change
  - Information sharing and dissemination
  - Disaster risk research

Thank You