Connecting the dots for knowing the risks in Bosnia and Herzegovina
Disaster Risk Analysis System (DRAS)

DRAS is an online platform created with the aim to change the approach to disaster risk reduction (DRR) in Bosnia and Herzegovina by providing accurate information to decision makers and citizens about exposure to floods, landslides, earthquakes and mine suspected areas.

DRAS has been developed within the United Nations Development Programme (UNDP). The system allows free access to scientific flood and landslide hazard data to decision makers and citizens in order to increase disaster risk awareness for specific locality. DRAS is available for cities Doboj and Tuzla, and under the development for Brcko District municipality, Ljubuški, Livno, Lukavac, Maglaj, Martinjaš, Grad, Đevlić, Žitnica and Prozor.

DRAS consists of 3 Modules. Module 1 is being publicly available while Modules 2 and 3 are accessible to respective local authorities in accordance with their user rights. System can be accessed via the following link: http://mara.un.org.

Module 1:
- Uses hazard maps and projects them on a publicly available Google maps that citizens can easily search and use.
- Linked to precipitation and water level data publicly available from Hydrometeorology and Water Agencies which provides additional information and awareness raising to citizens.

DONORS

CZECH REPUBLIC

Government of Republic of Turkey

UNDP
May 2014 Floods in BiH - Post Disaster Needs Assessment

Damages and Losses

- Livelihoods and Employment: 40%
- Housing and household items: 23%
- Transport and Communications: 18%
- Agriculture: 9%
- Flooding protection, Energy, Health, Public Services and Facilities, Water Sanitation and Gender: 10%
- Damages and Losses
Recovery, BBB and resilience
UN Floods Recovery Programme

MORE THAN
16,240
PEOPLE WERE ABLE TO RETURN TO THEIR HOMES, WHICH HAD BEEN RENDERED UNINHABITABLE BY THE FLOODS.

156 SCHOOLS

71,800 CHILDREN AND STUDENTS

288,381
PEOPLE

6 PROGRAMME PROGRESS

22,859
REHOMES

206,781
REHOMED

4 CENTRES FOR SOCIAL WORK

3 SCHOOLS

51 HOUSING

31 WATER AND SANITATION FACILITIES

63 BUSINESS

6,365 HL stability

FOR MORE THAN 610,000 PEOPLE

116 SMEs

4,326
ÓMEN

1,270 FOOD PRODUCTION

5,600
ÓOJ
Recovery, BBB and resilience
Resilience

True opportunity to create resilience is in citizens themselves and municipalities

BiH already has solid scientific data on hazards, exposure, and vulnerabilities. The main challenge is a lack of systematic data collection, exchange of information among different stakeholders, and translating the available data into action.

New technologies can bridge the gap
Disaster Risk Analysis System (DRAS)

DRAS is an online platform  http://dras.undp.ba/

DRAS consists of 3 Modules

Allows free access to scientific data on landslides and floods hazard (soon earthquakes and mines)

Helps decision makers in preparation of planning documents and risk assessments that combine spatial data, hazards, land use and data on vulnerable population

DRAS is available for 2 cities and under the development for 10 municipalities.
1 in 20 years. The probability of flooding 1 in 20 years, which is also called the twenty-year big water. The probability of such flooding is 5% in each year (for the flood of this magnitude or greater).
DRAS Modul 2
Flood risk calculation

The individual risk maps are obtained by multiplying the value of vulnerable categories:

1. population, 0.40 (40%)
2. economy, 0.35 (35%)
3. protected areas, 0.15 (15%)
4. cultural and historical heritage, 0.10 (10%)
5. *IPPC facilities, no category

with the weight factor and the hazard map values.

\[ \text{RF} = S \cdot n \cdot WF \cdot H \]

RF – risk factor, \(n\) – number of dots, km ili km², TF – weight factor, H – hazard.

Summary risk map is obtained by summing the individual values of all vulnerable categories, adjusted with relative risk factors for each category.

*IPPC facilities - facilities and plants that could cause sudden water contamination in the event of a flood (chemical, metal, energy, waste management ...)

