COMPARABLE SOCIAL VULNERABILITY PROFILING
CASE STUDY: CROATIA

PRESENTATION OUTLINE

Background info - Croatia

Flooding 2014

CSVP methodology

CONCLUSIONS

Understanding Risk Forum 2016
Venice, 18 May 2016
Republic of Croatia
Size: 56.542 km²
Population: 4,284,889 (census 2011)
Territorial division:
City of Zagreb (capital) and 20 counties (regions)
DISASTER RISK DOCUMENTS in CROATIA

Republic of Croatia HAZARD ASSESSMENT (March 2013)
Problem: **NO SOCIAL VULNERABILITY DATA**
(note that as of November 2015 Republic of Croatia has new RISK ASSESSMENT however this problem was not solved)

Republic of Croatia PROTECTION AND RESCUE PLAN (July 2010)
Problem: **NO CONTINGENCY PLANNING IN TERMS OF SOCIAL VULNERABILITY**
(the only remote mention of social vulnerability within a document of 79 pages is that evacuation lists of vulnerable groups should be made with info on: pregnant women, mothers with children of up to 12 y/o, children of up to 15 y/o, persons with special needs, sick, helpless, imobile and older than 75 y/o)

**GENERAL PROBLEM:**

**LACK OF STANDARDIZED SOCIAL VULNERABILITY METHODOLOGY**

BACKGROUND:

MAY 2014

2 weeks of heavy rain

Highest ever recorded peaks of River Sava

13,000 persons at risk

SOURCE: www.vusz.hr
RESULT:

Flooded area
18 May 2014

3 villages completely flooded
3 villages partially flooded
2 fatalities
11,172 buildings/houses flooded
8,635 evacuated

SOURCE: www.vrss.hr
COULD WE HAVE REACTED BETTER IN TERMS OF PROTECTION AND RESCUE IF WE HAD MORE ACCURATE DATA ON SOCIAL VULNERABILITY?
Recommendations/Guidelines for development of Social Vulnerability Methodology in Croatia are to first and foremost rely on two important pillars and those are: **data Simplicity and Comparability**.

Based upon widely accessible and standardized data as per **Census of Population, Households and Dwellings in Croatia 2011**.
VULNERABILITY DATA INDICATORS

CSVP variables selection/principles

Once the Census 2011 data is collected it can be summarized using basic percentages and proportions to compare and contrast areas.

- Age (Av)
- Gender (Gv)
- Education (Ev)
- Minorities (Mv)
- Income (Iv)
- Disability/Dependency (Dv)

- No pondering (values added) to indicators

- Plus sign “+“ and red color stand for more vulnerability and minus sign “-“ and green color stand for less vulnerability
### VULNERABILITY DATA INDICATORS (Av, Gv, Ev)

#### CSVP AGE VARIABLE

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 15 years of age/Over 65 years of age</td>
<td>+</td>
</tr>
<tr>
<td>In between 15 and 65 years of age</td>
<td>-</td>
</tr>
</tbody>
</table>

\[
AGE \ variable \ (Av) = \frac{\text{Total number of vulnerable AGE group}}{\text{Total number of population}} \times 100\%
\]

#### CSVP GENDER VARIABLE

<table>
<thead>
<tr>
<th>Gender</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>+</td>
</tr>
<tr>
<td>Male</td>
<td>-</td>
</tr>
</tbody>
</table>

\[
GENDER \ variable \ (Gv) = \frac{\text{Total number of vulnerable GENDER group}}{\text{Total number of population}} \times 100\%
\]

#### CSVP EDUCATION VARIABLE

<table>
<thead>
<tr>
<th>Education</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without secondary education</td>
<td>+</td>
</tr>
<tr>
<td>With secondary education</td>
<td>-</td>
</tr>
</tbody>
</table>

\[
EDUCATION \ variable \ (Ev) = \frac{\text{Total number of vulnerable EDUCATION group}}{\text{Total number of population}} \times 100\%
\]
## Vulnerability Data Indicators (Mv, Iv, Dv)

### CSVP Minority Variable

<table>
<thead>
<tr>
<th>Minority</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Majority</td>
<td>-</td>
</tr>
</tbody>
</table>

**MINORITY variable \((A_v)\)**

\[
A_v = \frac{\text{Total number of vulnerable MINORITY group}}{\text{Total number of population}} \times 100\%
\]

### CSVP Income Variable

<table>
<thead>
<tr>
<th>No income</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>With income</td>
<td>-</td>
</tr>
</tbody>
</table>

