An Overview of Disaster Management Training & Education in Pakistan

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OUTLINE

- Disaster Profile of Pakistan
- Institutionalization of Disaster Management in Pakistan
- Genesis of Disaster Management Training & Education
- Introduction to National University of Sciences & Technology (NUST), Pakistan
- Disaster Management related programs being offered at NUST
DISASTER PROFILE OF PAKISTAN
Earthquake Hazard:

Seismic Zones of Pakistan

![Seismic Zones Map]

<table>
<thead>
<tr>
<th>COLORS</th>
<th>Zones Category</th>
<th>Seismic Factor</th>
<th>Possible Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Very High Hazard</td>
<td>$g/5$ to $g/10$</td>
<td>Major</td>
</tr>
<tr>
<td>II</td>
<td>High Hazard</td>
<td>$g/10$ to $g/15$</td>
<td>Moderate</td>
</tr>
<tr>
<td>III</td>
<td>Moderate Hazard</td>
<td>$g/15$ to $g/20$</td>
<td>Minor</td>
</tr>
<tr>
<td>IV</td>
<td>Low Hazard</td>
<td>$g/20$ or Less</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

Pakistan Meteorological Department
MAJOR EARTHQUAKES IN PAKISTAN

- Quetta - 1935
- Makran Coast - 1945
- Northern Areas - 1976
- Kashmir - 2005
- Ziarat Earthquake - 2008
FLOODS

Flash Floods & Hill Torrents

KPK

KASHMIR

PUNJAB

BALOCHISTAN

SIND

Floods
### MAJOR FLOOD EVENTS IN PAKISTAN

<table>
<thead>
<tr>
<th>Year</th>
<th>Lives Lost</th>
<th>Monetary losses (Billion Rs)</th>
<th>Villages Affected</th>
<th>Area Flooded (Sq. Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>2910</td>
<td>9.08</td>
<td>10,000</td>
<td>7,000</td>
</tr>
<tr>
<td>1955</td>
<td>679</td>
<td>7.04</td>
<td>6,945</td>
<td>8,000</td>
</tr>
<tr>
<td>1956</td>
<td>160</td>
<td>5.92</td>
<td>11,609</td>
<td>29,065</td>
</tr>
<tr>
<td>1973</td>
<td>474</td>
<td>5.52</td>
<td>9,719</td>
<td>16,200</td>
</tr>
<tr>
<td>1975</td>
<td>126</td>
<td>12.72</td>
<td>8,628</td>
<td>13,645</td>
</tr>
<tr>
<td>1976</td>
<td>425</td>
<td>64.84</td>
<td>9,150</td>
<td>32,000</td>
</tr>
<tr>
<td>1978</td>
<td>393</td>
<td>41.44</td>
<td>9,199</td>
<td>11,952</td>
</tr>
<tr>
<td>1988</td>
<td>508</td>
<td>15.96</td>
<td>1,000</td>
<td>4,400</td>
</tr>
<tr>
<td>1992</td>
<td>1008</td>
<td>56.00</td>
<td>13,208</td>
<td>15,140</td>
</tr>
<tr>
<td>1995</td>
<td>591</td>
<td>7.00</td>
<td>6,852</td>
<td>6,518</td>
</tr>
<tr>
<td>1998</td>
<td>47</td>
<td></td>
<td>161</td>
<td></td>
</tr>
</tbody>
</table>
## Major Flood Events in Pakistan

<table>
<thead>
<tr>
<th>Year</th>
<th>Lives Lost</th>
<th>Villages Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>219</td>
<td>50</td>
</tr>
<tr>
<td>2003</td>
<td>484</td>
<td>4,376</td>
</tr>
<tr>
<td>2004</td>
<td>85</td>
<td>47</td>
</tr>
<tr>
<td>2005</td>
<td>59</td>
<td>1,931</td>
</tr>
<tr>
<td>2007</td>
<td>918</td>
<td>6498</td>
</tr>
<tr>
<td>2010</td>
<td>1985</td>
<td>20.18 M Personnel affected</td>
</tr>
<tr>
<td>2011</td>
<td>466</td>
<td>9.18 M Personnel affected</td>
</tr>
</tbody>
</table>
FLOOD AFFECTED AREAS 2010

