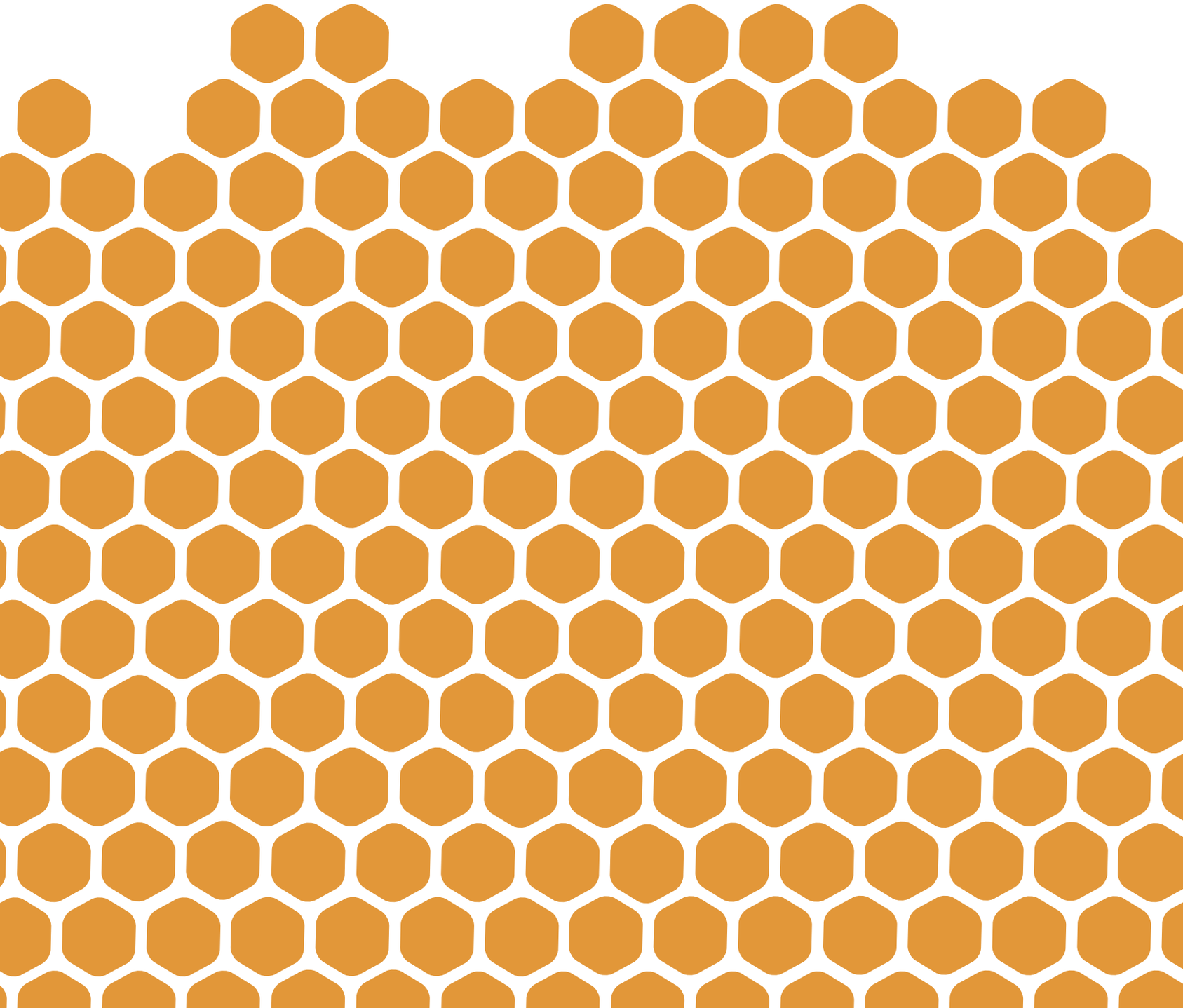
Human Development Report
Serbia 2016

UNDP 50 YEARS

Empowered lives. Resilient nations.

SOCIAL CAPITAL:

The Invisible Face of Resilience



Author/s
Branka Anđelković
Maja Kovač

Human Development Report
Serbia 2016

SOCIAL CAPITAL:
THE INVISIBLE FACE OF RESILIENCE

First edition

Publisher
UNDP Serbia

Editor
Barbara Hall

Design and layout
Benussi&TheFish

Printing
DMD Štamparija

ISBN
978-86-7728-238-7

Circulation
200

Acronyms and abbreviations

CRI	Capitals of Resilience Index
CSO	civil society organization
DRM	disaster risk management
DRR	disaster risk reduction
EC	European Commission
EM	Emergency Management
ESHQ	Emergency Situation Headquarters
EU	European Union
EWS	early warning system
GDP	gross domestic product
GNI	gross national income
HD	human development
HDI	Human Development Index
HFA	Hyogo Framework for Action
MDG	Millennium Development Goal
MoI	Ministry of Interior
NHDR	National Human Development Report
SDG	Sustainable Development Goal
SEM	Sector for Emergency Management
SORS	Statistical Office of the Republic of Serbia
The Sendai Framework	Sendai Framework for Disaster Risk Reduction 2015-2030
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development

Foreword

Since 1992, UNDP has spearheaded Human Development, a people-centered approach to development that not only focuses on the national incomes, but also on the ability of individuals to develop their full potential to lead healthy, productive and creative lives. However, societies and communities are increasingly facing various threats along that path: from economic and demographic downturns to floods and earthquakes.

It is my pleasure to introduce the 4th National Human Development Report for Serbia (NHDR), *Resilience of Municipalities*. Resilience has different meaning in different disciplines. Although the idea is not new, the term began to gain popularity following the 2008 global financial crisis, but most of the definitions focusing too narrowly on responding to shocks in order to maintain the current state of affairs.

In this report we looked at the resilience as the ability of Serbian municipalities to resist, absorb, adapt and recover from the effects of natural disasters – and to "build back better". There is a growing recognition that all disasters are actually influenced by human action and inaction, and development choices. Nowadays, countries with high and very high progress in human development, including Serbia, increasingly pay a high price in the face of devastating events. The 2014 floods come to mind, which affected more than 20 per cent of Serbia's population, causing EUR1.7 billion in damage, which pushed the country into the recession.

Clearly, all economic, environmental and institutional challenges related to resilience could not be addressed in a single report. This is partially explaining why the Government of the Republic of Serbia and UNDP decided to look deeper into the invisible face of resilience – **the social capital** – as manifested by peoples' actions in times of crisis.

How to better prepare for the crisis? How to engage volunteers and distribute humanitarian aid more efficiently? Why is it important to include women in disaster risk preparedness and response? How to prevent the poor, persons with disabilities, the elderly and children from becoming even more vulnerable during a crisis? Why do partnerships between the state and non-state actors matter? These are only some questions that the report answers. This National Human Development Report (NHDR) shows the importance of communication, partnerships and coordination, solidarity and volunteerism, humanitarian aid, social inclusion and trust.

Findings emerge from the analysis of hundreds of compelling stories and testimonies, collected through direct interviews with citizens and local authorities. By bringing all the views together, the NHDR offers a set of actionable recommendations on how to strengthen the social fabric to reinforce the resilience of communities.

In addition to diagnosing the problem, the report seeks to compare municipalities through the **Capitals for Resilience Index**, which was specifically constructed for this purpose. Notwithstanding the Index's limitations, primarily its inability to capture important non-measurable aspects, it effectively complements the findings from the field.

However, it was impossible to capture in the entirety the wealth of information that the research team collected. Our attempt to open the debate about resilience by portraying the local communities and providing measurements and ranking might have been too ambitious, taking into account a multitude of factors that make up resilience. But we hope that the selection of empirical and practical information presented in this report will help Serbian municipalities strengthen social and institutional mechanisms in order to minimize the costs of disasters, build capacity to manage and sustain development momentum, and maximize transformative potentials.

Irena Vojackova Sollorano

UNDP Resident Representative

Acknowledgments

The Human Development Report for Serbia was prepared during 2015 and 2016 by a national team of experts from the Public Policy Research Center and the Center for Social Policy. Upon endorsement of the theme by the Government of the Republic of Serbia, the preparation of the report included discussions with representatives of the local self-governments, in particular departments responsible for emergency situations, as well as local institutions, grassroots organizations, voluntary organizations and citizens.

I would like to extend my sincerest thanks and appreciation to all colleagues who contributed to the report preparation.

The lead authors, Ms. Branka Anđelković and Ms. Maja Kovač, played a fundamental role in introducing a novel approach to disaster risk reduction, linking it to the social capital concept. They also coordinated the work of other team members and contributors.

Mr. Srđan Bogosavljević was in charge of developing and calculating the Capitals for Resilience Index, supported by a team of national experts from the Statistical Office of the Republic of Serbia: Mr. Miladin Kovačević, Ms. Dragana Đokovic Papić, Mr. Vladica Janković and Ms. Jovanka Stojanović. Mr. Aleksandar Zorić and Ms. Milena Lazić, statistical experts from the Ipsos Strategic Marketing, calculated the Capitals for Resilience Index for 13 assessed municipalities.

Ms. Violeta Orlović Lovren from the Belgrade Faculty of Philosophy incisively contributed to the research and analysis of the disaster risk profile for Serbia and the national and local DRR policy frameworks.

The report profited from the review experiences and research support by the colleagues from the Public Policy Research Centre and the Center for Policy Analysis from Belgrade, and their associates: Mr. Mladen Ostojić and Mr. Marko Milanović.

Special thanks are due to hundreds of professionals, volunteers and civil society activists who attended the focus group discussions in Šid, Novi Sad, Nova Crnja, Negotin, Kladovo, Obrenovac, Smederevska Palanka, Kragujevac, Novi Pazar, Kraljevo, Loznica, Mali Zvornik, and Vranje.

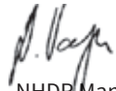
Gratitude is extended to colleagues from the UNDP Istanbul Regional Hub, Mr. Mihail Peleah, who prepared the groundwork for Capitals for Resilience Index, and Ms. Elena Danilova-Cross, who provided technical advice to the research team and peer-reviewed the draft report.

Thanks are also due to other peer reviewers, Ms. Biljana Mladenović from the Social Inclusion and Poverty Reduction Unit, and to UNDP Serbia colleagues Ms. Steliana Nedera, Ms. Jelena Tadžić, Mr. Stevan Vujasinović and Mr. Žarko Petrović as well as to the Human Development Report Office colleagues.

Additional thanks go to Mr. Pavle Golicin who helped me in the theme selection and to subsequently prepare the initial report outline.

The editorial efforts of Ms. Barbara Hall and Ms. Joanna Brooks, and the excellent translation in Serbian by Mr. Đordje Tomić greatly contributed to the quality of the report.

Daniel Varga



NHDR Manager

Content

SOCIAL CAPITAL:
THE INVISIBLE FACE OF RESILIENCE

EXECUTIVE SUMMARY

The more a community is interwoven through social ties and networks, the more it is able to cope with and adapt to shocks. When the system is not performing well, the value of personal connections, networks and citizens' initiatives becomes more apparent and bridges the gap between the system's delayed response and the community's imminent needs.

What is this report about? As a result of impact of the floods and landslides in 2014 and 2015 in the Western Balkans countries and territories, the concept of resilience has become the main focus in policy debates on disaster risk reduction (DRR) in the region. By assessing the resilience of Serbian municipalities and the role of social capital, this National Human Development Report (NHDR) seeks to improve understanding and raise awareness among multiple national and local stakeholders on the vital force of communication, cooperation, partnerships, volunteerism, and social inclusion in building resilient communities. These manifestations of social capital become even more important when the Disaster Risk Reduction (DRR) system lacks financial resources and has limited human capacity and know-how to plan for and respond to natural disasters. Social capital then becomes the community's central insurance policy for preventing and reducing the loss, and thus a cornerstone of community resilience. This is the first research conducted in Serbia that focuses on the role of social capital in community resilience to natural hazards, and it aims to inform current policies and practices about the importance of social capital in promoting resilience in the country.

This report includes the Introduction, Part 1, Part 2 and Recommendations. The Introduction details Serbia's natural disasters profile in the Western Balkans context and presents the approach used in this report. Part 1 has two chapters. Chapter 1 brings together the main concepts that lay the basis for assessing the abilities of communities to 'build back better'. It first discusses approaches to the concept of resilience and its aspects with reference to DRR and human development concepts. Through defining social capital and its manifestations, including the benefits of social capital for the community, this chapter further links the concepts of resilience and social capital in the context of natural disasters. Chapter 2 introduces key global DRR policy frameworks, such as the Sendai Framework for Disaster Risk Reduction 2015-2030 (the Sendai Framework), the Sustainable Development Goals 2015-2030, and the Paris Agreement on Climate Change. It further includes discussion on the progress of Serbia's DRR system in adopting the main principles of these universal instruments. Finally, the Chapter presents Serbia's policy and legal DRR framework.

Part 2 includes two chapters, which present findings of the research on the role of social capital in community resilience in Serbia. The first chapter discusses different approaches to measuring resilience and the expanding field of measurement. It explores the potentials of the Human Development Index to assess resilience and presents the Capitals of Resilience Index (CRI) for Serbia that has been developed by the Statistical Office of the Republic of Serbia (SORS), through UNDP support. The significance of principal capitals for building resilient communities – economic, physical, natural, human, social and institutional – are further

examined in 13 Serbian municipalities, with the aim to understand how and to what extent this index contributes towards understanding the resilience potential of a specific local context.

The second chapter unpacks the importance of social capital for the resilience of communities by presenting research findings on the role of communication, partnerships and coordination, solidarity through volunteerism, humanitarian aid provision, social inclusion, and trust in Serbian communities.

Finally, the Recommendations focus on strengthening and including social capital aspects in the existing national and local DRR systems in order to further enhance their inclusionary features. Other recommendations relate to CRI results and how to enhance the policy and institutional framework of the DRR system in general, because they facilitate boosting the system's inclusionary characteristics.

KEY FINDINGS:

1. Despite the increasing attention given to the concept of resilience and its link to human development, and in the global, regional and national DRR policy frameworks, the important role of the manifestations of social capital, which foster community resilience, remains neglected. As such, social capital deserves a more prominent place in the national DRR planning and policy framework. At the same time, the Human Development approach needs to be enriched with the collective perspective as one of the means for individual development.
2. Serbia is increasingly exposed to natural disasters, more frequently and with greater impact. The DRR framework is emerging but is showing limitations in all its phases. It focuses too much on response, whereas risk planning is weak. Local communities are attributed a primary role in disaster risk reduction but have not the capacities to reduce risk or adequately respond to natural disasters.
3. Resilience cannot be measured as an all-encompassing entity due to different approaches and degrees of risks to which people are exposed, but it can be approached in relative terms. This is illustrated by the CRI, developed for Serbia. When assessing the Serbian municipalities at the aggregate level and in absolute terms, economic and then physical traits are the most distinctive resilience factors. Yet, when CRI is disaggregated at the municipal level, other capitals such as social capital begin to play a more important role.
4. Information has the greatest value at the beginning of the crisis, where the volume of information sharing is the most intense. This is when the Emergency Situation Headquarters (ESHQ) activity can best be observed. However, when the system is disrupted, informal and alternative channels of communication substitute for the system, and social capital becomes the key communication medium.
5. The partnerships within the DRR system and between the non-state actors and ESHQs are informal and are based on personal connections and friendships. This shows the robustness of social capital in the local community. However, abrupt and unplanned partnerships prevent the local DRR system from continuously acting coherently in order increasing resilience through social capital.
6. Close ties in the community support actions of volunteers. As shown in Serbia, communities capitalized on this resource whether they accounted or disregarded its potential. Yet, limitations of the DRR system in securely and effectively managing the inflow of volunteers and the provision of their services, as well as ensure effective and fair distribution of humanitarian aid, constrain the full utilization of volunteers as a powerful resource of the community in times of crisis.
7. All DRR phases inadequately and insufficiently recognize the needs of vulnerable groups (the elderly, persons with disabilities, Roma, etc.) despite the emerging DRR policy framework. This results in an ad hoc approach to these groups when the crisis strikes, especially during evacuation. When the system is weak, local community leaders take over and lead the evacuation of vulnerable citizens. These strong solidarity practices are based on close ties in the local community, which reduce human losses and foster resilience in times of crisis. Still, Roma men and women rarely experience solidarity from the rest of the community.
8. Trust 'lubricates' social capital and directly affects the degree of resilience of municipalities. Local communities in Serbia show significant levels of trust in family members and friends. To some extent, they also trust their local DRR system but only in times of crisis. And yet, trust in the local DRR system as a whole is weak, which results in limited or are often absent partnerships, as in the case of cooperation between civil society organizations (CSOs) and ESHQs. In the absence of trust in local DRR actors, the community organizes itself and relies on its own resources to deal with the crisis.
9. When the work of local ESHQs is transparent and provides information in a timely manner to the citizens, trust in institutional actors is strengthened. It also contributes to stronger mobilization of citizens in times of crisis and increases solidarity and cooperation with the system.

INTRODUCTION

INTRODUCTION

The water was coming fast. We didn't believe that in two hours everything would be flooded. Nobody expected that, neither the community that remembered some past situations, nor the system that was expected to react fast. People started to mobilize, self-organize, link with others, help, support… Everything happened so fast. It was difficult to communicate. There was no electricity, no mobile phones … but what did save us was the human network that exists in our small community. This was the most precious!