**INCOME variable \((G_v)\)**

\[
G_v = \frac{\text{Total number of vulnerable INCOME group}}{\text{Total number of population}} \times 100\%
\]

### CSVP Disabled Variable

<table>
<thead>
<tr>
<th>Disabled/Dependent</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Disability/Dependency</td>
<td>-</td>
</tr>
</tbody>
</table>

**DISABLED variable \((G_v)\)**

\[
G_v = \frac{\text{Total number of vulnerable DISABLED group}}{\text{Total number of population}} \times 100\%
\]
Step one

- calculating respective vulnerability variables and creating an overall vulnerability table:

  - AGE variable (Av)
  - GENDER variable (Gv)
  - EDUCATION variable (Ev)
  - MINORITY variable (Mv)
  - INCOME variable (Iv)
  - DISABILITY variable (Dv)

<table>
<thead>
<tr>
<th>MUNICIPALITY</th>
<th>VULNERABILITY</th>
<th>A(v)</th>
<th>G(v)</th>
<th>E(v)</th>
<th>M(v)</th>
<th>I(v)</th>
<th>D(v)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunja</td>
<td>+</td>
<td>34.03%</td>
<td>52.73%</td>
<td>63.85%</td>
<td>34.16%</td>
<td>43.59%</td>
<td>17.68%</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>65.97%</td>
<td>47.26%</td>
<td>36.15%</td>
<td>60.12%</td>
<td>56.4%</td>
<td>82.31%</td>
</tr>
</tbody>
</table>

- When all the vulnerability variables are mathematically calculated they are all included in one overall table representing Comparable Social Vulnerability Profile of respective municipality/city/county.
Step two

- Comparing respective vulnerability tables (municipalities/cities/counties)

- Vulnerability variables are presented in percentage of respective category within a total number of population, those variables that are increasing the level of vulnerability are being compared (marked with plus sign “+“ and red color).

- Community having 4, 5 or 6 increased vulnerability categories attached, and is therefore recognized as more vulnerable (as oppose to the community with 1 or 2 higher vulnerability categories in its favor is recognized as less vulnerable).
### CSVP METHODOLOGY EXPLANATION/EXAMPLES

#### CSVP COMPARABILITY: ILOK vs GUNJA

<table>
<thead>
<tr>
<th>CSV profile</th>
<th>A(v)</th>
<th>G(v)</th>
<th>E(v)</th>
<th>M(v)</th>
<th>I(v)</th>
<th>D(v)</th>
<th>VULNERABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ilok</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Gunja</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35.7%</td>
<td>48.53%</td>
<td>59.57%</td>
<td>22.4%</td>
<td>34.96%</td>
<td>20.67%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>34.03%</td>
<td>52.73%</td>
<td>63.85%</td>
<td>34.16%</td>
<td>43.59%</td>
<td>17.68%</td>
<td>+</td>
</tr>
</tbody>
</table>

#### CSVP COMPARABILITY: VINKOVCI vs ZAGREB

<table>
<thead>
<tr>
<th>CSV profile</th>
<th>A(v)</th>
<th>G(v)</th>
<th>E(v)</th>
<th>M(v)</th>
<th>I(v)</th>
<th>D(v)</th>
<th>VULNERABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinkovci</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Zagreb</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>32.97%</td>
<td>52.22%</td>
<td>53.65%</td>
<td>6.84%</td>
<td>37.59%</td>
<td>16%</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>25.17%</td>
<td>53.25%</td>
<td>55.34%</td>
<td>5.26%</td>
<td>28.41%</td>
<td>14.49%</td>
<td>-</td>
</tr>
</tbody>
</table>
Step three

- **Comparing respective vulnerability tables against common denominator**

To determine vulnerability levels between respective communities within one area, all the results derived from respective vulnerability tables need to be compared with the common denominator.

