National Disaster Risk Assessment: moving from scenarios to the full probabilistic approach

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Outline

1. Policies for National Risk Assessment
2. Scenario-Based National Risk Assessment
3. Probabilistic Risk Assessment
Risk Assessment in Policy

• Union Civil Protection Mechanism (2014)
  – **Art. 5:** “... to complete risk assessments at national or appropriate subnational level and make available a summary of the relevant elements by 22 Dec. 2015 and every three years thereafter.”
  – Legislation under revision- full risk assessment report

• Sendai Framework: Targets G
Guidelines for Risk Assessment

- Risk management - Risk assessment technique (ISO 31010)
- National Disaster Risk Assessment (UNISDR, 2017)
- Science for Risk Management (DRMKC, 2017)
Guidelines NDRA 2017: DRA as a Process
Scenario-Based Risk Assessment

Elaboration, analysis and evaluation of **scenarios** of potential risk situations, which condense the realm of possibilities to a **limited number of identified situations**
Risk Assessment – Scenario

• Detailed (and if possible quantitative) estimation of
  – the probability of occurrence of event
  – the severity of the potential impacts

• Whenever possible, risk analysis must be based on quantitative data

Examples of Scenario
1. Top event
2. Worst case
3. Most probable
4. Low, medium and high frequent events
Risk Assessment – Examples

- Failure of a large dam on a river
- Failure of a large dam on a river
- Prolonged drought wave
- Extensive disruption to GMOS
- Disruption to the drinking water supply due to diesel discharge in Stockholm's raw water

Impact Levels:
- Very significant
- Significant
- Average
- Small
- Minimal

Likelihood Levels:
- Very low
- Low
- Medium
- High
- Very high

Uncertainty assessment:
- High
- Medium
- Low

Consequences:
- Extreme events
- Conceivable serious scenarios (NRA)
- Day-to-day events
Overview of Risks in Europe

- Risk Summaries prepared by 34 participating states

Graph 1: number of UCPM Participating States having assessed each risk covered by the Overview of Risks
# National Risk Assessment In Western Balkans and Turkey

<table>
<thead>
<tr>
<th>Partner</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>Study OSCE</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>In harmonization with EU guidelines</td>
</tr>
<tr>
<td>Kosovo*</td>
<td>Developed with UNDP and under revision</td>
</tr>
<tr>
<td>Macedonia</td>
<td>To be developed in line with EU Guidelines</td>
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<td>Montenegro</td>
<td>To be developed</td>
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<tr>
<td>Serbia</td>
<td>Finalized</td>
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Risk Assessment – Probabilistic Risk Assessment

Considers a large number of possible scenario, their likelihood and associated impacts
Conceptual modelling framework: Floods

Full Scale Weather generator (current and future Climate)

Thousands of Scenarios
Probabilistic Risk Analysis

All Possible Flood Scenarios with different frequencies

Vulnerability of exposed assets

All Possible Loss Scenarios with different frequencies
Probable Maximum Loss curve

- the likelihood of a $US 100 million loss occurs, on average, once in a decade
- loss of $US 1 billion occurs is a very rare event.

Risk Metrics: Average Annual Losses
Sectoral Economic Losses

Average Annual Loss AAL
Annual Average Loss and average capital stock (%)

Figure 2. Source-Global Assessment Report on Disaster Risk Reduction 2015.
Conclusion

• Governance of NDRA process

• Scenario-Based NDRA is widely used and greatly improved availability of risk information

• Probabilistic Risk Assessment can provide a more comprehensive understanding of the complex disaster risk
THANK YOU

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