(Excerpt from one of the focus groups held throughout the fieldwork, 30 October 2015, Municipality of Kladovo)

Serbia has by far the largest population at risk of floods, followed by Croatia, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro, Albania and Kosovo. Their occurrence and severity has been increasing since the end of the 20th century (UNDP, 2016b: 39-45).*

Crisscrossed by rivers, spectacular canyons and mountain ranges, picturesque and melancholic lowlands, the Western Balkans[1] countries and territories offer numerous scenic views. But this beauty comes with a price: the region has been historically affected by natural hazards, the most challenging of which are floods and earthquakes. Serbia has by far the largest population at risk[2] of floods, followed by Croatia, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Montenegro, Albania and Kosovo*. Their occurrence and severity has been increasing since the end of the 20th century (UNDP, 2016b: 39-45). And yet, the 2014 floods caught everybody by surprise. In May 2014, Serbia, Croatia, Bosnia and Herzegovina were hit by cyclone Tamara and the accompanying massive rainfall, which triggered floods on large river basins and torrential floods in these three countries.

In Serbia alone, 1.6 million people were exposed to and affected by the floods, which left 51 casualties. The extent of the human suffering and damage laid bare the deficiencies of the natural disaster prevention and response mechanisms in the country. Decades of neglect in the maintenance of key infrastructure combined with the unpreparedness of central and local authorities to respond to natural disasters substantially increased the devastation generated by the unprecedented rainfall.

The flood in May 2014 also caused extensive damage in Croatia and Bosnia and Herzegovina, which led to a massive evacuation of the population in both countries. More than one million people were affected by the disaster in Bosnia and Herzegovina and 38,000 in Croatia (ibid:143). Tens of thousands of homes were lost.

Many people were left without electricity, and other critical infrastructure was damaged or destroyed. Flooding and mudslides washed out or buried road networks, making it difficult to evacuate people and administer aid to those trapped in areas directly affected by the storm (UNDP, 2016b).

* References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

Just several months later, in January 2015, regions in Albania and the former Yugoslav Republic of Macedonia were exposed to harsh flooding, which damaged their agriculture and economies. Consequently, 42,000 people in Albania and 170,000 in the former Yugoslav Republic of Macedonia were affected by these events.

As laid out by the 2016 Sub-regional Human Development Report, the effects of floods in the Western Balkans pre- and post-2014 significantly differ. Before 2014, the total of affected population was under 200.000 people. The 2014 and 2015 floods affected 2.8 million people. At the same time, the financial impact of the floods prior to 2014 was US$148 million compared to the US$4.63 billion afterwards (table 1).

Table 1.
Effect of floods in the Western Balkans, prior and post-2014

	NUMBER OF DEATHS		NUMBER OF PEOPLE AFFECTED		ECONOMIC LOSSES		Overall floods impact (territory affected, people evacuated, houses flooded/damaged and sectors affected)	
Country/ Territory	**Prior to 2014**	**2014/ 2015**	**Prior to 2014**	**2014/ 2015**	**Prior to 2014**	**2014/ 2015**	**Prior to 2014**	**2014/ 2015**
Albania*	Sept 2002	Feb 2015	Sept 2002	Feb 2015	Sept 2002	Feb 2015	Dec' 2009 – Jan'2010 and Dec'2010	Feb 2015
	0	1	66,884	42,000	USD 17 million	USD 125 million	175 km^2 flooded; over 17,000 people evacuated; 7,000 houses flooded/ damaged.	9 regions and 53 municipalities affected; 850 families evacuated; 122 km2 of arable land flooded; approx. 15,000 farming households affected; approx. 100 km2 of agricultural land damaged.
Bosnia and Herzegovina*	Dec 2010	Feb 2015	Sept 2002	Feb 2015	Sept 2002	Feb 2015	Dec' 2009 – Jan'2010 and Dec'2010	Feb 2015
	3	25	20,000	Over 1 million people	USD 1 million	USD 2.46 billion	5,000 houses flooded and 6,000 people evacuated.	13,200 km2 flooded; 90,000 people evacuated; 43,000 homes flooded; over 2,000 totally destroyed with 15 % of GDP in damage and losses.
Croatia*	June 2010	May 2014	June 2010	May 2014	June 2010	May 2014	June 2010	May 2014
	0	3	300	38,000	USD 73.6 million	USD 340 million	112 families were evacuated, 427 houses, cellars and yards were flooded, 682 houses were directly threatened and damaged.	20,000 people evacuated; 7,500 homes damaged.
Kosovo**	March 2006	April 2014	March 2006	April 2014	March 2006	April 2014	Mar. 2006	April 2014
	No data	No data	1,200	No data	USD 1.6 million	USD 3.25 million	No data	No data
former Yugoslav Republic of Macedonia**	June 2004	Feb 2015	June 2004	Feb 2015	June 2004	Feb 2015	June 2004	Feb 2015
	0	2	100,000	170,000	USD 3.3 million	USD 35.7 million	No data	No data
Montenegro*	Dec 2010	2014/ 2015	Dec 2010	2014/ 2015	Dec 2010	2014/ 2015	Dec 2010	2014/ 2015
	0	None	5,000	None	USD 50 million	None	No data	No data
Serbia*	April 2006	May 2014	April 2006	May 2014	April 2006	May 2014	February 2010	February 2013, Sep., May 2014
	No data	51	No data	1.6 million people	USD 1.6 million	USD 1.7 billion	1,306 houses damaged	**181 families evacuated; 9,100 km2 affected; 38 municipalities/ cities affected;** 32,000 people evacuated.
TOTAL	**3**	**81**	**193,384**	**2,850,000**	**148.1 million USD**	**4.63 billion USD**		

Sources: EM-DAT and contributions from UNDP Offices; UNDP (2016b: 143).
Notes: It is unrealistic to fully rely on EM-DAT since most of the disaster events, especially minor disaster events, are systematically underreported. The authors, therefore, combined EM-DAT figures with those provided by UNDP Offices in the region.

* No. of deaths and people affected, data from EM-DAT; economic damages, data from the UNDP Office;
** No. of deaths and economic data, from UNDP Office and no. of people affected, data from EMDAT; 1 - No EM-DAT data; all data provided by UNDP.

*** EU 'Flood Prevention and Management' Study, 2015: Danube River Basin District: flood events in 2010 (ICPDR Flood Report 2010), FloodList, ReliefWeb, International Federation of Red Cross and Red Crescent Societies.

**** References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

THE DISASTER RISK PROFILE FOR SERBIA

According to the Lonely Planet Guide, Serbia is a destination where "it's easy to go wild" (Scheward, 2014). There are five large national parks, more than 60 nature reserves, 15 nature parks, four mountain ranges, six rafting rivers, countless canyons and 280 natural monuments in the country (ibid.). The terrain ranges from arable flatlands in the north and east of the country,[3] to the fertile highlands and high mountains in the central and southern parts. Situated between two climatic zones that are influencing the Western Balkans, Serbia is a temperate continental country, with cold, relatively dry winters and warm, humid summers. Similar in size to Austria and the Czech Republic, it is among the largest of the Western Balkan countries and territories.[4]

Analysis of trends related to the types, frequencies, causes and the degree of severity of catastrophic events in Serbia show their increase in the 21st century, aggravating losses and economic downturn.

KEY FACTS ABOUT SERBIA

Population: 7.129 million

Surface area: 88,407 km^2

GDP (2015): US$36.51 billion

GDP per capita (2015): US$5,143.9

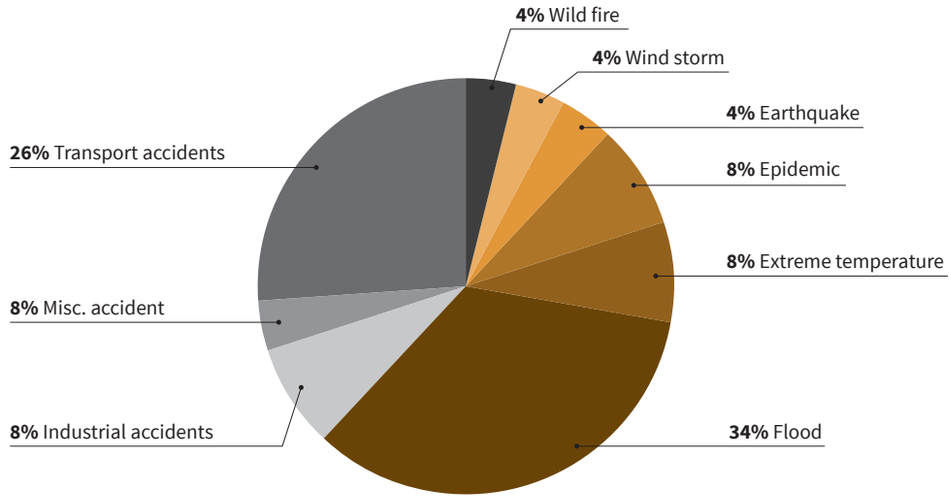
Human Development Index – HDI (2014) 0.771 (66)

Source: The World Bank (2015a) and UNDP (n.d.)

Yet, many of the popular tourist sites have been affected by natural disasters, as well as man-made hazards (see figure 1). Some of these hazards result from the geography of the region, whereas others are a product of human action/inaction (UNDP, 2016b). Natural hazards can be further categorized as geo-physical (e.g. earthquakes and tsunamis) or hydro-meteorological (e.g. storms, floods, droughts, heatwaves and wildfires). While geo-physical hazards are unpredictable and often have a sudden onset, hydro-meteorological hazards are seasonal and sometimes have a slow onset. Due to the impact of climate change, hydro-meteorological hazards are becoming more frequent, unpredictable and severe. Also, natural and climate change-related disasters are not bound by national borders, thus knowing the wider, regional context of natural hazards is important to manage hazards effectively at the national level (ibid.).

According to available historical sources, there were 2,000 occurrences of natural disasters from 1980-1990, and 2,800 in the last decade of the 20th century in Serbia (Official Gazette of the Republic of Serbia, 2011). Analysis of trends related to the types, frequencies, causes and the degree of severity of catastrophic events in Serbia show their increase in the 21st century, aggravating losses and economic downturn.

Figure 1.
Breakdown of types of disasters in Serbia, 1989-2006



Source: ISDR and World Bank (2007).

Figure 2.
Climate change adaption and DRR in Serbia

MOST VULNERABLE SECTORS

- **HEALTH**
- **FORESTRY**
- **AGRICULTURE**
- **HYDROLOGY AND WATER RESOURCES**
- **BIODIVERSITY AND NATURAL TERRESTRIAL ECOSYSTEMS**

MOST SIGNIFICANT HAZARDS

- Extreme temperature
- Wildfire
- Wind storms
- Floods

FLOOD 2014

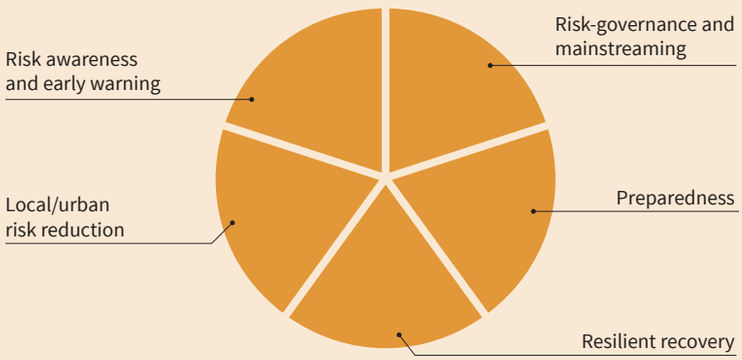
MOST SIGNIFICANT DISASTER RECORDED IN RECENT YEARS

Over **$2 million economic damage** and over **1.5 million people affected**.

The change in the mean annual temperature is positive over the entire territory of Serbia ranging from **2.4 to 3˚C** in some parts. The precipitation change is negative, ranging from **-10 to -15%**.

PRIORITY AREAS OF UNDP INTERVENTIONS FOR 2015-2030

Priorities for Serbia



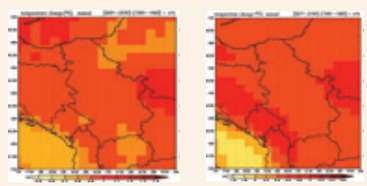
INFORM 2016 INDEX

Global risk assessment for humanitarian crises and disasters

	Hazard and Exposure	Vulnerability	Lack of coping capacities	Country rating
Global average	3.3	3.6	4.7	76 out of 194
Regional average	3.6	2.9	4.4	4 out of 18
Country	3.8 ⚠	4.5 ⚠	4.1	

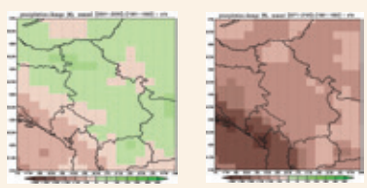
ANNUAL CHANGES OF THE MEAN 2-METRE AIR TEMPERATURE (°C)

2001-2030	2071-2100



ANNUAL CHANGES OF ACCUMULATED PRECIPITATION IN %

2001-2030	2071-2100



Source: Initial National Communication, A1B scenario.

Source: UNDP (2015c).

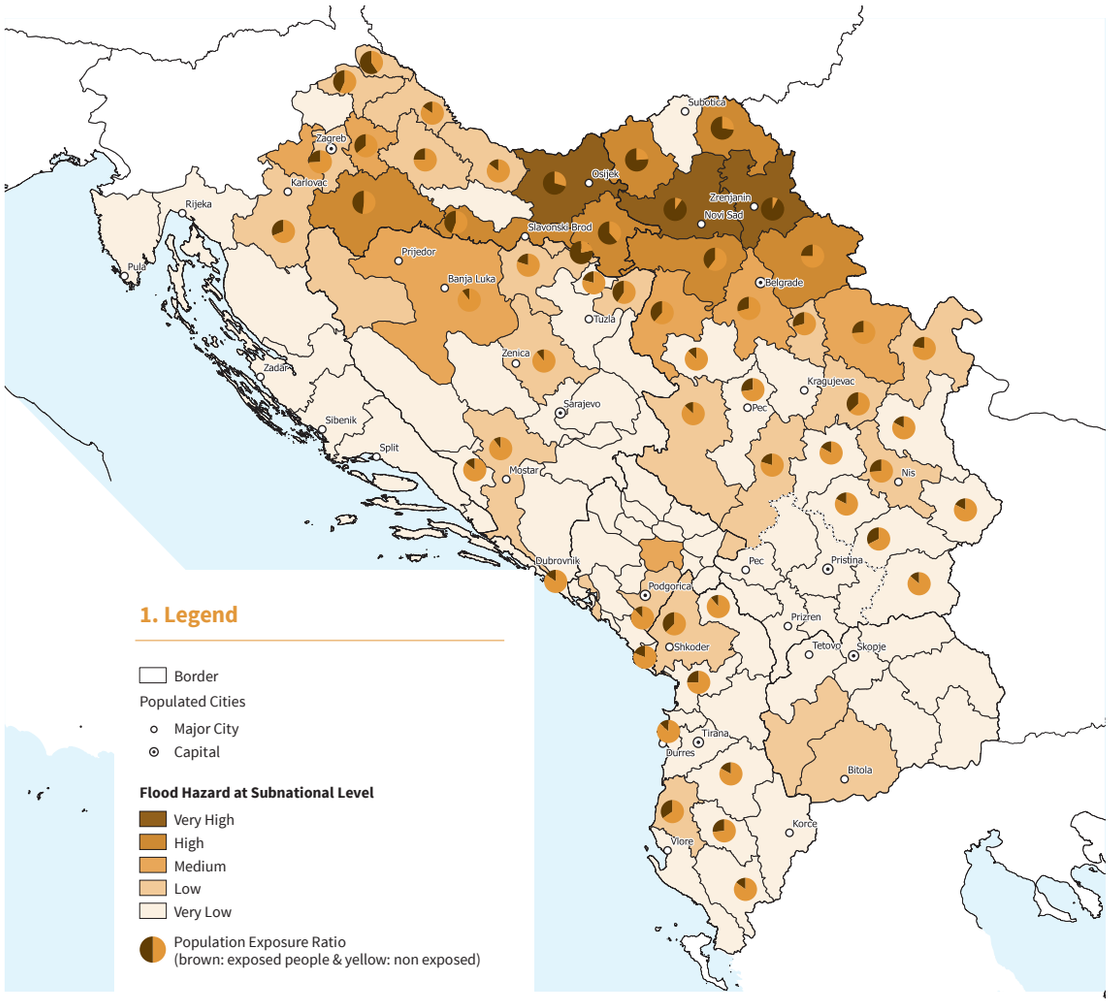
MOST COMMON NATURAL HAZARDS IN SERBIA: FLOODS AND TORRENTS

Floods of large rivers and torrents or flash floods are the most frequent and challenging hazard in Serbia. Flooding occurs in almost all river basins throughout the entire region of the Western Balkans. While predictable floods play a positive role in the livelihoods of farmers, unpredictable and severe flooding puts their crops, health and livelihoods at risk (UNDP, 2016b). Flood-prone areas in Serbia are located on the large plane watercourses (the Danube, Sava, Tisa, Drina, West and South Morava). These rivers have large basins, which extend to the territories of several countries, so their flood waves are predominantly being formed beyond the borders of Serbia (except in the cases of Morava rivers). In Serbia as well as in the Western Balkans, floods occur throughout the year with the peak in spring when there are high levels of precipitation and snowmelt from the mountains. Heavy rainfall can also trigger riverine floods during autumn, which are typically shorter in duration but occur suddenly and with high water flows.

The potential flooding area in Serbia is about 1.57 million ha, including 512 larger settlements, 515 industrial facilities, 4,000 km of roads, and 680 km of railways, and 30 per cent of that territory is agricultural land (Republic of Serbia, 2014). Map 1 shows the population exposed to flood risk in the whole region of the Western Balkans with Serbia taking the lead.

