Flood disasters – A global perspective

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Flood disasters – A global perspective

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1. Introduction: Recent water-related disasters

Water is responsible for most natural disaster losses in the world.

2013 in particular was a year with some exceptional floods.

   Examples: Typhoon Haiyan/Philippines, central Europe, Uttarakhand/India, Colorado/USA, Canada, Mexico, Indonesia, Australia, southern Africa, China, Russia, Sardinia/Italy, ....

2014: Balkan countries, Kashmir, Pakistan

   Landslides in Afghanistan, India, Nepal

   Ongoing drought in California
1. Introduction: Recent water-related disasters

Table 1: Water-related disasters in the period 2000–2014 in which material losses of US$ 8bn and more (original values) occurred.

<table>
<thead>
<tr>
<th>Year</th>
<th>Country/region</th>
<th>Event/basin(s)/area</th>
<th>Overall losses due to water (US$ bn)</th>
<th>Insured losses due to water (US$ bn)</th>
<th>% insured</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>USA</td>
<td>Hurricane Katrina/Gulf Coast</td>
<td>83</td>
<td>41.5</td>
<td>50</td>
</tr>
<tr>
<td>2011</td>
<td>Japan</td>
<td>Tsunami</td>
<td>55</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>2012</td>
<td>USA, CDN, Caribbean</td>
<td>Hurricane Sandy/Northeast</td>
<td>46</td>
<td>19.7</td>
<td>43</td>
</tr>
<tr>
<td>2011</td>
<td>Thailand</td>
<td>Chao Phraya</td>
<td>43</td>
<td>16</td>
<td>37</td>
</tr>
<tr>
<td>2012</td>
<td>USA</td>
<td>Drought</td>
<td>20</td>
<td>12</td>
<td>60</td>
</tr>
<tr>
<td>2002</td>
<td>Central, South. Europe</td>
<td>Elbe, Danube, Italy</td>
<td>16.5</td>
<td>3.4</td>
<td>21</td>
</tr>
<tr>
<td>2013</td>
<td>Central Europe</td>
<td>Danube, Elbe</td>
<td>12.6</td>
<td>3.1</td>
<td>25</td>
</tr>
<tr>
<td>2011</td>
<td>USA</td>
<td>Hurricane Irene/Northeast</td>
<td>5</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>2013</td>
<td>Philippines</td>
<td>Typhoon Haiyan</td>
<td>5</td>
<td>0.35</td>
<td>7</td>
</tr>
<tr>
<td>2002</td>
<td>USA</td>
<td>Drought</td>
<td>10</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>2004</td>
<td>Indian Ocean</td>
<td>Tsunami</td>
<td>10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2008</td>
<td>USA</td>
<td>Midwest; Missouri</td>
<td>10</td>
<td>0.5</td>
<td>5</td>
</tr>
<tr>
<td>2010</td>
<td>Pakistan</td>
<td>Indus</td>
<td>9.5</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>2000</td>
<td>Italy, Switzerland</td>
<td>Southern Alps</td>
<td>8.5</td>
<td>0.48</td>
<td>6</td>
</tr>
<tr>
<td>2010</td>
<td>China</td>
<td>East, Southeast, South</td>
<td>8</td>
<td>0.15</td>
<td>2</td>
</tr>
<tr>
<td>2012</td>
<td>China</td>
<td>East, Northeast, Southeast</td>
<td>8</td>
<td>0.18</td>
<td>2</td>
</tr>
</tbody>
</table>
### Table 2: Flood disasters in the period 2000–2014 in which more than 1,500 people died.

Source: Munich Re NatCatSERVICE 2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Region</th>
<th>Event</th>
<th>Deaths*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>Indian Ocean (12 countries)</td>
<td>Tsunami</td>
<td>220,000</td>
</tr>
<tr>
<td>2008</td>
<td>Myanmar</td>
<td>Cyclone Nargis</td>
<td>140,000</td>
</tr>
<tr>
<td>2011</td>
<td>Japan</td>
<td>Tsunami</td>
<td>15,880</td>
</tr>
<tr>
<td>2013</td>
<td>Philippines</td>
<td>Typhoon Haiyan</td>
<td>6,334</td>
</tr>
<tr>
<td>2013</td>
<td>India</td>
<td>Flash floods</td>
<td>5,500</td>
</tr>
<tr>
<td>2007</td>
<td>Bangladesh</td>
<td>Cyclone Sidr</td>
<td>3,295</td>
</tr>
<tr>
<td>2004</td>
<td>India, Bangladesh, Nepal</td>
<td>Floods</td>
<td>2,200</td>
</tr>
<tr>
<td>2007</td>
<td>Bangladesh, India, Nepal</td>
<td>Floods</td>
<td>2,030</td>
</tr>
<tr>
<td>2004</td>
<td>Haiti, Dominican Republic</td>
<td>Floods</td>
<td>2,000</td>
</tr>
<tr>
<td>2004</td>
<td>Caribbean, USA</td>
<td>Hurricane Jeanne, floods</td>
<td>2,000</td>
</tr>
<tr>
<td>2010</td>
<td>Pakistan</td>
<td>Floods</td>
<td>1,760</td>
</tr>
</tbody>
</table>