- If the respective community vulnerability variable is higher than the reference vulnerability variable it gets marked with red color; in the opposite case it gets marked with green color meaning that with that particular variable community is lower vulnerable than its reference point (county/state).
Overall community vulnerability when cross-referenced to the common denominator is determined in the following manner:

“low vulnerability communities”
“medium-low vulnerability communities”
“medium vulnerability communities”
“medium-high vulnerability communities”
“high vulnerability communities”

Vulnerability variables marked with red color (0 to +6).
Vulnerability variables marked with green color (0 to -6).
### CSVP METHODOLOGY EXPLANATION/EXAMPLES

#### CSVP comparability table Lika-Senj County

<table>
<thead>
<tr>
<th>CSV profile</th>
<th>A(v)</th>
<th>G(v)</th>
<th>E(v)</th>
<th>M(v)</th>
<th>I(v)</th>
<th>D(v)</th>
<th>RESULT</th>
<th>CSVP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lika-Senj</td>
<td>43.96%</td>
<td>50.23%</td>
<td>57.67%</td>
<td>14.76%</td>
<td>29.34%</td>
<td>20.65%</td>
<td>REFERENCE</td>
<td></td>
</tr>
<tr>
<td>Lovinac</td>
<td>50.55%</td>
<td>48.16%</td>
<td>61.47%</td>
<td>16.48%</td>
<td>23.04%</td>
<td>18.67%</td>
<td>-3</td>
<td>+3</td>
</tr>
<tr>
<td>Brinje</td>
<td>40.69%</td>
<td>50.58%</td>
<td>67.69%</td>
<td>6.54%</td>
<td>35.04%</td>
<td>25.49%</td>
<td>-2</td>
<td>+4</td>
</tr>
<tr>
<td>Donji Lapac</td>
<td>38.76%</td>
<td>49.69%</td>
<td>57.31%</td>
<td>80.97%</td>
<td>18.22%</td>
<td>18.84%</td>
<td>-5</td>
<td>+1</td>
</tr>
<tr>
<td>Gospić</td>
<td>37.23</td>
<td>50.33%</td>
<td>56.43%</td>
<td>6.02%</td>
<td>30.83%</td>
<td>20.21%</td>
<td>-4</td>
<td>+2</td>
</tr>
<tr>
<td>Karlobag</td>
<td>40.13%</td>
<td>50.49%</td>
<td>54.42%</td>
<td>4.14%</td>
<td>24.54%</td>
<td>23.45%</td>
<td>-4</td>
<td>+2</td>
</tr>
<tr>
<td>Novalja</td>
<td>37.1%</td>
<td>49.3%</td>
<td>52.01%</td>
<td>3.38%</td>
<td>30.74%</td>
<td>14.14%</td>
<td>-5</td>
<td>+1</td>
</tr>
<tr>
<td>Otočac</td>
<td>37.49%</td>
<td>49.99%</td>
<td>42.11%</td>
<td>7.83%</td>
<td>32.51%</td>
<td>20.09%</td>
<td>-5</td>
<td>+1</td>
</tr>
<tr>
<td>Perušić</td>
<td>46.1%</td>
<td>49.7%</td>
<td>67.32%</td>
<td>8.91%</td>
<td>25.44%</td>
<td>25.36%</td>
<td>-3</td>
<td>+3</td>
</tr>
<tr>
<td>Plitvička J.</td>
<td>37.34%</td>
<td>51.13%</td>
<td>57.42%</td>
<td>28.17%</td>
<td>30.76%</td>
<td>18.39%</td>
<td>-3</td>
<td>+3</td>
</tr>
<tr>
<td>Senj</td>
<td>34.88%</td>
<td>50.61%</td>
<td>52.98%</td>
<td>2.3%</td>
<td>27.67%</td>
<td>16.42%</td>
<td>-5</td>
<td>+1</td>
</tr>
<tr>
<td>Udbina</td>
<td>42.74%</td>
<td>50.43%</td>
<td>63.98%</td>
<td>52.35%</td>
<td>22.41%</td>
<td>26.31%</td>
<td>-2</td>
<td>+4</td>
</tr>
<tr>
<td>Vrbovina</td>
<td>40.19%</td>
<td>50.76%</td>
<td>57.06%</td>
<td>80.96%</td>
<td>21.87%</td>
<td>14.12%</td>
<td>-4</td>
<td>+2</td>
</tr>
</tbody>
</table>

**LOW** | **L** | **MEDIUM** | **M-L** | **MEDIUM** | **M** | **MEDIUM** | **HIGH** | **M-H** | **HIGH** | **H**
CSVP LESSONS LEARNED / CONCLUSIONS

DATA AVAILABILITY
• if no adequate data available from census you could consider other sources or even conducting your own researches

SIMPLICITY
• especially recommendable during the introductory phase as overly complicated solutions might not be accepted

COMPARABILITY
• social vulnerability data will not serve its purpose if they cannot be compared against each other

POLITICAL WILL (THERE IS TIME AND PLACE FOR EVERYTHING)
Thank you!

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