In Serbia as well as in the Western Balkans, floods occur throughout the year with the peak in spring when there are high levels of precipitation and snowmelt from the mountains.

Map 1.
Population exposed to flood risks in the Western Balkans



Data Sources
The flood hazard data was downloaded from the Global Assessment Report (GAR) on Disaster Risk Reduction 2015 using a 100 year return period. http://risk.preventionweb.net/ The population data is from the Gridded Population of the World v4 dataset from Columbia University. http://beta.sedac.ciesin.columbia.edu/data/collection/gpw-v4 The exposure ratio was generated using raster calculators and zonal statistics tools on these two datasets. Map created on QGIS by Jeremy Wetterwald and Erik Kjaergaard April, 2016.

Source: UNDP (2016b).

Around 2.5 million inhabitants in Serbia are exposed to the risk of floods. Serbia's GDP is also seriously affected by this type of natural hazard (table 2).

Table 2.
Flood exposure in Serbia and the Western Balkans

COUNTRY / TERITORY	GDP	POPULATION	FLOOD GDP EXPOSURE	FLOOD POPULATION EXPOSURE	POPULATION RATIO	GDP RATIO
Albania	11.930.000	2.857.000	1.901.247	392.200	**16%**	**14%**
Bosnia and Herzegovina	16.850.000	3.846.000	4.956.804	414.066	**29%**	**11%**
Croatia	59.640.000	4.418.000	18.245.923	1.127.981	**31%**	**26%**
fYROM	9.339.000	2.102.000	2.241.803	136.738	**24%**	**7%**
Montenegro	4.115.000	620.078	818.941	40.987	**20%**	**7%**
Serbia	39.370.000	7.291.000	16.559.745	2.515.715	**42%**	**35%**
Kosovo*	5.830.000	1.776.00	503.006	81.067	**9%**	**5%**

Source: UNDP (2016b).
*References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

Around 2.5 million inhabitants in Serbia are exposed to the risk of floods.

Numerous torrential flows occur in mountainous parts of the country, where floods occur suddenly, are of brief duration and often trigger landslides (Babić-Mladenović, 2014). Torrents occur mostly south from the Sava and Danube, and less so in the north, in Vojvodina (Fruška Gora) (Ristić, 2014). Since the 1970s, there have been fewer reports of torrential floods due to improved protection systems. Still, torrential floods are considered the most frequent natural hazards in Serbia. Finally, owing to the structural condition of aging and ill-maintained dams, it is not possible to rule out human-made outburst floods and notably torrential floods (UNDP, 2016b).

Numerous torrential flows occur in mountainous parts of the country, where floods occur suddenly, are of brief duration and often trigger landslides (Babić-Mladenović, 2014).

Available historical documents confirm that harsh floods and torrents were also frequent in the past in Serbia. At the end of the 20th and the beginning of the 21st century, a number of devastating floods were recorded (1999, 2002, 2005, 2006 and 2014); their occurrence related to the increased water and air temperatures and increased precipitations, which increased snowmelt.[5] The majority of these floods occurred between the months of April and June**.**

The flooding hit 38 cities and municipalities in central and western Serbia (map 2) and affected more 20 per cent of Serbia's population).

The most severe flooding in Serbia ever recorded occurred in May 2014. The flooding hit 38 cities and municipalities in central and western Serbia (map 2) and affected more than 20 per cent of Serbia's population.[6] The disaster impacts amounted to EUR1.7 billion overall, of which EUR1.525 billion in the 24 most affected municipalities. The estimated recovery and reconstruction needs amounted to EUR1.346 billion; 51,800 jobs were temporarily lost due to interruption of productive activities in the 24 most affected municipalities; damage to housing was also very high, leading to a significant decline in the living conditions of the population (Republic of Serbia, 2014). The disaster caused a recession in the Serbian economy, causing it to contract by 1.8 per cent in 2014, rather than growing by 0.5 per cent as was previously projected (Bijelić and Lazarević, 2015). The most affected sectors included mining/energy, agriculture, trade and transport.

Only four months later, the country was hit again by another disaster: flooding, torrential floods and landslides caused damage in seven municipalities in Bor District (Negotin, Kladovo, Majdanpek, Tekija, Grabovica, Brza Palanka and Boljetin) in the eastern part of Serbia. The total monetary value of the effects of the 2014 floods was estimated at 4.8 per cent of Serbia's GDP.

The post-disaster Recovery Needs Assessment in Serbia highlighted that women, poor families, including Roma and persons with disabilities, and the elderly were the most affected (Republic of Serbia, 2014). As a result of the floods, 125,000 persons fell below

The floods from April/May 2014 and February 2015 had a far more devastating impact than the previous most extreme documented flood events in terms of deaths, people affected and economic damages

the poverty line, an increase of nearly 7 per cent over the 2013 figure of people living under poverty conditions (ibid.).

Landslides and erosion were also triggered by the 2014 floods and heavy rainfalls. The percentage of the country's territory under the risk of erosion varies from 65 to 75 per cent depending on the literature.[7]

The floods from April/May 2014 and February 2015 had a far more devastating impact than the previous most extreme documented flood events in terms of deaths, people affected and economic damages (Republic of Serbia, 2014). The more extreme impacts resulting from these most recent floods may in part be attributed to risk accumulation.

Map 2:
Flood-affected region in Serbia on 28 May 2014

Source: UNDAC/OCHA (2014).

NATURAL HAZARDS IN SERBIA: EXTREME TEMPERATURES

In the Western Balkans, as in Serbia, droughts tend to result in significant economic losses, particularly in the agricultural, energy and water sectors.

Less frequent but with a serious impact are other natural hazards such as extreme temperatures. Droughts most often hit the northern territory of Vojvodina and southern parts of the country, as observed in the last two decades (Official Gazette of the Republic of Serbia, 2011). The driest year in the last 25 years was 2012, with extremely low amounts of rainfall and high temperatures, over 35°C. It was the most severe among the seven recorded serious droughts, heavily affecting Serbia's agricultural production. In the Western Balkans, as in Serbia, droughts tend to result in significant economic losses, particularly in the agricultural, energy and water sectors. Still, due to the lack of data and analysis on this issue, there is scarce knowledge about knowledge about the economic losses from droughts in Serbia and the Western Balkans.

The occurrence of wildfires also increased, the most critical ones recorded in Serbia in 2006-2007, in particular in national parks and other protected areas (the Djerdap and Tara national parks, Stara Planina Nature Park and Deliblato Sands Special Nature Reserve).[8] Wildfires are often determined by their size, the speed at which they can spread, their potential to alter their direction unexpectedly and their ability to jump gaps such as roads, rivers and firebreaks (UNDP, 2016b), In Serbia as well as in Western Balkan countries and territories, wildfires are typically the result of agricultural fires that spread to combustible vegetation in the surrounding area. They have serious negative effects on agriculture, forestry and tourism. At the same time, extremely low temperatures struck Serbia several times in recent years. As a result of sudden brief spells of cold weather in January and December 2010, more than 20 people died, and more than 90,000 people were affected.

NATURAL HAZARDS IN SERBIA: EARTHQUAKES

Serbia and the Western Balkans are exposed to earthquakes. Albania and the coastal region of the Western Balkans experience more tremors than the northern, western and eastern parts of the region. Earthquakes, like other natural hazards, have considerable impact on the economy of countries and the vulnerability of their populations, as shown in table 3.

Based on available data, over 50 per cent of Serbia is vulnerable to earthquakes of magnitude 7 on the

Richter scale and around 20 per cent of the territory to magnitude 8 (UNDP, 2016b), Human Development Report 2016. The highest risk-prone area of Serbia is around Kopaonik Mountain (ISDR and World Bank, 2007). In 2010, there was an earthquake in central Serbia, which most severely affected the city of Kraljevo (M 5.4) (Official Gazette of the Republic of Serbia, 2011). The total damage from the earthquake was estimated at US$132,260 million and a total of 27,030 people was affected (EM-DAT, 2016).

Table 3.
Earthquake exposure in Serbia and the Western Balkans

COUNTRY / TERRITORY	GDP	POPULATION	EARTHQUAKE GDP EXPOSURE	EARTHQUAKE POPULATION EXPOSURE	POPULATION RATIO	GDP RATIO
Albania	11.930.000	2.857.000	11.825.341	2.847.572	**99%**	**100%**
Bosnia and Herzegovina	16.850.000	3.846.000	2.652.397	985.245	**16%**	**26%**
Croatia	59.640.000	4.418.000	35.06.992	2.850.052	**59%**	**65%**
fYROM	9.339.000	2.102.000	8.120.330	2.100.949	**87%**	**100%**
Montenegro	4.115.000	620.078	3.613.701	486.141	**88%**	**78%**
Serbia	39.370.000	7.291.000	10.660.874	1.737.445	**27%**	**24%**
Kosovo*	5.830.000	1.776.00	5.666.664	1.775.645	**97%**	**100%**

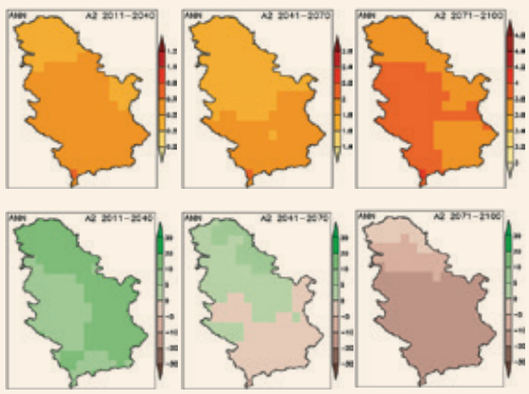
Source: UNDP (2016b).
*References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

CLIMATE CHANGE IN SERBIA

As forecasted by the AccuWeather website, the future in the Western Balkans will not only bring snowdrops and bluebells in spring, but also an elevated threat of flooding. According to the climate change projections of the *Second National Communication to the UNFCCC for Serbia for the period 2001-2030* (UNDP, 2015b), the increase in temperature will vary between 0.8 and 1.1° C, while changes in precipitation will follow the trend of a mild rise up to 5 per cent in most of the country in the respective period. Other models of climate change indicate an even higher temperature rise (up to 3.4–3.8°C) and deficit in precipitation level, the maximum of which might be up to -15 per cent) (Popović et al., 2009).

Figure 3 depicts the climate change scenario in Ser¬bia. It shows changes in average yearly temperature in Celsius and changes in precipitation in percentage for the three respective periods 2011-2040; 2041-2070 and 2071-2100 in comparison to the period 1961-1990.

Figure 3.
Climate change scenarios for Serbia for the periods 2011-2040, 2041-2070, and 2071-2100



Source: UNDP (2015a).

All the scenarios of climate change indicate that Serbia and the Western Balkans face a high probability of temperature increase in the future, associated with frequent and prolonged droughts and wildfires (IPCC, 2012). This is expected to be complemented with prolonged and intense rainfalls and snowmelts, resulting in massive mudslides, rockslides and debris flows.

Although severe floods, landslides, droughts and earthquakes have alternated in the last ten years, the accumulation of natural hazards was not observed until the 2014 flooding. The magnitude of the event turned into a wake-up call, raising the interest of the public and policymakers in the topic.

THE APPROACH IN THIS REPORT

The approach in this report is focused on the interplay between the resilience of communities to natural disasters and the role of social capital in 'building back better' viewed through quantitative and qualitative methodological lenses.

Natural disasters significantly and increasingly affect local communities in Serbia, producing huge economic loss and curtailing previous development gains. They impact communities, infrastructure and most sectors of the economy. For example, damage caused by intensive droughts over the past two decades to Serbian agriculture may result in further serious reduction of crop production, which in turn may increase the country's sensitivity to climate change (UNEP, 2012). Increased frequency and severity of hydro-meteorological and other climate-related hazards highlight the importance of determining the status of local communities and their actions.

Increased frequency and severity of hydro-meteorological and other climate-related hazards highlight the importance of determining the status of local communities and their actions.

Due to the impact of the floods and landslides in 2014 and 2015 in the Western Balkans countries and territories, the concept of resilience has become the main focus in policy debates on disaster risk reduction (DRR). However, there has been little focus on assessing the immediate and lasting impact of these risks on local communities. By assessing the resilience of Serbian municipalities and the role of social capital, this National Human Development Report (NHDR) seeks to contribute to these efforts. The authors consider that social capital is a central element of community resilience to natural and climate change-related hazards.[9] This report connects these two concepts, aiming to document the relation in the specific context of the Serbian municipalities exposed to natural disaster risks.

Community capacities are mostly built on social networks, trust and solidarity. By analysing these and other manifestations of social capital (i.e. cooperation, coordination, partnership, communication, social inclusion, civic participation, among and between different local and national stakeholders), this report examines their role in building community resilience to natural disasters.

Ultimately, this report aims to inform current policies on the support required to build resilience. Distilling attributes of local communities, which can actively prevent and respond to natural disasters, is an important element in planning how to mitigate respective risks. This report shows that social capital is among the community's central insurance policies for preventing and reducing the loss.

This NHDR builds on empirical research on examining the role of social capital in community resilience in Serbia. Based on risk exposure to floods, fires and earthquakes, 13 municipalities were selected for interviews and focus groups.[10] Box 1 presents their regional distribution.

Box 1.

Selected municipalities for interviews and focus groups, by regional distribution

To the extent possible, a **regional (spatial) distribution** was also taken into account in the process of selection: **Vojvodina** (three municipalities – Šid, Novi Sad, Nova Crnja), **eastern Serbia** (two municipalities – Negotin and Kladovo), **central Serbia** (three municipalities – Obrenovac, Smederevska Palanka and Kragujevac), **western Serbia** (two municipalities – Loznica and Mali Zvornik), **south-western** Serbia (two municipalities – Novi Pazar and Kraljevo) and **southern** Serbia (one municipality – Vranje).

Although located in different parts of the country and on diverse terrains, from flatlands to plateaus and mountains, all of the 13 municipalities were affected by floods and torrents in the last decade, and in the case of Nova Crnja, by pluvial flooding in 2011. All but one, Nova Crnja, are situated on river banks, and often more than one river runs through their territories. Four municipalities were among those most affected by the 2014 floods: Obrenovac, Mali Zvornik and Smederevska Palanka in May and Kladovo in September (Republic of Serbia, 2014).

Most of the municipalities (eight out of 13) have been exposed to flood-triggered landslides. Seven municipalities have been identified as prone to forest fires. Although Kraljevo is the only municipality that was hit by the earthquake in 2010, other municipalities are still identified as exposed to this risk, such as Kragujevac, Loznica, Negotin, Novi Sad and Vranje (for the full methodology, see Annex 1).

The research findings were complemented by the multi-dimensional municipal Capitals for Resilience Index (CRI) developed by UNDP and the Statistical Office of the Republic of Serbia (Annex 2). The CRI measures the resilience of municipalities in Serbia to economic, social or natural risks, using nationally available data. By examining inter-linkages between five capitals (natural, physical, economic, human, and social and institutional capital) through a series of indicators, the idea was to create a single measure for the multidimensional phenomenon of resilience. Additional analysis was carried out exclusively for this report in order to assess the resilience of 13 selected municipalities, based on each individual capital (the findings are presented below).

The aim of these complementary qualitative and quantitative approaches was to provide evidence that resilience cannot be measured as an all-encompassing concept due to different degrees of risks to which people are exposed to, but rather, must be approached in relative terms. When assessing risk at the aggregate level, the distinctive resilience factors of local communities could not be easily captured. For risk-informed planning and preparedness, local communities must be assessed individually. Only then does the role of social capital emerge as a prominent factor in boosting the resilience of local communities to natural disasters. This prominence of social capital is reflected in the fact that communities regularly work together to survive and recover from catastrophic events (Aldrich and Meyer, 2015), which an aggregate level of assessing resilience overlooks. This report is a response to the existing gap in research on resilience, disaster and human development with respect to the role of social capital, which is one of the key resources for increasing community resilience and positively impacting on DRR policy and practice.

PART 1

CONCEPTS AND CONTEXT

CHAPTER 1. CONCEPTUAL FRAMEWORK

This chapter brings together the main concepts that lays the basis for assessing the abilities of communities to 'build back better'. It first discusses approaches to the concept of resilience and its aspects with reference to DRR and human development concepts. Through defining social capital and its manifestations including the benefits of social capital for the community, the chapter further links the concepts of resilience and social capital in the context of natural disasters.

RESILIENCE, DISASTER RISK REDUCTION AND HUMAN DEVELOPMENT

RESILIENCE DEFINITIONS AND APPROACHES

Although the concept of resilience is not new, it has received global attention recently, notably in relation to increasing risks posed by natural hazards in general, and risks associated with climate change.