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**Population**

<table>
<thead>
<tr>
<th>Faktor rizika</th>
<th>Klasa</th>
<th>Kategorija rizika</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-499</td>
<td>0</td>
<td>Zanemariv rizik</td>
</tr>
<tr>
<td>500-1,499</td>
<td>0 &lt; R &lt; 0,25</td>
<td>Nizak rizik</td>
</tr>
<tr>
<td>500-1,999</td>
<td>0,25 &lt; R &lt; 0,50</td>
<td>Umjeren rizik</td>
</tr>
<tr>
<td>1,000-1,999</td>
<td>0,50 &lt; R &lt; 0,75</td>
<td>Visok rizik</td>
</tr>
<tr>
<td>≥1,500</td>
<td>0,75 &lt; R &lt; 1,0</td>
<td>Ekstremni rizik</td>
</tr>
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</table>

**Economy**

<table>
<thead>
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<th>Kategorija rizika</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-249</td>
<td>0</td>
<td>Zanemariv rizik</td>
</tr>
<tr>
<td>250-499</td>
<td>0,33 &lt; R &lt; 0,67</td>
<td>Visok rizik</td>
</tr>
<tr>
<td>≥500</td>
<td>0,67 &lt; R &lt; 1,0</td>
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**Protected areas**

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<tr>
<td>0-149</td>
<td>0</td>
<td>Zanemariv rizik</td>
</tr>
<tr>
<td>150-299</td>
<td>0 &lt; R &lt; 0,50</td>
<td>Visok rizik</td>
</tr>
<tr>
<td>≥300</td>
<td>0,50 &lt; R &lt; 1,0</td>
<td>Ekstremni rizik</td>
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**Cultural and historical heritage**

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**Summary risk map**

- **Klasa (RF):** 0 Zanemariv rizik
- **Kategorija rizika:**
  - 0 < R < 0,25 | Nizak rizik
  - 0,25 < R < 0,50 | Umjeren rizik
  - 0,50 < R < 0,75 | Visok rizik
  - 0,75 < R < 1,0 | Ekstremni rizik
Calculation of population risk

Number of people

Hazard (value)

Reclassification

Population risk

332 (number of people) x 100 (WF) x 1.5 (hazard) = 49800 (FR) → reclassification

EXSTREME RISK
Calculation of economy risk

Categories:
- Social objects (schools, hospitals, nursing home for elderly people, cultural centre ...)
- Municipal infrastructure and production and business activities (gas station, factory, heating facility ...)
- Housing (housing density - individually, mixed and multiple housing)
- Traffic (motorway, regional road, highway ...)
- Natural areas (agricultural land, forests, water areas ...)

Polygons – unit of measure

Hazard (values)

Reclassification

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Economy: 41 (number of objects) x 80 (WF) x 1,5 (hazard) = 4920 (FR – risk factor) → reclassification 1 - EKSTREME RISK
Calculation of IPPC risk

Number of IPPC

Hazard (value)

IPPC risk

1 (facility) x 100 (WF) x 2,99 (hazard) = 299 (FR) → reclassification 0,50 - HIGH RISK
Calculation of cultural-historical risk and protected area risk

Reclassification

### Cultural-historical heritage

Number of protected objects (polygon) × TF × Hazard (value)

**CH:** 1 (monument) × 95 (WF) × 1.5 (hazard) = 142.5 (FR) → reclassification 0 - NEGLIGIBLE RISK

### Protected area

Area PA (polygon) × W × Hazard (value)

**PA:** 10 km² (protected area) × 50 (WF) × 2.99 (Hazard) = 1499 (RF) → reclassification 0,33 - LOW RISK
Summary risk

- Risk class for population × 0.4
- Risk class for economy × 0.35
- Risk class for cultural-historical heritage × 0.1
- Risk class for protected areas × 0.15
- Risk class for IPPC

SUMMARY RISK
Future for DRAS

Institutionalizing DRAS to 10 additional municipalities (in total 22 by 2020). DRAS is affordable tool and easy to use.

Possibility to be introduced in other countries in the region.

Introduction of fire hazard and risk data as well as environmental sensitivity risk.

Familiarizing more advanced users such as insurances, International Financial Institutions (IFIs), investors and private businesses with DRAS features to unlock greater funding for DRR.

We want to make DRAS ones to-shop for increasing resilience.
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Disaster Risk Reduction Project Manager
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