- Gilgit-Baltistan
- Chilas
- Kabul
- Peshawar
- Mingora
- Islamabad
- Jhelum
- Chenab
- Punjab
- Satluj
- New Delhi
- Gwadar
- Karachi
- Tatta
- Sindh
- Balochistan

Legend:
- districts with minor flooding
- districts with major flooding
- completely flooded areas

Scale: 500 km
DROUGHT

DROUGHT AT THE END OF DEC 2000

MODERATE

SEVERE

SOURCE:
Pakistan Meteorological Department
Pakistan Meteorological Department
Drought conditions at the end of July 2002

Source:
Pakistan Meteorological Department
MAJOR IMPACTS

1997-2002 Drought Period

- **People**
  - Died: 120
  - Affected: 2.2 M

- **Livestock**
  - Died: 2.5 M
  - Affected: 7.2 M

- The drought was termed as worst in the history of the country
OTHER NATURAL HAZARDS

• Landslides
  • Kashmir, Northern Areas and parts of the KPK are vulnerable to landslide hazard (Hattian Bala and Attabad Landslides)

• Avalanches
  • Gyari avalanche is latest case in point
  • Continuous threat in northern areas

• GLOF
  • Phenomena is more common in Indus Basin
  • 52 out of 2420 lakes in Indus basin are continuous threat
  • Global warming can increase the potential of GLOF
OTHER NATURAL HAZARDS

- **Tsunami**
  - A big tsunami - 28 Nov 1945
  - Cause - Earthquake M8.3
  - Height of se waves - 12-15 meters
  - Loss of lives > 4000
Cyclones/Storms

- Coastal belt of Pakistan (especially in Sindh) is highly vulnerable to cyclones.
- The cyclone of 1999 in Thatta and Badin districts wiped out 73 settlements, killed 168 people and 11,000 cattle. Nearly 0.6M people were affected.
Institutionalization of Disaster Management in Pakistan
GENESIS OF DM ORGANIZATIONS

- Reactive policy (Rescue and Relief oriented) till Kashmir Earthquake 2005
- Establishment of ERRA - 2006
- National Disaster Management Ordnance 2006
  - National Disaster Management Commission (NDMC)
  - National Disaster Management Authority (NDMA)
  - National Institute of Disaster Management (NIDM)
  - Provincial DMCs and PDMAs
  - District DMAs (DDMAs)
- National Disaster Risk Management Framework 2007
- National Disaster Management Act 2010
- National Disaster Response Plan 2010
- Ministry of Climate Change created - 2012
DM RESPONSE TIERS

- Small scale disasters like road / traffic accidents, fires etc are managed by *Emergency Services (ES)*

- Medium scale disasters like building collapse, train accidents, terrorists attack etc are managed by ES as well as *Community Emergency Response Teams (CERT)*

- For large scale DM like floods, earthquakes etc, *Army* is called upon in addition to ES and CERT
NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY (NUST)
HISTORICAL PERSPECTIVE

- Established 1991
- Awarded Charter 1993
To Develop NUST as a Comprehensive, Research-led University with a focus on Technology, Innovation and Entrepreneurship
WORLD RANKING

- Top 500 (417\textsuperscript{th}) Universities of the World
- Engg & IT: Top 250 Universities of the World

ASIAN RANKING

- Overall 108\textsuperscript{th} University of Asia
- Engineering & IT: 53\textsuperscript{rd}
- Life Sciences & Medicine: 87\textsuperscript{th}

Source: QS World and Asian Rankings
• Constituent Institutions : 18

• Programs:
  - UG : 27
  - PG : 34

• Fields:
  - Engineering
  - IT
  - Medical & Bio Sciences
  - Management Sciences
  - Basic Sciences
  - Social Sciences
  - Art, Design & Architecture
<table>
<thead>
<tr>
<th>Category</th>
<th>Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>UG</td>
<td>8,846</td>
</tr>
<tr>
<td>MS/MPhil</td>
<td>2,240</td>
</tr>
<tr>
<td>PhD</td>
<td>350</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,436</strong></td>
</tr>
</tbody>
</table>
PROGRESSIVE INCREASE IN TOTAL STUDENT STRENGTH