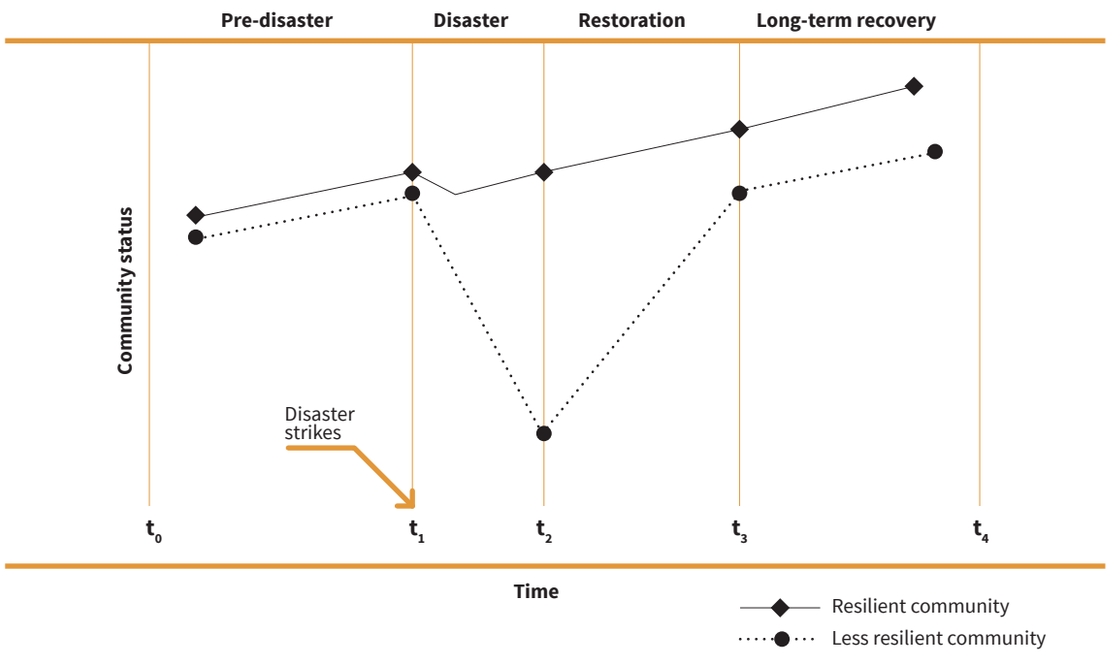
No matter how well a country is prepared and how good its policy framework is, shocks occur often with inevitable and highly destructive consequences. ***When recovery processes are partial and not oriented towards enhancing resilience, the impact of the disaster can be long-lasting and have ongoing effects on entire generations*** *(UNDP, 2014a: 107).*

The components of resilience involve the capacity of a social system to learn, to have options and to be flexible (Schipper and Langston, 2015).

Resilience can be broadly defined as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions" (UNISDR, 2009). Thus, the components of resilience involve the capacity of a social system to learn, to have options and to be flexible (Schipper and Langston, 2015). Awareness of possible risks and learning from adverse events are important elements of preparedness and recovery. This enhances the flexibility of a social system to withstand disruption without significant collapse and to minimize the effects of disaster and to recover quickly (Mayunga, 2007).

Figure 4 represents the ways in which more resilient and less resilient communities cope with disasters over time: pre-disaster, disaster, recovery and long-term recovery. While a more resilient community has the capacity to minimize disaster effects, a less resilient one would experience a significant negative impact of the disaster and would face a longer recovery process.

Figure 4:
A trajectory of resilient and less resilient communities



Source: Adopted from Mayunga (2007).

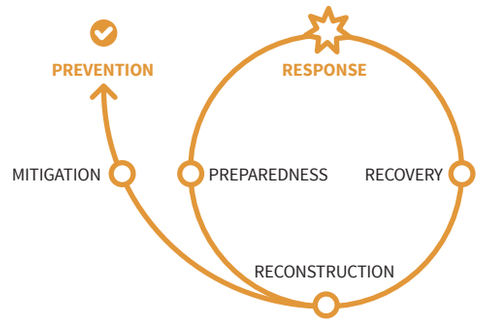
RESILIENCE AND DISASTER RISK REDUCTION

The concept of resilience is today directly connected to the global DRR policy framework. In 2009, the United Nations International Strategy for Disaster Reduction (UNISDR) refined the definition of DRR, which aligned resilience and DRR to a greater extent.

> *The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events (UNISDR, 2009).*

In contrast to the traditional disaster management approach that was focused on emergency preparedness and disaster response, this new DRR paradigm has shifted the focus to the prevention and mitigation of disaster risks (UNDP, 2016b). The changing DRR approaches are presented in figure 5.

Figure 5.
Changing disaster risk management approaches over time and DRR equation



$$\text{Risk} = \frac{\text{Hazard x Vulnerability x Exposure}}{\text{Capacity}}$$

Source: UNDP (2016b).

Human vulnerability and capacities are now at the centre of the DRR concept (UNDP, 2016b: 10). DRR aims to address disasters before they occur and impact development. The DRR equation is concentrated on risks as opposed to disasters thus DRR works towards reducing exposure to hazards, decreasing vulnerability of people and communities, and improving preparedness and early warning for potential risks. Disaster risk is dependent on the level of development in a particular context such as demography, poverty, gender equality, urbanization, environment and climate change.

Dealing with risks requires a good understanding of the underlying risk factors. Until recently, the influence of 'blind' development on natural disasters was not recognized. Today, the perspective of human actions and its connection to natural disasters has been largely discussed and incorporated in the DRR strategies (UNDP, 2016b). Moreover, the social profile of communities and the dynamics of social networks reflected in the levels of social capital are today recognized as an important factor for building DRR strategies. This has also provoked discussions on grassroots DRR systems as being the most effective and sustainable. All these aspects are significant elements in building safer, resilient communities (IFRC, 2014).

The concept of resilience has therefore revitalized traditional approaches to DRR towards new global policy frameworks, which will be later discussed.

RESILIENCE AND HUMAN DEVELOPMENT

Resilience is not limited to protection from natural hazards alone. The concept of resilience has been increasingly extended to encompass dealing with financial and economic risks that have been disrupting the world and national economies through the loss of income, jobs and social stability (World Bank, 2014).

Following this broader understanding of the resilience concept, the 2014 Global Human Development Report includes security issues and exposure to economic crises in defining resilience. Resilience is introduced as an essential element for reducing vulnerability and building and sustaining human development. "At its core, resilience is about ensuring that state, community and global institutions work to empower and protect people" (UNDP, 2014a), Resilience needs to be built up in order to reduce vulnerabilities, which are defined as "the prospects of eroding people's capabilities and choices" (ibid: 1).

Resilience is not limited to protection from natural hazards alone. The concept of resilience has been increasingly extended to encompass dealing with financial and economic risks that have been disrupting the world and national economies through the loss of income, jobs and social stability (World Bank, 2014).

Box 2.

The Human Development Approach

By taking into consideration education, health and income generation in the assessment of wellbeing, the human development approach aimed to contrast per capita income measurement as the key standard determinant in the level of development. In 1990, UNDP embraced the concept of human development in its first Human Development Report (HDR) (UNDP, 1990). Human Development is based on the conviction that development is much more than economic growth, that people are the 'real wealth' of nations and that people's well-being is the end goal of development (Klugman, Rodriguez and Hyung-Jin, 2011).

The 2014 HDR also introduced the concept of 'human resilience' and directly referred to human development that focuses on the idea of broadening people's capabilities[11] in order to allow them to fulfil their potential and lead flourishing lives. Human resilience should ensure that sustainable and robust choices are available to people so that they can meet and adjust to challenges that adverse events induce (UNDP, 2014a).

Building resilience thus requires boosting the capacity of individuals, societies and countries to respond to setbacks. People with insufficient core capabilities, such as in education and health, are less able to exercise their agency to live lives they value. Further, their choices may be restricted or held back by social barriers and other exclusionary practices, which can further embed social prejudice in public institutions and policies (ibid:10).

Yet, the relationship between human development and resilience requires further elaboration and attention. Although the HDR 2014 points out that hazards threaten human development, a human development approach remains incomplete if it does not incorporate more rigorously vulnerability, risk and thus resilience into its concept.

The latest sub-regional Human Development Report 2016, *Risk Proofing the Western Balkans: Empowering People to Prevent Disasters* makes pioneering steps by drawing further attention to the intersection between the human development, resilience and DRR concepts (box 3). It suggests that the common ground lies in the efforts to reduce vulnerabilities and prevent risk factors in relation to a particular context – in an environment where DRR is necessary (ibid.) Human Development therefore must ensure that people and communities are protected against potential hazards and that resilience is enhanced in order to enable risk mitigation. In addition, DRR should enlarge the scope of emergency planning by putting greater focus on the ways disasters affect vulnerable populations and how people can contribute to decreasing disaster risk. A common factor for all the concepts is the emphasis on reducing vulnerability and preventing risk factors (ibid.).

Box 3.

The elements of the risk-informed human development concept

- **Development for people so that they are protected against risks:**
  - risks are analysed so that future disasters can be prevented;
  - vulnerabilities and capacities are recognized;
  - exposure to risks is minimized;
  - measures are put in place to protect people and their livelihoods when disasters hit;
  - coping mechanisms are enhanced.

- **Development by the people so that their role as agents of change is enhanced:**
  - The resilience of people should be built by strengthening systems, such as social services or sub-national governance, and by empowering the most vulnerable and exposed segments of a community, including persons with disabilities, children, youth and the elderly, with the capacity to deal with different shocks and stresses.
  - Capacities and capabilities should be enhanced so that the people are able to take on active roles in response to different DRR activities: (i) the prevention and mitigation of risk; (ii) preparedness, including contingency planning and simulation exercises; (iii) disaster response and coping mechanisms; and (iv) rebuilding their lives and livelihoods.
  - People's choices (in terms of knowing the risks, living where they want to and engaging in economic activities for which they are capable and want to participate in) should be assured in the process.

Source: Based on UNDP (2016b: 27-28).

RESILIENCE AND MANIFESTATIONS OF SOCIAL CAPITAL

SOCIAL COMPETENCES AND INSTITUTIONS VERSUS SOCIAL CAPITAL

The concept of resilience continues to change and expand, and today it is increasingly taking into account the value of social interactions in building resilient communities.

The concept of resilience, as shown, permeates developmental and risk reduction agendas. It enriches the human development paradigm that shifts the concept of progress from traditional human development by putting a greater focus on resilient human development (UNDP, 2014a: 1). Resilience is also rooted in current DRR concept and thinking.

The concept of resilience continues to change and expand, and today it is increasingly taking into account the value of social interactions in building resilient communities. While the human development approach largely ignores the importance of 'social' for 'individual' flourishing, the DRR paradigm is slightly more in harmony with social flourishing.

Different societies will seek to develop different types and blends of dimensions of social capital relevant for their particular social, economic, political, cultural and historical context.

Yet, the above does not imply the lack of trends that pursue the importance of social capital. In 2014, UNDP includes 'social competencies' and 'social institutions' as important components of human development. The terms have been used as synonyms for social capital. Accordingly, social interactions are an indispensable part of human life. They occur in some kind of group collective environment, which affect multiple aspects of our lives and progress of every human (Stewart, 2013). However, these 'collective' and 'social' facets still remain at the margin of the human development thinking.

Mainstream DRR strategies often overlook the ability of communities to mobilize people and the strengths of their networks to act for the common aim of risk protection. Most part DRR strategies and policies presume that economic wealth, investments in 'physical' community assets, and different kind of related DRR infrastructure and instruments are the key to risk mitigation. Nonetheless, an additional aspect of DRR in strengthening risk preparedness, response and recovery increasingly examines the value of social capital in affecting community resilience. It stems from the recent evidence that no amount invested in physical infrastructure is able to prevent and/or mitigate all risks and eliminate vulnerability (Aldrich, 2010).

Box 4.
How does the human development concept treat social capital?

Social institutions and social competencies – the use of terms

The Human Development discourse avoids reference to social capital as an asset of human development; rather, it discusses the concept of social competencies and social institutions that affect expansion of human capabilities. According to Frances Stewart:

> *Social institutions* are understood as all institutions in which people act ... [T]hey include non-governmental organizations; informal associations, such as neighbourhood associations or sports clubs and much more. [S]ocial institutions include norms and rules of behaviour. They influence, and are influenced by, both state and market. While both state and market have been subject to much investigation in relation to the human development and capability approaches, the role of collective activities outside the state and the market has been given a much less central place. ... *Social competencies* are defined as what such institutions can be and do, i.e. they are in a sense the capabilities of institutions, as against those of groups. ... Social competencies are needed, first, for all activities that, by their essence, can only be done in a group and not individually; and second, for many activities that in principle could be carried out by individuals alone, but that could be carried out much more effectively if done collectively.

It is clear that social interactions within the social institutions (family, neighbourhood, community, nation) are a central part of human life. They certainly affect the nature and quality of life of an individual. Thus, these facets of individual development must be regarded as indispensable elements of the human development concept.

Source: Stewart (2013).

WHAT IS SOCIAL CAPITAL?

Broadly speaking, social capital represents the value that people draw from being connected in particular groups or networks. People rely on connections on a regular basis: they have different interactions within various networks and they build new one(s) daily. For instance, people find jobs through shared connections and cope with adverse and crisis situations through the support of family, friends or the wider community. People improve their business performance based on insights they receive through participation in relevant professional networks. The social capital possessed by some groups of people (family, neighbourhood, community, or nation) is thus used on a daily basis.

In addition to networks, the other main social capital components are norms of reciprocity (solidarity) and trust. For instance, the level of happiness and wellbeing increases through living in a connected and trusted community (Helliwell, Layard and Sachs, 2015).

It is important to note that social capital is a highly context-dependent phenomenon.[12] Context-dependency suggests that different forms of social capital have diverse manifestations in different societies and change over time. Different societies will seek to develop different types and blends of dimensions of social capital relevant for their particular social, economic, political, cultural and historical context.[13]

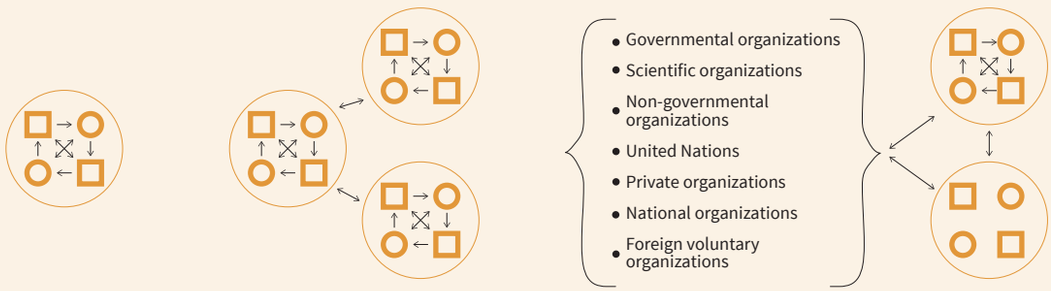
Box 5.
Theoretical underpinnings and types of social capital

The central idea of social capital is that networks of relationships have individual and collective value. The social capital concept, as envisaged by Robert Putnam, revolves around the concepts of social networks, trust and norms of reciprocity. Networks* involve mutual obligations within a group, based on solidarity ('norms of reciprocity') and trust. According to Putnam, the value of networks resonates with the ways cultures of trust and norms of reciprocity are involved in the creation of social capital as a 'private' and 'public' good.** Thus, the value of social capital is reflected in its potential to engage people to cooperate and coordinate for personal and/or public good.

Social capital comes in various forms and sizes, and positive and negative social manifestations.*** The most common distinction is made between **bonding**, **bridging** and **linking** social capital. **Bonding** social capital refers to social networks built around perceived and shared identities such as social class, ethnicity, age, gender, education, religion, language etc. It describes relationships between people who have similar personal and social characteristics, who may be family members, friends or extended kin, or neighbours. Bonding social capital can be also found in ethnic fraternal organizations, church-based gatherings, or local sports clubs. But this form of social capital is often inward-looking and may be exclusive to people outside the group since it is often related to homogeneous identities. As a consequence, bonding social capital can be formed around negative social manifestations such as discrimination, social exclusion, or corruption. Organizations such as the mafia or Ku Klux Klan operate on the bonding social capital principles.

Bridging social capital cuts across social categories, identities and statuses by bringing together people from diverse backgrounds having a more inclusionary character and consequently greater impact to social cohesion. These ties display demographic diversity and provide novel information and resources that can help individuals in advancing in society.**** Bridging social capital describes connections among individuals who are different in many ways but share an interest or institution. For instance, bridging networks are beneficial for linkages to external assets and effective spread of information. They assist in finding jobs, or connecting with people that share similar views to politics or art for example.**** Bridging social capital boosts social inclusion through crossing identity boundaries. It assists in enlarged civic engagement for some common aim, and enables the wider spread of information. Finally, **linking** social capital basically involves connections between civil society and the state and/or the citizens and decision makers. This typology further encompasses the distinctions between formal/informal ties, as well as thick social trust and norms of reciprocity..

In the context of disasters, bonding capital is extremely valuable in terms of securing emergency rescue and assistance to those in need. Bridging social capital is beneficial for the recovery process as it allows individuals to draw on resources across social groups and thus diversify sources of support while linking social capital enables better connectedness and knowledge of institutions that support risk response and recovery processes.



Source: Mathbor (2007; 357-369).

Note:
* Various forms of social networks are extracted by social scientists. The most frequent refer to horizontal, vertical, formal and informal social networks characterized by strong or weak ties.
** Putnam (2000).
*** ibid. (2000:21)
*** Aldrich and Meyer (2015: 254-269).
**** Putnam (2000).

MANIFESTATIONS OF SOCIAL CAPITAL

The interest in potentials of social capital in advancing community and individual wellbeing is often concentrated on its practical social manifestations. They usually include the issues of cooperation, coordination and partnership building, information sharing as well as civic engagement in many forms but particularly in the form of volunteer engagement for the common goal and social inclusion. All of these forms directly fuse and impact on the level and spread of trust and wider social solidarity, which are the flesh and blood of the social capital concept.