* - death figures include all causes (such as earthquake, windstorm, landslides, etc.) not only flood;  
- those missing are not included
1. Introduction: Recent water-related disasters

Figure 1: Percentage distributions of number of events, fatalities, overall loses and insured losses for water-related loss events and other types of natural disasters. Period 2000–2014. Losses are given in inflation-adjusted values of 2014. Source: Munich Re NatCatSERVICE 2014
Figure 2: Overall and insured annual inland flood losses (bars) and number of flood events per year (line) from 1980 to 2014, derived from all events with losses exceeding US$ 50m (inflation-adjusted in 2013 values). Only floods that are not associated with named tropical cyclones are included in the analysis.

Source: Munich Re NatCatSERVICE 2014
2. Types of water-related disasters

- River flood
- Flash flood
- Storm surge
- Tsunami
- Mass movement
- Drought
3. Reasons for increasing losses

- People (global population increase)
- Land use (settling on river plains, coasts, hillsides)
- Risk awareness (false) feeling of safety if protected by a dyke)
- Complexity (modern lifeline and infrastructure systems)
- Wealth (practically everywhere in the world people own more items)
- Susceptibility (electronic components of items)
- Urban concentration (megacities)
- Environmental changes (development areas, land degradation, etc.)
- Climate change (more extreme events)
4. From hazard to risk

- Phenomenon/hazard vs. Risk
- Event vs. Disaster

**Definition of risk:**

\[
\text{Risk} = \text{Hazard} \times \text{Values at risk} \times \text{Vulnerability}
\]
\[
= \text{Hazard} \times \text{Consequences}
\]
Public authorities
(state, community, NGOs)

People concerned
(private persons, companies)

Finance industry
(insurance and capital market)
6. Flood insurance

- General benefits
- Hazard zoning and premiums
- Aspects of premium calculation (pricing)
7. The role of reinsurance

- Worldwide spread of the risk
- Examples of reinsurance shares (Typhoon Haiyan/Philippines; Flood/Thailand; Hurricane Gilbert/Jamaica)

Hurricane Gilbert (Jamaica 1988):
- Economic loss: US$ 2,000m
- Insured loss: US$ 700m
- Reinsured loss: US$ 690m (99%)
7. The role of reinsurance

- Worldwide spread of the risk
- Examples of reinsurance shares (Typhoon Haiyan/Philippines; Flood/Thailand; Hurricane Gilbert/Jamaica)
- Loss modeling
- Disaster loss databases (MRNatCatSERVICE)
- Expertise in natural hazards
- Source for information
- Impacts from water disasters are more devastating in less developed parts of the world than to rich societies.
- Natural disasters can have a positive effect on an economy (via reconstruction).
- But the indirect positive effects on GDP can usually not offset the losses.
- National debt and "destroyed capital" must be considered in the context of disaster impact on a country (not only the direct losses)
- Countries with higher insurance cover will be better able to withstand natural disasters.

- RESILIENCE (= the “bouncing back” to normal)
Figure 3: Typical example of the impact of a natural disaster on GDP and national debt of a low-resilience country. Tropical cyclones are included in the analysis.
9. What can and should be done?

- Examples of successful prevention/protection/preparedness measures
  - Flood shelters in Bangladesh
  - Protection of Hamburg/Germany against storm surges
  - Dutch Delta Programme
  - Mississippi River and Tributary Project (MR&T)
  - Flood protection strategy after 1998 floods in China

- Increase awareness
- Enable people/enterprises to take financial precautions
10. Insuring the poor

- Microinsurance schemes
- MI has huge development potential, but still very few schemes set up
- Example: MCII (Caribbean: “Livelihood Protection Policy”)
- Huge amounts of money available in the international financial markets
- Cat Bonds
  - high-interest, but also high-risk investments
  - geared to very large potential losses
  - exclusively used in developed countries
12. Conclusions

- The rising number of severe weather-related natural disasters will cause higher loss burdens for economies in the future.

- Trends of disaster losses can only be lessened by a package of integrated counter-measures:
  - *strict land-use regulations*
  - *warning systems*
  - *education and information*
  - *(financial) motivation*
  - *insurance*

- For no other peril are protection measures as effective with respect to risk and loss reduction as for floods.

- Stakeholders must have a long-term perspective, not plan on a day-to-day basis.
Great natural events are not avoidable. Great disasters are.

Disasters are inevitably the net result of the effects of extreme natural events and the response to those events.

Effective safeguards are both achievable and indispensable, but they will never provide complete protection.

The determining factor is awareness that nature can always come up with events against which no human means can prevail.

If we are willing to tackle the risk from frequent events in a joint effort involving governments and the people, and if we are sufficiently prepared for the residual risk from rare events by involving the finance industry, we are headed for a world that becomes a safer place to live in.
Conclusions

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Thank you for your attention.