Increase: More than Double

- PhD
- MS/Mphil
- UG
- Total

<table>
<thead>
<tr>
<th>Year</th>
<th>PhD</th>
<th>MS/Mphil</th>
<th>UG</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>74</td>
<td>650</td>
<td>5406</td>
<td>4687</td>
</tr>
<tr>
<td>2008</td>
<td>107</td>
<td>107</td>
<td>5185</td>
<td>5185</td>
</tr>
<tr>
<td>2009</td>
<td>181</td>
<td>1124</td>
<td>7177</td>
<td>8482</td>
</tr>
<tr>
<td>2010</td>
<td>247</td>
<td>1066</td>
<td>8580</td>
<td>9893</td>
</tr>
<tr>
<td>2011</td>
<td>350</td>
<td>2240</td>
<td>8846</td>
<td>11436</td>
</tr>
<tr>
<td>2012</td>
<td>400</td>
<td>2500</td>
<td>8800</td>
<td>11700</td>
</tr>
</tbody>
</table>
FACULTY STRENGTH

- PhD + Fellowships: 377 (45.8%)
- MS/MSc + MPhil + Memberships: 446
- Total: 823
CIVIL ENGG COLLEGE & SCHOOL

- Military College of Engineering (MCE) Risalpur
  - PG Programs in:
    - Disaster Management
    - Disaster Mitigation & Reconstruction Engg (DM&RE)
    - Construction Engg & Management
  - UG Program in Civil Engg since 1952

- School of Civil and Environmental Engg (SCEE), Islamabad
  - NUST Institute of Geo Informatics System (IGIS)
  - NUST Institute of Environmental Sciences & Engg (IESE)
  - NUST Institute of Civil Engg (NICE)
  - National Institute of Transportation (NIT)
PHASE-WISE DEVELOPMENT OF NUST H-12 CAMPUS

Phase 1 - Almost Complete

Phase 2 - By 2017: Development of NUST Medical Complex with a 500 Bed teaching cum Research Hospital along with a School of Health Sciences.

Phase 3 - Beyond 2017: Science and Technology Park, additional Schools, up-gradation/consolidation and simultaneous development of HR
MCE started conduct of Program for Enhancement of Emergency Response (PEER) Courses under NDMA - 2007

Approval of training package for DM courses - 2008

First course in Disaster Management - 2009

PEER and DM courses organized so far - 19

Courses being scheduled per training year - 4

Two MS programs commenced from Fall 2012:

- Disaster Management (DM)
- Disaster Mitigation & Reconstruction Engg (DM&RE)
Disaster Management Related Programs being offered at NUST, Pakistan
DISASTER MGMT CURRICULUM

1. Fundamentals of Disaster Management
2. Policies, Planning and Strategies for DM
3. Disaster Risk and Vulnerabilities Assessment
4. Disaster Preparedness and Response
5. Disaster Recovery and Project Management
6. GIS & RS for Disaster Mapping & Management
7. Community Based Disaster Risk Mgmt
8. Environmental Framework on Disasters
9. Earthquake Disaster Assessment and Mitigation
10. Climate Forecasting and Early Warning System
11. Flood Hazard Assessment and Remediation
13. Public and Mental Health Aspects of DM, Psychotrauma Consequent to Disasters
DM&RE CURRICULUM

1. Fundamentals of Disaster Management
2. GIS&RS for Disaster Mapping and Management
3. Disaster Risk Assessment and Mitigation
4. Adv Structural Analysis
5. Disaster Risk Eval and Retrofitting of Existing Structures
6. Seismic Design of Reinforced Concrete Structures
7. Seismic Design of Masonry Structures
8. Structural Dynamics
9. Geotechnical Earthquake Engg
10. Landslide Analysis and Mitigation
11. Foundation Engg (Deep Foundation)
12. Flood Hazard Modelling and Flood Forecasting
13. Climate Forecasting and Early Warning System
14. Earthquake Seismology and Earthquake Hazard

Core Courses

Elective Courses
CONCLUSIONS

• Pakistan is highly disaster prone country with multiple types of threats

• Pakistan has reasonably progressed in developing DM related organization (NDMC, Ministry of Climate Change, DMAs etc.)

• Shift from reactive to proactive approach to deal with the disasters

• Steps taken to impart DM related training and education are encouraging
Way Forward

• Carrying out research on DM related issues using latest scientific tools available that can be applicable to Pakistan and to the rest of world

• Planning to hold an International Conference on Disaster Management in second half of 2013
THANKS Xie Xie