- The issues of cooperation, coordination, partnership building and information sharing across groups that share some mutual interests are the litmus test of the density and quality of a community's or society's social fabric. The character and the level of cooperation and coordination, and the speed and spread of information directly relate to the type and the level of social capital in a given network.
- Social capital is directly embodied through active civic participation and is one of the main indices of the level of social capital generated within a society (Putnam, 1993). Civic participation manifests in different forms and shapes, in formal and informal associational activities, including volunteering for the common good. Volunteering particularly contributes to the bolstering of trust and solidarity across a community (Putnam, 2000). Civic engagement is a decisive factor in explaining differences in better institutional performance in different social contexts (ibid.).
- Civic participation and access to citizens' rights are at the core of the social inclusion concept. Ideally, wider social participation should facilitate individuals to achieve positive social, economic and political ends. Furthermore, the engagement and active participation of deprived social actors (based on ethnicity, race, gender, age, income, etc.) and their interrelation with policy structures shall contribute to building individual and collective social capital.
- Trust and solidarity underpin the ability of people and groups to work together for common purposes. The level of social capital in a society is directly dependant on trust and solidarity (Fukuyama, 1995). People who trust their fellow citizens volunteer more often, contribute more to charity, and participate more often in politics and community organizations; i.e. people who trust others are all-round good citizens, and those engaged in community life are both more trusting and trustworthy (Putnam, 2000).

The issues of cooperation, coordination, partnership building, and information sharing across groups that share some mutual interests are the litmus test of the density and quality of a community's or society's social fabric.

HOW DOES SOCIAL CAPITAL AFFECT AND ENABLE RESILIENCE?

As already noted, the value of social interactions and informal community ties is increasingly recognized as an important characteristic of resilient communities to natural and man-made hazards. This has led some authors to use the concept of community resilience as a "collective ability of a community, neighbourhood or geographically defined area to deal with stressors and efficiently resume the rhythms of daily life through cooperation following shocks" (Aldrich and Meyer, 2015).

The principal elements of community resilience include different kinds of cooperation, coordination, partnership building and information sharing. Social inclusion, which is reflected in the care of those deprived, civic participation and volunteerism, is also an important aspect of this concept. Ideally, these forces reinforce one another, since it is the only way to equip communities to resist, absorb and recover from stressors (ibid.). Accordingly, communities characterized by higher levels of social capital, i.e. better connectedness between members of the community, high levels of trust, practice of partnership building and support, are better prepared, more aware and able to adequately respond to upcoming risks (Mathbor, 2007). The stock of evidence from the contexts that are prone to natural disasters, is gradually increasing to prove this. Some of the studies on community resilience examine the 1995 Kobe earthquake in Japan and the 2005 Hurricane Katrina in New Orleans, United States of America. They also depict the contrast in the levels of cooperation and trust within these communities through the prism of social capital.

Neighbours and local community members are often the first to be in the position to help each other in the immediate aftermath of a dramatic event. Following the Kobe earthquake in 1995 and the tsunami in 2011, neighbours, friends and relatives played a key role in rescuing those in need (Aldrich and Meyer, 2015). The Kobe earthquake killed 6,500 people and left 300,000 homeless. The Kobe citizens and the city administration in a joint effort restored all the utilities and restored the economy to 80 per cent of its pre-disaster level without central government assistance, within a year after the disaster.

Moreover, the US Government provided US$16 billion for the recovery of New Orleans after Hurricane Katrina, which hit the city in 2005. The hurricane killed 1,600 people and left 250,000 citizens homeless. Vast parts of the city remained in ruins years after the disaster, while employment hovered at less than two-thirds its pre-storm level. As argued, high fragmentation and division among communities in the city hindered the overall recovery (Aldrich, 2010).

As discussed above, the concepts of social capital, resilience and human development all place people at the centre. Yet, only social capital and community resilience concepts pay significant attention to the groups' wellbeing and their interconnectedness, which permeates every development.

CHAPTER 2.
UNDERSTANDING AND REDUCING RISKS

This chapter introduces key global DRR policy frameworks, such as the Sendai Framework for Disaster Risk Reduction 2015-2030 (the Sendai Framework), the Sustainable Development Goals (SDGs) for the period 2015-2030, and the Paris Agreement on Climate Change, and presents the progress of Serbia's DRR system in adopting the main principles of these universal instruments. The Chapter further explains Serbia's policy and legal DRR framework.

GLOBAL DISASTER RISK REDUCTION POLICY FRAMEWORKS

During 2015 and 2016, resilience to natural and climate-change hazards was discussed at intergovernmental global conferences that yielded new policy frameworks on DRR. These frameworks provide universal principles and directions for preventing and reducing natural and human-made hazards, decreasing the vulnerability of people and communities, and building their resilient capacities to deal with potential risks.

THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015-2030

The Sendai Framework[14] was adopted in 2015 as a successor of the Hyogo Framework for Action (2005–2015): Building the Resilience of Nations and Communities to Disasters (HFA) (UNISDR, 2005). The main aim of the Sendai DRR concept is to build resilience to natural and man-made hazards by identifying and effectively managing risks, and not just limited to disaster management (UNISDR, 2015). Although the Sendai Framework builds on elements established by the HFA, it places even stronger emphasis on the adaptive and transformative capabilities of communities that should allow them to overcome stresses and shocks and bounce back in order to 'build back better.' The Sendai Framework underlines that DRR and resilience are essential elements for achieving sustainable human development (UNISDR, 2016).

The main aim of the Sendai DRR concept is to build resilience to natural and man-made hazards by identifying and effectively managing risks.

FOUR PRIORITIES HAVE BEEN DEFINED BY THE SENDAI FRAMEWORK:

Priority 1:
Understanding disaster risk.

Priority 2:
Strengthening disaster risk governance to manage disaster risk.

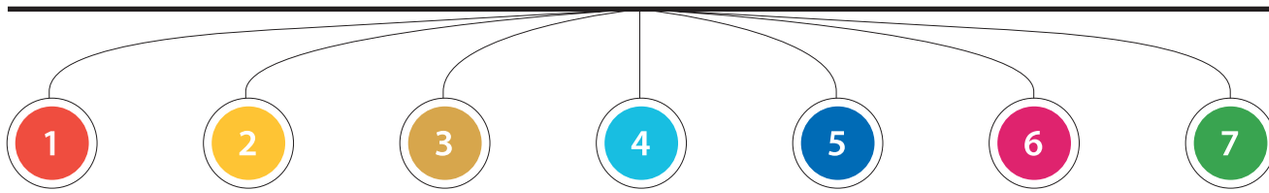
Priority 3:
Investing in disaster risk reduction for resilience.

Priority 4:
Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

The four priorities follow all the phases of DRR and emergency management – risk prevention, risk mitigation, risk planning, risk response, recovery and rebuilding. The Sendai Framework sets seven global targets to be achieved by 2030 (figure 6).

Figure 6.
Global targets and priority actions of the Sendai Framework

THE SEVEN GLOBAL TARGETS



1. Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020-2030 compared to the period 2005-2015.
2. Substantially reduce the number of people affected globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020-2030 compared to the period 2005-2015.
3. Reduce direct disaster economic losses in relation to global gross domestic product by 2030.
4. Substantially reduce disaster damage to critical infrastructure and the disruption of basic services, among them health and education facilities, including developing their resilience by 2030.
5. Substantially increase the number of countries with national and local DRR strategies by 2020.
6. Substantially enhance international cooperation with developing countries through the provision of adequate and sustainable support to complement their national actions for implementation of this Framework by 2030.
7. Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments for people by 2030.

THE FOUR PRIORITIES FOR ACTION

1st Understanding Disaster Risk

Disaster risk management should be based on a thorough understanding of disaster risk in all of its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. This knowledge can be used for risk assessment, prevention, mitigation, preparedness and response.

2nd Strengthening Disaster Risk Governance to Manage Disaster Risk

Disaster risk governance at the national, regional and global level is very important for prevention, mitigation, preparedness, response, recovery and rehabilitation, and fosters collaboration and partnership.

3rd Investing in DRR for Resilience

Public and private investment in Disaster Risk Reduction and prevention through structural and non-structural measures are essential for enhancing the economic, social, health and cultural resilience of people, communities, countries and their assets as well as the environment.

4th Enhancing Disaster Preparedness for effective Response and to 'Build back Better' in Recovery, Rehabilitation and Reconstruction

The growth in disaster risk means that there is an ongoing need to strengthen disaster preparedness for response, take action in anticipation of events and to ensure that capacities are in place for effective response and recovery at all levels. The recovery, rehabilitation and reconstruction phase is a critical opportunity to 'build back better', including the integration of DRR into development measures.

By referring to gender, age, disability and cultural features, the Sendai Framework advocates for inclusionary aspects of DRR policies. It also stresses the positive potentials of effective multi-level coordination and cooperation in the DRR governance area.

In July 2016, the European Commission (EC) adopted the Action Plan for the implementation of the Sendai Framework into the European DRR policies (European Commission, 2016). This Action Plan includes key Sendai Framework priorities tailored to the EU DRR policy framework. The Action Plan stresses the importance of including local authorities, civil society and communities in the development of specific strategies for risk awareness in order to involve the most vulnerable groups in the particular settings (ibid.).

In Serbia, the Draft Law on Disaster Risk Reduction and Emergency Management proposed solutions that are in line with the Sendai Framework. The Draft Law has not yet been brought before the National Assembly.

THE SUSTAINABLE DEVELOPMENT GOALS

The SDGs were adopted by the United Nations General Assembly in 2015 and can be seen as the application of resilient human development priorities to an international context (Alkire, 2010: 51). According to the United Nations Secretary-General: "[A]ll investments in sustainable development should be risk-informed." The 17 SDGs are significantly broader and more ambitious than those set by the Millennium Development Goals (MDGs) in 2000.[15] They cover a wide spectrum of economic, social, environmental, governance, human rights and gender-related issues. The SDGs reflect the recognition that development is multifaceted and that progress in one area depends on achievements made in others. The SDGs also put much more emphasis on the concept of resilience including DRR, which is both a core feature and a cross-cutting theme among the targets set for each goal.

Box 6.
Resilience and the Sustainable Development Goals

Resilience is at the core of target 1.5, of Sustainable Development Goal 1 (End poverty in all its forms everywhere):

> *By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.*

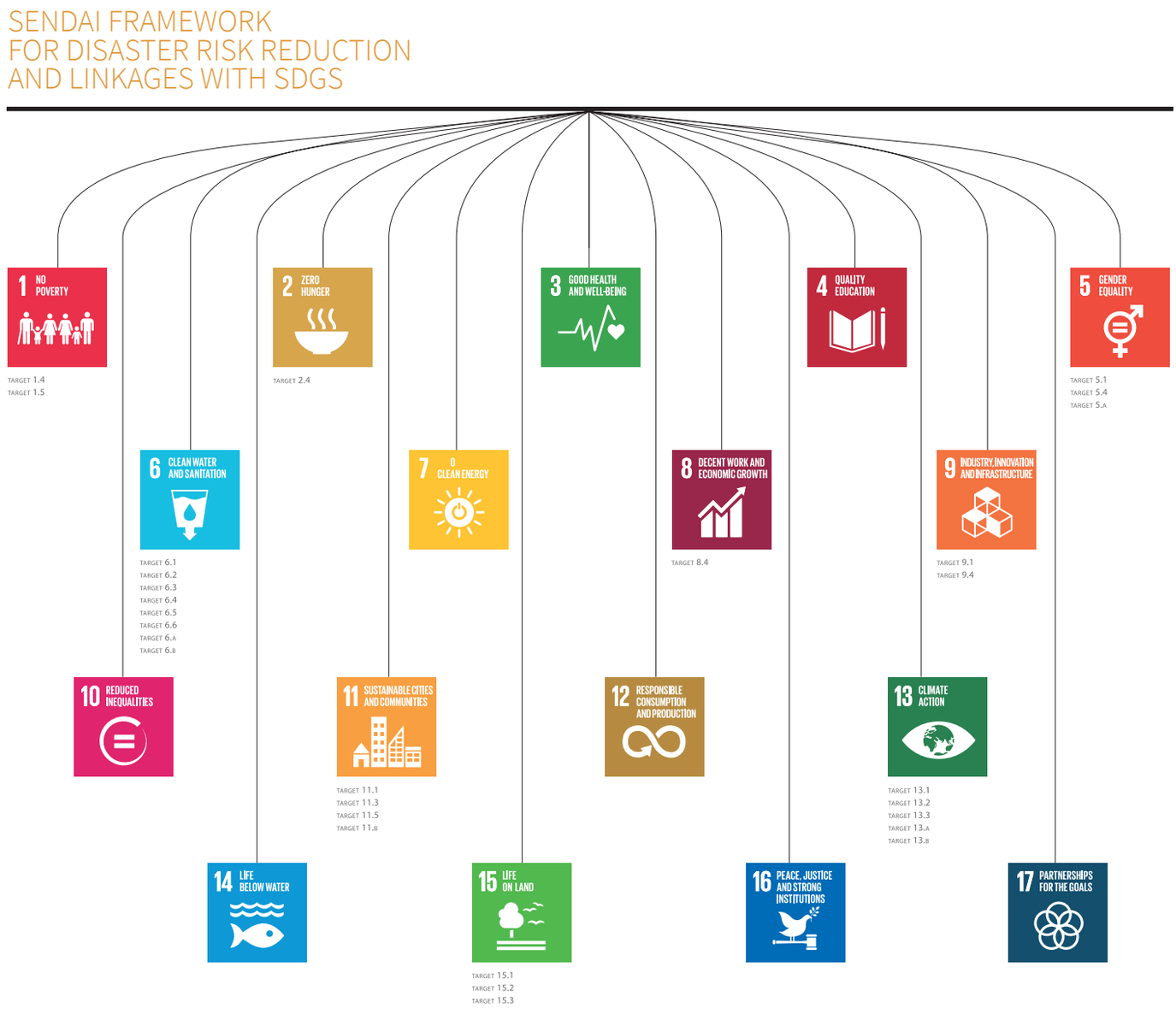
Resilience is also a core element in target 13.1, which aims to "strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries".

In addition, it plays a constitutive part in several other targets, including: "ensure sustainable food production systems and implement resilient agricultural practices..." (2.4); "Develop quality, reliable, sustainable and resilient infrastructure..."(9.1); "Facilitate sustainable and resilient infrastructure development in developing countries..." (9.a); "...substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels" (11b): "Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials" (11.c); and "By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans" (14.2).

Like the 2014 HDR, the SDGs have embraced a very broad definition of resilience, which encompasses economic, social, environmental and infrastructural factors. Questions have been raised as to whether such a broad approach to resilience can be effectively applied considering the difficulties in measuring it (Bahadur et al., 2015). The set of 230 global indicators for each SDG target was developed by the Inter-Agency and Expert Group on SDG indicators (IAEG-SDG) and adopted in March 2016.[16] The indicators are intended for follow-up and review of progress at the global level towards achieving the 17 SDGs (UN, 2016). In Serbia and the Western Balkans, preparatory activities to assist in debates on the nationalization and localization of the SDGs are underway (UNDP, 2016b).

A significant part of the process of the Sendai Framework development was being implemented in parallel and in synergy with those related to the new Sustainable Development Goals. The two policy frameworks are in many aspects interlinked, as figure 7 shows.

Figure 7.
Linkages between the Sendai Framework and the Sustainable Development Goals



THE PARIS AGREEMENT ON CLIMATE CHANGE

The Paris Agreement on Climate Change, which builds on the United Nations Framework Convention on Climate Change, was adopted in November/December 2015 at the United Nations Climate Change Conference held in France. The Agreement brings all nations together for the first time in efforts to combat and reduce risks and losses from climate change effects (UNFCCC, 2015). Its central aim is to foster the global response to the threat of climate change by keeping temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the Agreement aims to strengthen the ability of countries to deal with the impacts of climate change (UNFCCC, 2015). To reach these goals, appropriate financial flows, a new technology framework and an enhanced capacity building framework will be put in place, which will also support the action of developing and most vulnerable countries in line with their own national objectives (ibid.). The principles of the Agreement also resonate with the Sendai Framework.

The First National Adaptation Plan was drafted for Serbia in December 2015, setting the directions for its implementation (Republic of Serbia, Ministry of Agriculture and Environmental Protection, 2015).

THE NATIONAL DISASTER RISK REDUCTION PLATFORM IN SERBIA

LEGISLATIVE AND STRATEGIC FRAMEWORK

In Serbia, after decades of neglect, the DRR and Emergency Management (EM) system was re-established through the Law on Emergency Situations from 2009 (Official Gazette of the Republic of Serbia, 2009a) and the National Strategy for DRR Protection and Rescue in Emergency Situations from 2011 (The Republic of Serbia National Assembly, 2011), which have been the key documents for DRR and EM in the country (Republic of Serbia, 2014). For several years, efforts have been made to harmonize national principles of the DRR system with the global policy framework, primarily with the HFA.[17]

The Law on Emergency Situations sets up the framework for an integrated system of EM in the country. It defines all actors in the system of protection and rescue, including those responsible for prevention: governmental organizations and bodies in charge at the national, provincial and local levels; business and entrepreneurs' associations and other legal entities and citizens, civil and professional associations, etc. It further regulates responsibilities, rights and obligations of local governments regarding emergency management.

In 2011 and 2012, a set of amendments to the Law on Emergency Situations was adopted mainly concerning increased risk preparedness measures, such as rescue from floods, fire and explosion, as part of the prevention and promoting a culture of civil protection (Official Gazette of the Republic of Serbia, 2009a). The Law also introduced the transparency principle according to which the state administration, autonomous provinces and local governments have the obligation to inform the population in the areas potentially affected by natural or other disasters about the threat thereof. The guidelines for developing risk assessments and protection and rescue plans were adopted soon after, in 2012.[18]

The Law further reflected the importance of the early warning system (EWS) as a focal instrument in the prevention of risks and disasters; accordingly, all main potential hazards in Serbia are covered by the EWS.[19] Earthquake data are ensured by the Seismological Institute of Serbia (Republički seizmološki zavod, 2015). Data concerning drought, storm winds, hail, snow blizzards, rainfall, snow drifts and glaze ice are provided by the Republic Hydro-Meteorological Service of Serbia (RHMSS) (Republic of Serbia, Ministry of Interior, 2015).[20]

The National Strategy for Disaster Risk Reduction, Protection and Rescue in Emergency Situations promoted links between DRR to other sectors and issues, reflecting the importance of preparedness actions such as risk assessments and permanent monitoring. It also advocated for regulation related to urban planning and construction rules, among others. Compared to the Law, the Strategy was more harmonized with the global DRR and developmental strategic frameworks presented in the HFA, and the MDGs defined by the United Nations member states.

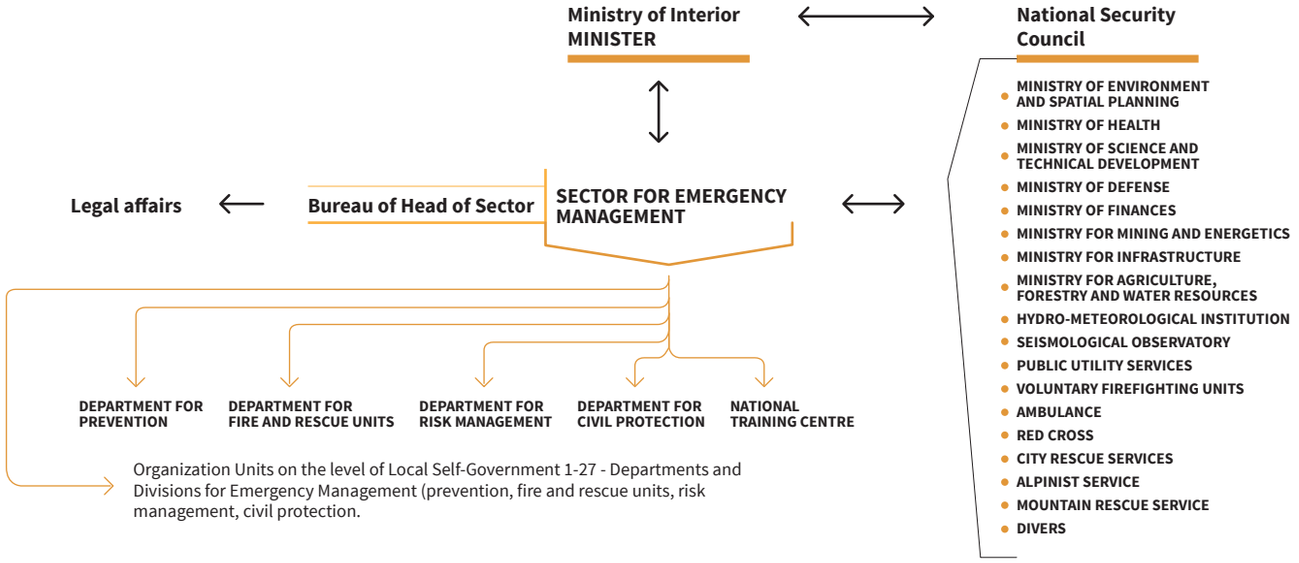
Given the complexity of the DRR and the EM systems, a number of other legal documents are considered to be directly relevant by the Government. There are more than 20 strategies and laws, and more than 100 by-laws recognized as important for building the system around the concept of resilience (see Annex 3). This excludes economic and social development documents in which the issues related to DRR and climate change adaptation (Crnčević, 2013) are yet to be addressed.

INSTITUTIONAL FRAMEWORK

The Government has the guiding role in introducing DRR and EM principles and activities into the scope of the work of the ministries. Ministers of major sectors are members of the National Emergency Headquarters, with the Minister of Interior as its head (Official Gazette of the Republic of Serbia, 2015b). To date, the Ministry of Interior's National Emergency Management Headquarters (NEMH) and the Sector for Emergency Management (SEM) have been at the forefront in shaping DRR policies and implementing protection and rescue activities during emergencies (Republic of Serbia, 2014). The SEM lies directly under the Minister of Interior and contains five departments:

- **The Department for Prevention**
- **The Department for Fire and Rescue Units**
- **The Department for Risk Management**
- **The Department for Civil Protection**
- **The National Training Centre.**

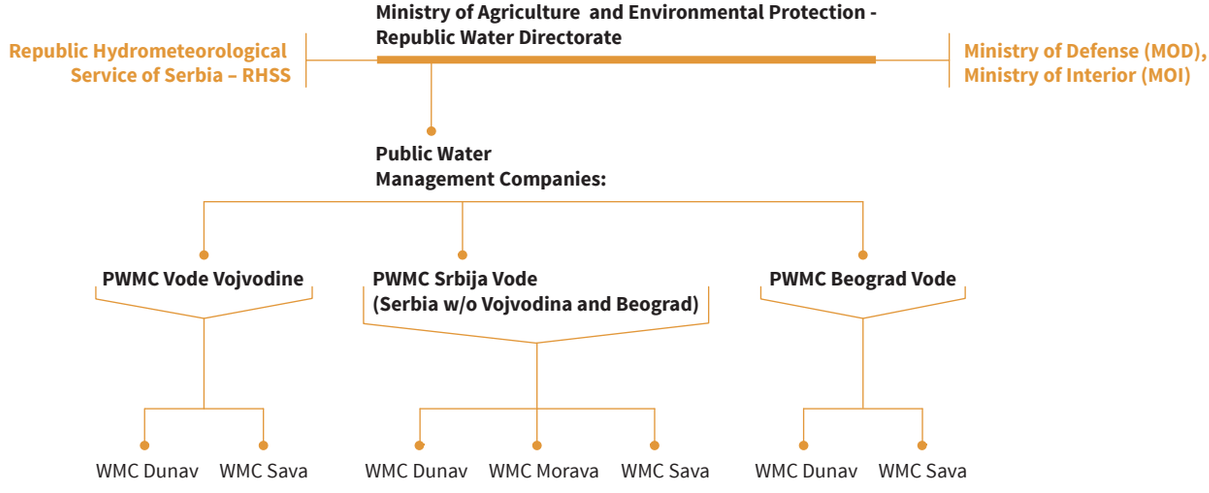
Figure 8.
The Institutional Disaster Risk Reduction Framework in Serbia



Source: Republic of Serbia, Ministry of Interior (n.d-a)

The Ministry of Agriculture and Environmental Protection has the mandate to coordinate disaster prevention and protection at the national level (in weather and climate related hazards) and the RHMSS monitors hydrology and precipitation, temperature and other features. The Seismological Survey of Serbia has the mandate over earthquake hazards, while cities and municipalities perform this task at the local level. Within the Ministry, the core responsibility for flood protection and water management at the national level resides with the Water Directorate, and water and flood management of watercourses of level 2 are within the mandate of local governments.[21] The Ministry of Interior and the Ministry of Defence are in charge and deploy their forces in case of declared national emergencies.

Figure 9.
Organizational structure of flood protection and water management in Serbia



To ensure that DRR is being implemented, in January 2016, a new government body was set up: the Public Investment Management Office.[22] This Office took over from the Office for Reconstruction and Flood Relief, set up in 2014. The new Office follows the recovery post-disaster mandate and is responsible for managing "the projects of reconstruction of thousands of preschool, school, health care and social protection establishments" (Public Investment Management Office of the Republic of Serbia, 2016). The Office is tasked with coordinating the risk reduction activities in line with Sendai and thus represents one of the key actors in the developing and fostering Serbian DRR strategic framework.

FINANCIAL INSTRUMENTS

Every year, the Ministry of Finance of Serbia establishes a budgetary contingency reserve for natural disasters (the Permanent Budgetary Reserve); it is usually insufficient to cover any major disaster costs. Moreover, there is no requirement for the allocated funds to sit in the reserve account at any given time. For this reason, the Permanent Budgetary Reserve in the Serbian budget has more of a symbolic function (Bijelić and Lazaravić, 2015).

In case of disasters, the Ministry of Finance has been using ex-post instruments such as budget reallocation, international aid and debt financing (ibid.: 36). Although budget reallocation, a post-disaster instrument, is used by all countries in cases of larger-scale natural disasters, it took more than five months after the 2014 floods to approve a supplementary budget with additional funds for recovery and reconstruction, which affected the pace of recovery (ibid.).

Focus is further shifted to risk reduction, risk awareness and preparedness.

As a result of the above, the Government has been highly dependent on international support. As an illustration, by November 2015, Serbia received EUR220 million in grants and US$300 million in loans for the recovery of infrastructure and housing in the 24 affected municipalities (Republic of Serbia, Government Office for Reconstruction and Flood Relief, 2015b). The post-disaster recovery needs for 2014 and 2015 were estimated at EUR1,266 billion, because the Government was unable to cover much of the needed remaining funds (Republic of Serbia, 2014).

Lack of insurance for local governments, home owners and small- and medium-sized enterprises (SMEs) increased the overall 2014 flooding loss. Analysis of the data after the floods in May 2014 in Serbia shows that only 1.6 per cent of the total damage was covered by insurance (World Bank, 2015b). If local self-governments had only insured their municipal budgets against natural disasters with an annual policy of EUR100,000, they would have been able to co-finance recovery. For example, Obrenovac would have been covered with EUR25 million for the inflicted damage. Since this is not the case, the Government compensates its losses.[23]

In 2014, a new Law on Insurance (Official Gazette of the Republic of Serbia, 2014d) was adopted, relating to the ex-ante risk financing mechanisms and tied to efforts and incentives for investment in risk reduction (Arnold, 2008). The Law brought improvements in this area, defining property insurance against fire, explosion and natural disasters. Increased insurance coverage and the promotion of insurance of public facilities against natural disasters and other hazards are further encouraged, forming a critical part of a comprehensive DDR and management strategy.[24]

RECENT DEVELOPMENTS

In December 2014, the Government of the Republic of Serbia passed a National Disaster Management Programme. In 2015, the Government worked on the creation of the cross-sectorial National Action Plan to implement the DRM programme, which was finalized at the beginning of 2016.

The draft Law on Natural and Other Hazard Risk Reduction and Emergency Management[25] was developed in 2015, and planned for adoption in 2016.[26] With this change, focus is further shifted to risk reduction, risk awareness and preparedness. The national government has a subsidiary role in the system of protection and rescue and the primary role of local self-governments (LSGs) in DRR and EM is underlined. The DRR approach is also reflected through requirements for local governments to develop risk reduction plans on the basis of the previous risk assessments in addition to plans for protection and rescue.

CONCLUSION

Global policy frameworks such as the Sendai Framework, the SDGs and the Paris Agreement on Climate Change set the scene for the development of contextualized national DRR instruments to 'build back better'. In Serbia, preparatory activities began to incorporate guiding principles of the Sendai Framework and the Paris Agreement on Climate Change as well as debates on SDG nationalization and localization.

In Serbia, preparatory activities began to incorporate guiding principles of the Sendai Framework and the Paris Agreement on Climate Change as well as debates on the SDG nationalization and localization.

However, a coherent DRR policy and institutional framework in Serbia is only emerging. Attempts to mirror the Sendai Framework are clear: DRR and EM are planned to be national and local priorities, and should be integrated in development plans and programmes in all relevant sectors based on inter-sectoral collaboration and partnership. However, less attention has been paid to rendering the system operational and enhancing national and local financial instruments to support the new DRR architecture.

PART 2

ANALYSIS: RESILIENCE, DISASTER RISK REDUCTION AND THE SOCIAL FABRIC

CHAPTER 1.
HOW RESILIENCE CAN BE MEASURED?

This chapter discusses different approaches to measuring resilience and the expanding field of measurement. The section explores the potentials of the Human Development Index to assess resilience and presents the Capitals of Resilience Index (CRI) for Serbia, which has been developed by the Statistical Office of the Republic of Serbia (SORS) through UNDP support. The significance of principal capitals for building resilient communities – economic, physical, natural, human, social and institutional – are further examined in 13 Serbian municipalities, with the aim to understand how and to what extent this Index can contribute to understanding the resilience potential of a specific local context.

THE HUMAN DEVELOPMENT INDEX AND MEASURING RESILIENCE

The concept of resilience has become the cornerstone of today's development and risk reduction agendas, increasingly sparking the interest of policymakers and research communities in measuring resilience. All of this has one aim: to identify (i.e. add another space) common characteristics of resilient communities in which chances are higher for a successful response and recovery from a variety of external shocks (UNDP, 2016b).

The Human Development Index (HDI) still does not address the issue of risks and resilience; it assesses the development of a country based on three key dimensions of human development: (i) living a long and healthy life; (ii) having access to education; (iii) and having a decent standard of living.

Yet, identifying universal attributes of resilient communities to a vast array of risks – natural disasters, economic, financial, and social – is a challenging endeavour because the concept of resilience is complex, multi-interpretable one, and is shared by many disciplines (Mayunga, 2007). An additional and important problem is how to embed resilience in the existing metrics and indices.

The HDI does not capture vulnerability, risks and thus resilience, although it is clear that external shocks and natural hazards have negative economic and social impacts on the exposed societies.

As discussed in the introduction, the concepts of human development and resilience in general, and to natural hazards in particular, increasingly overlap. However, one of the key global tools for measuring the level of national and global human development, UNDP's Human Development Index (HDI) still does not address the issue of risks and resilience; it assesses the development of a country based on three key dimensions of human development: (i) living a long and healthy life; (ii) having access to education; (iii) having a decent standard of living.[27] By focusing on these aspects, the HDI leaves out other important features of human development, such as inequalities and poverty, although the Human Development Reports Office (HDRO) offers other composite indices as a broader proxy for some of these key issues of human development. Furthermore, the HDI does not capture vulnerability, risks and thus resilience, although it is clear that external shocks and natural hazards have negative economic and social impacts on the exposed societies.

Therefore, the HDI only partially presents the level of human development in a given country. For instance, when assessing the Western Balkans countries, the HDI ranking is highly determined by economic growth. Thus ,the higher the income, the better the ranking. Consequently, Croatia and Montenegro are ranked as countries with very high human development (the Croatian GNI is twice as high as that of Bosnia and Herzegovina or Albania), while Serbia, former Yugoslav Republic of Macedonia, Albania, and Bosnia and Herzegovina belong to the group of countries with high human development (table 4).

However, if the 'income' component is taken out of the measure, Montenegro moves up the ladder due to great achievements in knowledge, as does Albania for the highest life expectancy among the countries of the

Western Balkans. As human capital plays an instrumental role in coping with disaster risk and in post-disaster recovery, in terms of wise choices, solutions and health conditions, these countries may appear as those with the highest resilience potential; however, the HDI metrics alone do not provide space for such a conclusion.

Table 4.
Human Development Indicators for Western Balkans countries, 2014

		HUMAN DEVELOP-MENT INDEX (HDI)	LIFE EXPECTANCY AT BIRTH	EXPECTED YEARS OF SCHOOLING[1]		MEAN YEARS OF SCHOOLING[2]		GROSS NATIONAL INCOME (GNI) PER CAPITA[3]	GNI PER CAPITA RANK MINUS HDI RANK
Human Development Indicators(HDI) rank	Country	Value*	Years	Years		Years		2011 PPP $	
		2014	2014	2014	a	2014	a	2014	2014
47	Croatia	0.818	77.3	14.8		11.0		19 409	11
49	Montenegro	0.802	76.2	15.2		11.2		14 558	27
66	Serbia	0.771	74.9	14.4		10.5		12 190	20
81	former Yugoslav Republic of Macedonia	0.747	75.4	13.4		9.3	q	11 780	9
85	Albania	0.733	77.8	11.8	i	9.3		9 943	14
85	Bosnia and Herzegovina	0.733	76.5	13.6		8.3	v	9 638	19

Source: UNDP (2016b).

Notes:
[1] Number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life.
[2] Average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level.
[3] Aggregate income of an economy generated by its production and its ownership of factors of production, less the incomes paid for the use of factors of production owned by the rest of the world, converted to international dollars using PPP rates, divided by mid-year population.
[4] a. Data refer to 2014 or the most recent year available.
i. Calculated as the average of mean years of schooling for Austria and Switzerland.
q. Based on data from United Nations Children's Fund (UNICEF) Multiple Indicator Cluster Surveys for 2005-2014.
v. Updated by HDRO based on data from the UNESCO Institute for Statistics (2015) and UNICEF's Multiple Indicator Cluster Surveys.

Box 7.
Measuring the impact of floods on human development in Bosnia and Herzegovina and Serbia

According to the projections, UNDP estimated that the Human Development Index (HDI) for Serbia and Bosnia and Herzegovina could be reduced by 0.003 to 0.005 points by 2018 because of flood-related declines in production and income, reduced access to healthcare in flood-affected areas, and possible reductions in education attainment for children living in the affected areas. Such HDI implications for Serbia and Bosnia and Herzegovina are similar to the five-year setback on targets in its achievement of greater gender equality, lower poverty rates, reduced marginalization, greater equality for minority groups and persons with disabilities.

Source: UNDP (2016b: 86).

Recently, limitations of the HDI approach have been acknowledged, which has led to innovative efforts to improve it. Taking into account the lost opportunity resulting from disasters at the local, national and regional level, and based on the World Bank methodology (World Bank, 2010), the UNDP Regional Centre for Europe and CIS (Commonwealth of Independent States) calculated the impact of the 2014 floods in Serbia and Bosnia and Herzegovina on human development.

Although this approach enriches the HDI assessments, the HDI continues to measure human development from the three core standpoints. By overlooking the weight of risks from external shocks and natural hazards, the HDI neglects these human development aspects.

MEASURING RESILIENCE: IS THERE A GOLD STANDARD?

The field of measuring resilience is booming despite numerous limitations.

There is a need for the number of contextual and practical specifications to be involved in each specific endeavour to measure it.

DIFFERENT APPROACHES TO MEASURING RESILIENCE

The field of measuring resilience is booming despite numerous limitations. Today, there are many different frameworks and approaches designed to expand knowledge on the matter and feed policymakers with information on how to strengthen the resilience of communities. As table 5 shows, there are significant differences between these frameworks, including different units of analysis, methodological approaches and number and type of indicators. For example, Arup International Development's City Resilience Framework and the Resilience Capacity Index, developed by the Buffalo Regional Institute, contains 12 main indicators on regional economic, socio-demographic, and community connectivity capacities, as presented below (table 5). Other resilience frameworks, namely UNISDR's disaster Resilience Scorecard for Cities (UNISDR, 2014a) and Twigg's Characteristics of a Disaster-Resilient Community (Twigg, 2009), encompass multiple themes, a number of sub-questions, and more than 50 indicators. The topics cover social, economic, institutional, environmental, infrastructure, educational areas, including the DRR concept for assessing resilience. Since there is no consensus on how to measure resilience, these various approaches are tested and used to yield answers about the resilient capacities of communities.

The growing debate in the field suggests that resilience cannot be measured as an all-encompassing entity due to different approaches and degrees of risks to which people are exposed. Yet, selected indicators within each framework or approach can provide insights into relative resilience (Schipper and Langston, 2015), although they are all conditioned with the conceptual framework taken to measure resilience. Since resilience is a relative term, there is a need for the number of contextual and practical specifications to be involved in each specific endeavour to measure it. For example, it is important to detail the type of hazard that the resilience is measured against, because a community can be more resilient to droughts but less to floods or earthquakes (ibid.).

Table 5.
Measuring resilience: Selected frameworks and approaches

TITLE AND AUTHOR	UNIT OF ANALYSIS	YEAR AND COVERAGE OF STUDY	WHY THE INDEX?	CONCEPT AND FRAMEWORK	DATA LOAD: INDEX / SUB-INDICES / INDICATORS / VARIABLES TYPE OF DATA
Resilience Capacity Index by the Buffalo Regional Institute	Region/ metro area	2011 361	**Compare** The Resilience Capacity Index (RCI) is a single statistic summarizing a region's status on 12 factors hypothesized to influence the ability of a region to bounce back from a future unknown stress. The Index permits comparisons across metropolitan regions and the identification of strong and weak conditions relative to other metropolitan regions.	**Resilience** Three pillars: Regional Economic Capacity Socio-Demographic Capacity Community Connectivity Capacity	1/-/3/12 Quantitative secondary
Economist Livability City Ranking by the Economist Intelligence Unit (EIU)	City	Continuous, most recent 2014 140	**Compare** The survey originated as a means of testing whether Human Resource Departments needed to assign a hardship allowance as part of expatriate relocation packages. While this function is still a central potential use of the survey, it has also evolved as a broad means of benchmarking cities.	**Livability** Four categories: Category 1: Stability Category 2: Healthcare Category 3: Culture and Environment Category 4: Education	1/-/5/30 Experts and quantitative Primary and secondary
The China Urban Sustainability Index by McKinsey & Company, Columbia University and Tsinghua University	City	2011, 2013	**Compare** The Index strives to develop insights into the relative sustainability of China's rapidly growing cities and to highlight case studies of successful policies and outcomes.	**Sustainability** Five areas: Basic needs Resource efficiency Environmental cleanliness Built environment Commitment to future sustainability	1/4/6/19 Quantitative secondary

TITLE AND AUTHOR	UNIT OF ANALYSIS	YEAR AND COVERAGE OF STUDY	WHY THE INDEX?	CONCEPT AND FRAMEWORK	DATA LOAD: INDEX / SUB-INDICES / INDICATORS / VARIABLES TYPE OF DATA
Climate and Disaster Resilience Initiative (Capacity building Program) by CityNet / Kyoto University / TDLC / SEEDS / UNISDR	City	2010 8	**Diagnose** Report on the capacity-building programme to help government officials become more aware of potential future risks that their city faces.	**Resilience** Five dimensions: • Physical • Social • Economic • Institutional • Natural	1/5/25/125 Quantitative Primary and secondary
10 Essentials of City Resilience by UNISDR	City	Ongoing 2014 113 first cycle 252 second cycle.	**Diagnose** Designed primarily for local government leaders and policymakers to support public policy, decision-making and organization as they implement disaster risk reduction and resilience activities.	**Resilience** Ten points check-list: • Institutional and Administrative Framework • Financing and Resources • Multi-hazard Risk Assessment - Know your Risk • Infrastructure Protection, Upgrading and Resilience • Protect Vital Facilities: Education and Health • Building Regulations and Land Use Planning • Training, Education and Public Awareness • Environmental Protection and Strengthening of Ecosystems • Effective Preparedness, Early Warning and Response • Recovery and Rebuilding Communities	-/-/10/41 Quantitative secondary
Disaster Resilience Indicators by the University of South Carolina	County	2010 736	**Diagnose** To provide a methodology and a set of indicators to measure the present conditions influencing disaster resilience within communities.	**Resilience** Components: • Social Resilience • Economic Resilience • Institutional Resilience • Infrastructure Resilience • Community Capital	1/5/-/36 Quantitative Secondary
City Resilience Index by Arup/ Rockfeller Foundation	City	2014 14 case studies	**Diagnose, influence** Provides cities with the tools to diagnose their resilience, and then to shape urban plans, implementation and investment in them.	**Resilience** Four aspects of resilience (health and wellbeing, the economy and society, leadership and strategy, systems and services) expanded into 12 indicators of resilience: • Minimal human vulnerability • Diverse livelihoods and employment • Adequate safeguards for human life and health • Collective identity and mutual support • Social stability and security • Availability of financial resources and contingency funds • Reduced physical exposure and vulnerability • Continuity of critical services • Reliable communications and mobility • Effective leadership and management • Empowered stakeholders • Integrated development planning	1/4/12/130-150 Quantitative and qualitative Primary and secondary

TITLE AND AUTHOR	UNIT OF ANALYSIS	YEAR AND COVERAGE OF STUDY	WHY THE INDEX?	CONCEPT AND FRAMEWORK	DATA LOAD: INDEX / SUB-INDICES / INDICATORS / VARIABLES TYPE OF DATA
ACCCRN City projects by the Rockefeller Foundation	Project	2013 22 projects in 10 cities	**Influence** The study aims to catalyse attention, funding and action by cities to strengthen their resilience to climate change impacts by: improving the capacity of cities for planning, financing, coordinating, and implementing climate change resilience strategies; strengthening awareness, engagement, and demand for building urban climate change resilience among Asian Cities Climate Change Resilience Network (ACCCRN) cities and other stakeholders; building urban climate change resilience in ACCCRN	**Resilience** • Six characteristics of resilience are: • Flexibility and diversity • Redundancy and modularity • Safe failure • Learning • Resourcefulness • Responsiveness.	-/-/6/- Qualitative Primary
Community-Based Resilience Analysis (CoBRA) by UNDP	Community/ household	2013	**Diagnose, influence** This tool measures and identifies the key building blocks of community resilience, or 'resilience characteristics', and assesses development/humanitarian interventions in attaining these resilience characteristics. Sustainable Livelihoods Framework (SLF) is used as a method of categorizing and mapping the potential characteristics of resilience. SLF presents the main factors that affect people's livelihoods and the typical relationships between them. It identifies five core asset categories or types of capital upon which livelihoods are built: financial, human, natural, physical and social.	**Resilience** The characteristics of resilience encompass income, food security, assets, access to basic services, social safety nets, ecosystem health, livelihood strategies, adaptive capacity, governance, and stability. The framework focusses on encouraging local level participation, and uses evidence gathered at the community level to determine direction.	-/-/-/- Qualitative/process-oriented
Measurement for Community Resilience by USAID	Project	2013	**Diagnose, influence** Six indices were developed based on food security/ nutrition, health, social capital, assets, ecosystem health and poverty. It measures disturbance (shocks, stressors) and identifying the frequency, duration and intensity of covariate shocks and stressors and idiosyncratic shocks and stressors. The next step looks at community capacities to measure resilience, and assesses adaptive, absorptive and transformative capacity. The framework then looks at areas of collective action, which are categorized under disaster risk reduction, conflict management, social protection, natural resources management and management of public goods and services. The final step is to reassess against initial baseline indices (Schipper and Langston, 2015).	**Resilience** USAID defines resilience as the ability of people, households, communities, countries and systems to mitigate, adapt to and recover from shocks, and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth. The USAID Measurement Framework for Community Resilience is based on a five-step process that begins with vulnerability assessment to identify baseline, wellbeing and basic conditions.	Mixed
Mayunga's Capital Based Approach	Community	2007	**Diagnose** Mayunga proposes a capital-based approach to measure the concept of community disaster resilience. Five major forms of capital are identified: social, economic, physical, human and natural. There is a broad expanse of indicators proposed, including public affairs, informal sociability, household income, employment, and housing, health, education and infrastructure/transport.	**Resilience** Resilience is the capacity or ability of a community to anticipate, prepare for, respond to, and recover quickly from the impacts of disaster.	-/-/-/- Quantitative

Sources: Peleah (2015), with input from the NHDR authors.

CAPITAL-BASED APPROACH TO MEASURING RESILIENCE

One possible avenue in measuring resilience is a capital-based approach.[28] This approach takes into account five capitals – social, economic, physical, human and natural[29] – in assessing community or household resilience capacities.[30]

A capital-based approach is widely accepted in sustainable development and poverty alleviation programmes, and consists of the components that are necessary for developing a sustainable community economy. It is rooted in the conceptual framework encompassing capitals that can contribute to reducing vulnerability and increasing community disaster resilience. It also specifically gives weight to the potentials of social capital – trust, norms, networks and corresponding indicators. Accordingly, trusting and connected communities are the most resilient (Mayunga, 2007). This framework, presented in table 6, further suggests that each form of capital is an independent domain that can be measured by a combination of indicators (ibid.)

Table 6.
Forms of capital and their links with community disaster resilience

FORM OF CAPITAL	INDICATOR OF RESILIENCE	LINK WITH COMMUNITY DISASTER RESILIENCE
Natural capital	Resources stocks Land and water Ecosystem	Sustains all forms of life Increases protection to storms and floods Protects the environment
Physical capital	Housing Public facilities Business/industry	Facilitates communication and transportation Facilitates evacuation Increases safety
Economic capital	Income Savings Investment	Increases capacity, e.g. insurance recovery process Increases wellbeing and reduces poverty
Human capital	Education, Health Skills Knowledge/information	Increases knowledge and skills to understand community risks Increases the ability to develop and implement risk reduction strategies
Social capital	Trust Norms Networks	Facilitates coordination and cooperation Facilitates access to resources

MEASURING RESILIENCE FOR SERBIAN CITIES AND MUNICIPALITIES: THE CAPITALS OF RESILIENCE INDEX

With the support of UNDP, the Serbian Statistical Office (SORS) adopted a capital-based approach to measuring resilience.

With the support of UNDP, the Serbian Statistical Office (SORS) adopted a capital-based approach to measuring resilience. In 2015, SORS developed the Capitals of Resilience Index of Serbian Municipalities (CRI). Its main objective is to measure the capacities of municipalities to overcome problems or the resilience of municipalities to changes in economic, social or natural aspects. Capitals form the basis of a community's ability to be resilient while resilience is understood through the UNISDR definition (see page 33, UNISDR, 2009).

Diverse and abundant capitals reduce community vulnerability and exposure to risks, i.e. forests could increase protection to storms and floods, while a vibrant local economy could increase wellbeing and reduce poverty. In addition, capitals are necessary for risk management and the ability to respond: education in the form of human capital increases knowledge and skills to understand community risks and increases the ability to develop and implement a risk reduction strategy, while social capital facilitates coordination and cooperation, which are essential for a fast response. Thus, the CRI was designed to diagnose existing capacities through available capitals proxies in each Serbian community.

The CRI is a composite index consisting in 39 indicators; the importance of each is not easily recognized

when considered individually (UNISDR, 2009). Only their linking and interactions provide a clear image of the phenomenon that should be described. These indicators are classified into five groups of capitals, which do not incorporate the same number of indicators (natural, physical, economic, human, and social and institutional capitals), each of which bears a certain value for the final descriptive indicator of the observed phenomenon. These five capitals are the factors that hold the key to adaptability and change, and potentials of the communities to be resilient (for methodology, see Annex 2).

Economic capital represents the most distinctive factor in the CRI overall municipal ranking. Therefore, the richest cities in Serbia ranked high and at the top of the Index.

The CRI is calculated for the 170 municipalities in Serbia. For each indicator, the average of the 2010-2013 data has been calculated. For the ranking list of municipalities, see Annex 2.

As indicated by the CRI, economic capital represents the most distinctive factor in the CRI overall municipal ranking. Therefore, the richest cities in Serbia ranked high and at the top of the Index. This is followed by physical and natural capitals. Human, social and institutional capitals do not show discriminative value for overall resilience; it seems that they have no significance.

According to the CRI, only one out of the 13 surveyed municipalities, Novi Sad, belongs to the group of resilient towns and municipalities. Vranje, Kragujevac and Kraljevo are in the middle of the ranking, while the remaining municipalities show a lack of the capacities for building up and sustaining resilience (table 7).

Table 7.
Ranking of 13 municipalities – the Capitals of Resilience Index

RANK	UNIT	I-DISTANCE
5	Novi Sad	63.24
22	Vranje	51.64
25	Kragujevac	51.36
26	Kraljevo	51.20
103	Šid	40.29
118	Novi Pazar	37.36
133	Nova Crnja	35.49
143	Obrenovac	32.49
148	Smederevska Palanka	31.10
155	Kladovo	29.06
164	Loznica	23.38
167	Negotin	19.86
169	Mali Zvornik	14.23

CAPACITIES OF 13 MUNICIPALITIES: A CAPITALS OF RESILIENCE INDEX BASED ANALYSIS

The main natural resources that make a difference to the vulnerability of the municipalities are the agricultural area, areas covered by forests, number of settlements and average size of plots, etc.

For the purpose of this NHDR, further analysis of natural, economic, physical, human, social and institutional capacities and characteristics was carried out for the selected Serbian municipalities. The analysis examined each capital and its values, with the aim of identifying the specific resilience potentials of the observed municipalities. The pattern between the municipalities and separate indicators for each capital helped to further understand the ways in which the level of vulnerability to natural disasters of the municipalities is conditioned by these features.

It should be taken into consideration that any interpretation is valid in the context of the 13 targeted municipalities and the chosen capitals/indicators. For example, the statement 'Negotin, Nova Crnja and Kladovo are strong in physical and natural capitals' is true only when compared to the remaining ten municipalities and in the context of the other three capitals.

NATURAL CAPITAL

Natural capital is composed of the following indicators (table 8). The main natural resources that make a difference to the vulnerability of the municipalities are the agricultural area, areas covered by forests, number of settlements, average size of plots, etc.

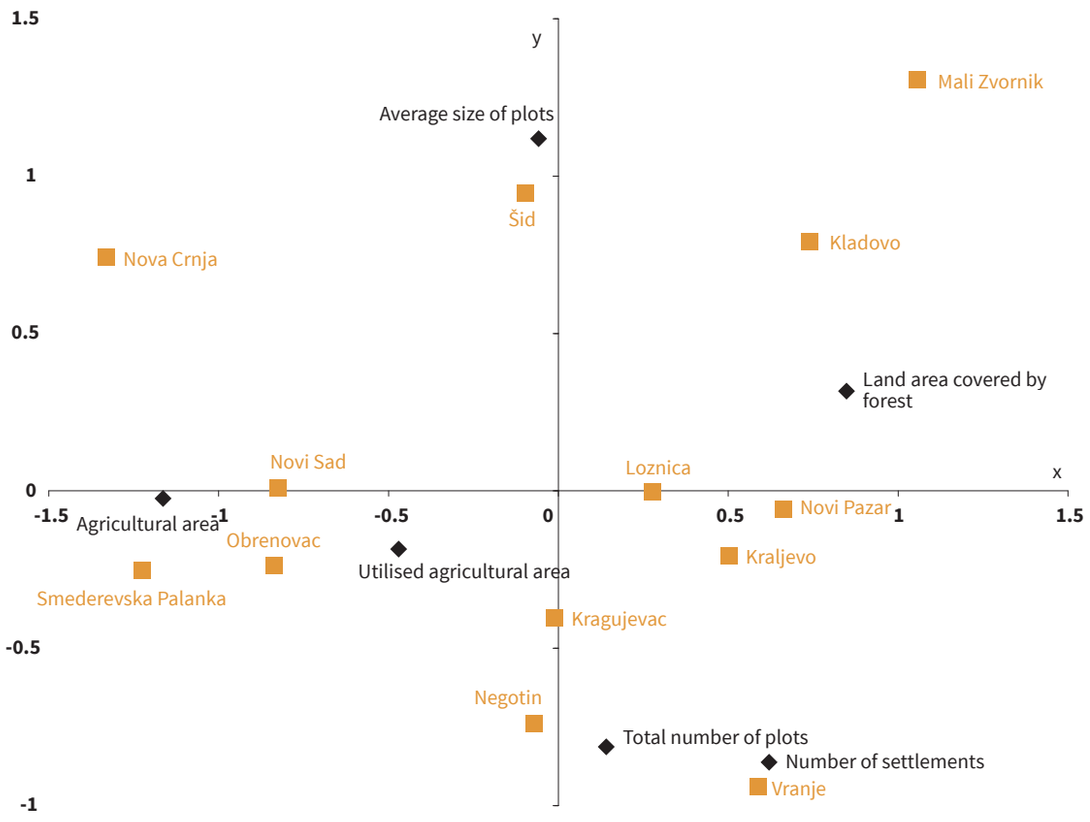
Table 8.
Natural capital indicators

NATURAL CAPITAL			
Mark	**Indicator**	**Measurement unit**	**Orientation**
V1	Agricultural area	%	Positive
V2	Number of settlements	no.	Positive
V3	Utilized agricultural area	ha	Positive
V4	Land area covered by forest	%	Positive
V5	Average size of plots	m^2	Positive
V6	Total number of plots	Number	Positive

Figure 10 shows the following patterns: when looking at the horizontal axis *(x-axis*), Nova Crnja, Smederevska Palanka, Obrenovac and Novi Sad stand out, with a large percentage of agricultural area (both agricultural area as the percentage of the total area of the municipality and utilized agricultural area in hectares), but a small percentage of area covered by forest. In contrast, Mali Zvornik, Kladovo, Novi Pazar, Kraljevo and Vranje have smaller areas suitable for agriculture, but have highly forested area.

If the vertical axis (*y-axis*) is considered, the analysis shows that Mali Zvornik, Šid, Kladovo and Nova Crnja on average have the largest size of the plots, but a low total number of plots as well as total number of settlements. In contrast, Vranje and Negotin are characterized by a high number of settlements and a high total number of plots. Loznica and Kragujevac seem to be average municipalities in terms of the indicators, which constitute the natural capital.

Figure 10.
Natural capital



The flat lands are easily flooded. In this group, Smederevska Palanka and Obrenovac are particularly vulnerable. By contrast, Mali Zvornik, Kladovo, Novi Pazar, Kraljevo, Vranje have high percentages of land covered by forest, which is their main advantage in preventing floods.

Most of the analysed municipalities have weak natural capital based on the CRI with the exception of Negotin, Nova Crnja and Kladovo.

Resilience of the municipalities in natural parameters – The vulnerability of Nova Crnja, Smederevska Palanka, Obrenovac and Novi Sad is due to the high share of agricultural land in these municipalities. The flat lands are easily flooded. In this group, Smederevska Palanka and Obrenovac are particularly vulnerable. By contrast, Mali Zvornik, Kladovo, Novi Pazar, Kraljevo and Vranje have high percentages of land covered by forest, which is their main advantage in preventing floods. Yet, the forests of Novi Pazar and Vranje pose risks, because these two municipalities and their surroundings are often affected by fires.

The analysis also indicates that a small number of settlements in combination with the large size of farms render Mali Zvornik, Šid, Kladovo and Nova Crnja particularly vulnerable to natural disaster. This could have a significant impact not only on the owners of the plots, but also on the entire agricultural industrial production affecting the gross product and prosperity of these municipalities.

In addition, potential natural disasters would affect a much higher percentage of the population and a larger number of farmers in Vranje and Negotin because they have a high number of settlements and a high total number of plots.

The analysis did not generate enough information for the municipalities of Kragujevac and Loznica.

According to the CRI, natural capital is among the capitals that makes a distinction in the overall resilience of municipalities and impact on their overall CRI positioning. Most of the analysed municipalities have weak natural capital based on the CRI, with the exception of Negotin, Nova Crnja and Kladovo. Yet, when assessing the specific values of natural capital, the differences within the group have been identified, indicating the direction for developing specific community resilience.

ECONOMIC CAPITAL

The economic indicators that were used for calculating economic capital include: municipal gross product, net average salaries and wages, number of companies and number of employees in relation to the population numbers, among others. These main economic resources that impact on the vulnerability of the municipalities are presented in table 9.

Table 9.
Economic capital indicators

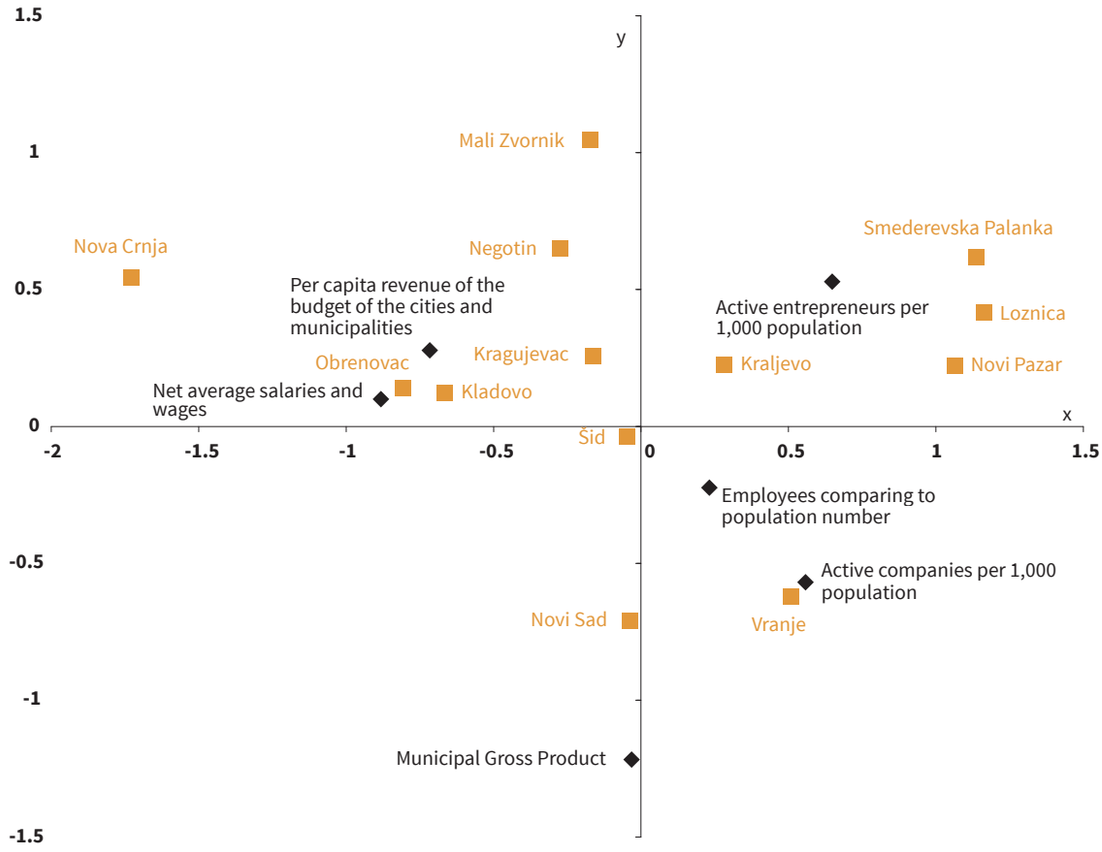
ECONOMIC CAPITAL			
Mark	**Indicator**	**Measurement unit**	**Orientation**
V1	Active companies	per 1,000 population	Positive
V2	Active entrepreneurs	per 1,000 population	Positive
V3	Employees comparing to population number	%	Positive
V4	Net average salaries and wages	RSD	Positive
V5	Per capita revenue of the budget of the cities and municipalities	RSD	Positive
V6	Municipal gross product	RSD million	Positive

The association between indicators of economic capital and the 13 targeted municipalities is presented in figure 11. When observing the horizontal axis (*x-axis*), there is a clear distinction between municipalities Obrenovac and Kladovo, on the one hand (left side), and Smederevska Palanka, Loznica and Novi Pazar, on the other hand (right side). Obrenovac and Kladovo stand out as municipalities characterized by their high net average salaries and wages, as well as their high revenue of budget per capita. This is in comparison to the municipalities Smederevska Palanka, Loznica and Novi Pazar, which are characterized by low salaries and wages and revenues of the budget. And yet, these three municipalities are noted for their high number of active entrepreneurs per 1,000 population.

When observing the vertical axis (*y-axis*), there is a distinction between Novi Sad and Vranje (bottom of figure), and Mali Zvornik and Negotin (top of figure). Novi Sad and Vranje are striking by their high municipal gross product, but also high number of active companies per 1,000 population and number of employees compared to the population number. This is not the case for Mali Zvornik, Negotin, Smederevska Palanka and Nova Crnja, which have low municipal gross product, as well as a small number of active companies per 1,000 population.

Šid, followed by Kragujevac and Kraljevo, is the most difficult to differentiate among targeted municipalities with respect to indicators illustrating economic capital.

Figure 11.
Economic capital



When all the data are summarized, it can be concluded that Obrenovac and Kladovo are wealthier than the others in terms of net average salaries and wages of their inhabitants, but also their revenue of the budget. In contrast, Smederevska Palanka, Loznica and Novi Pazar can be considered 'poor' in these terms. Yet, they have a high number of active entrepreneurs, which is their main strength.

Novi Sad and Vranje have the highest gross product at the municipality level and Mali Zvornik, Negotin, Smederevska Palanka and Nova Crnja have the lowest level.

Resilience of the municipalities in economic parameters – Novi Sad and Vranje have the greatest resilience potential due to their high municipal gross product and high number of active companies and employees compared to their population size. The resilience of Kladovo and Obrenovac is, in contrast, generated through their high budget revenue per capita.

Conversely, Smederevska Palanka and Loznica are characterized by high vulnerability because of their high number of entrepreneurs who could be endangered in the case of natural disaster. A disaster not only threatens entrepreneurs' business operations, but also their entire personal property.[31] At the same time and paradoxically, these cities, also including Novi Pazar, can count on the support of the private sector during natural disasters.

According to this analysis, Mali Zvornik, Negotin and Smederevska Palanka have the weakest resilience potential in economic parameters due to their small gross product, net average salaries and wages of their inhabitants and small number of private companies, etc. The analysis did not generate enough information for the municipalities of Nova Crnja, Kragujevac, Kraljevo and Sid.

As noted earlier, economic capital is the most distinctive 'set of the characteristics'. As such, it impacts on the overall resilience and CRI positioning of municipalities in Serbia. Yet, as the above disaggregated analysis shows, economic parameters are relative and therefore their specific locational values should be taken into account.

Novi Sad and Vranje have the greatest resilience potential due to their high municipal gross product and high number of active companies and employees compared to their population size.

Mali Zvornik, Negotin, and Smederevska Palanka have the weakest resilience potential in economic parameters due to their small gross product, net average salaries and wages of their inhabitants and small number of private companies, etc.

PHYSICAL CAPITAL

The indicators of the physical capital include the distance to the regional centre, the quality of connectivity (share of modern roads), characteristics of educational and healthcare systems and quality of water and sewage infrastructure, etc. These indicators are presented in table 10.

Table 10.
Physical capital indicators

PHYSICAL CAPITAL			
Mark	**Indicator**	**Measurement unit**	**Orientation**
V1	Distance to regional centre	Km	Negative
V2	Housed residential area per capita	m2	Positive
V3	Households connected to the water supply system	%	Positive
V4	Households connected to urban wastewater collecting system	%	Positive
V5	Length of modern roads as a % of total roads	%	Positive
V6	Number of doctors per 1,000 inhabitants	Ratio	Positive
V7	Number of elementary schools per 1,000 pupils of primary school age	per 1,000 pupils	Positive
V8	Number of healthcare institutions per 1,000 population	per 1,000 population	Positive
V9	Number of teachers per 1,000 pupils in primary schools	per 1,000 pupils	Positive
V10	Total value of residential area per m2	RSD	Positive

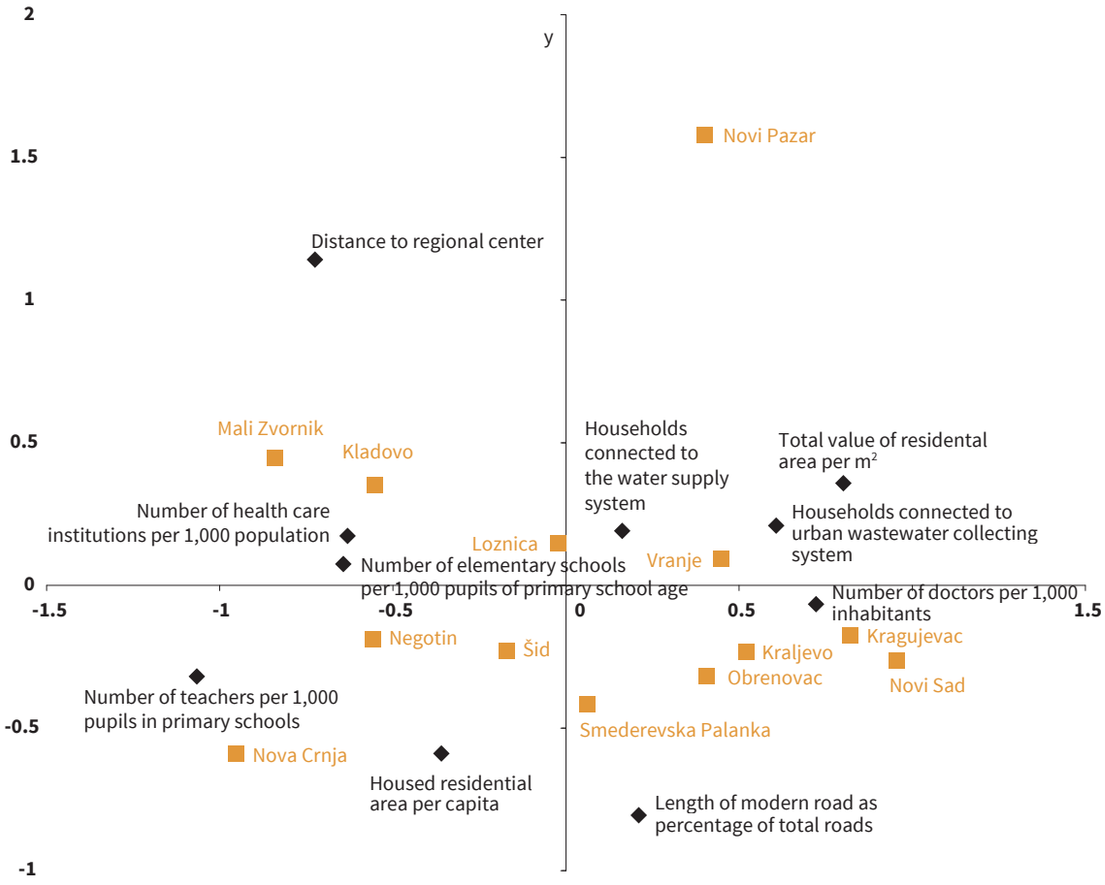
Looking at the position of the targeted municipalities on the physical indicators, the following points can be made (figure 12). First, the municipalities of Nova Crnja, Mali Zvornik, Negotin and Kladovo have a high number of teachers in primary schools per 1,000 pupils, a high number of primary schools per 1,000 pupils of primary school age, and a high number of health care institutions per 1,000 people. By contrast, Novi Sad, Kragujevac, Kraljevo and Vranje have poor educational and health infrastructure in terms of number of schools, teachers and health care institutions relative to their number of pupils of primary school age, i.e. their population.

Yet, these same municipalities (Novi Sad, Kragujevac, Kraljevo and Vranje) have a high number of doctors per 1,000 inhabitants, but also a large total value of residential area per square metre, and a high number of households connected to the urban wastewater collecting system. All of these can be seen by looking at the first dimension – the horizontal axis (*x-axis*).

It can be concluded from the second dimension, the vertical axis (*y-axis*), that Novi Pazar is characterized by being far from the regional centre, but also shows low values on almost all indicators within physical capital. In contrast, Nova Crnja, Smederevska Palanka and Obrenovac stand out as superior municipalities in terms of their percentage of modern roads out of the total number of roads.

Within the realm of physical capital, Loznica and Šid are positioned as average municipalities.

Figure 12.
Physical capital



Physical capital is another important dimension for stimulating the overall resilience of Serbian communities. The CRI analysis shows that most of the 13 municipalities have weak physical capital.

Resilience of the municipalities in terms of physical parameters – The findings allow to conclude that the advantage of Mali Zvornik, Negotin and Kladovo is related to their high number of primary educational and healthcare facilities that can be used as care centres in the case of a natural disaster. In contrast, special attention should be paid to Nova Crnja, because its facilities might be in great danger if they are not constructed in a way to enable them to resist more intensive floods and earthquakes.

Novi Sad, Kragujevac, Kraljevo and Vranje are in danger of significant human and material losses in the case of natural disasters due to their high total value of residential area per square metre. Although not superior in terms of educational and healthcare facilities, these cities stand out for their high number of doctors compared to their population size, which is certainly of paramount importance in responding to natural catastrophes.

Characterized by the large distance from the regional centre and bad road infrastructure, Novi Pazar is is poorly located for providing assistance in the case of natural disasters. On the contrary, the good road infrastructure and short distance to the regional centre are the main advantages of the municipalities of Nova Crnja, Smederevska Palanka and Obrenovac, and key components of their physical resilience.

The analysis did not generate enough information for the municipalities of Loznica and Sid. Together with economic and natural capitals, physical capital distinguishes and affects the municipalities' overall CRI positioning. Physical capital is another important dimension for stimulating the overall resilience of Serbian communities. The CRI analysis shows that most of the 13 municipalities have weak physical capital, although there are important differences between them.

HUMAN CAPITAL

The indicators used for calculating human capital include the share of the population aged over 15+ with secondary and higher education, the elderly and dependent populations, population density, literacy levels and the share of the welfare beneficiaries in the total population, among others. These main human capital indicators are presented in table 11.

Table 11.
Human capital indicators

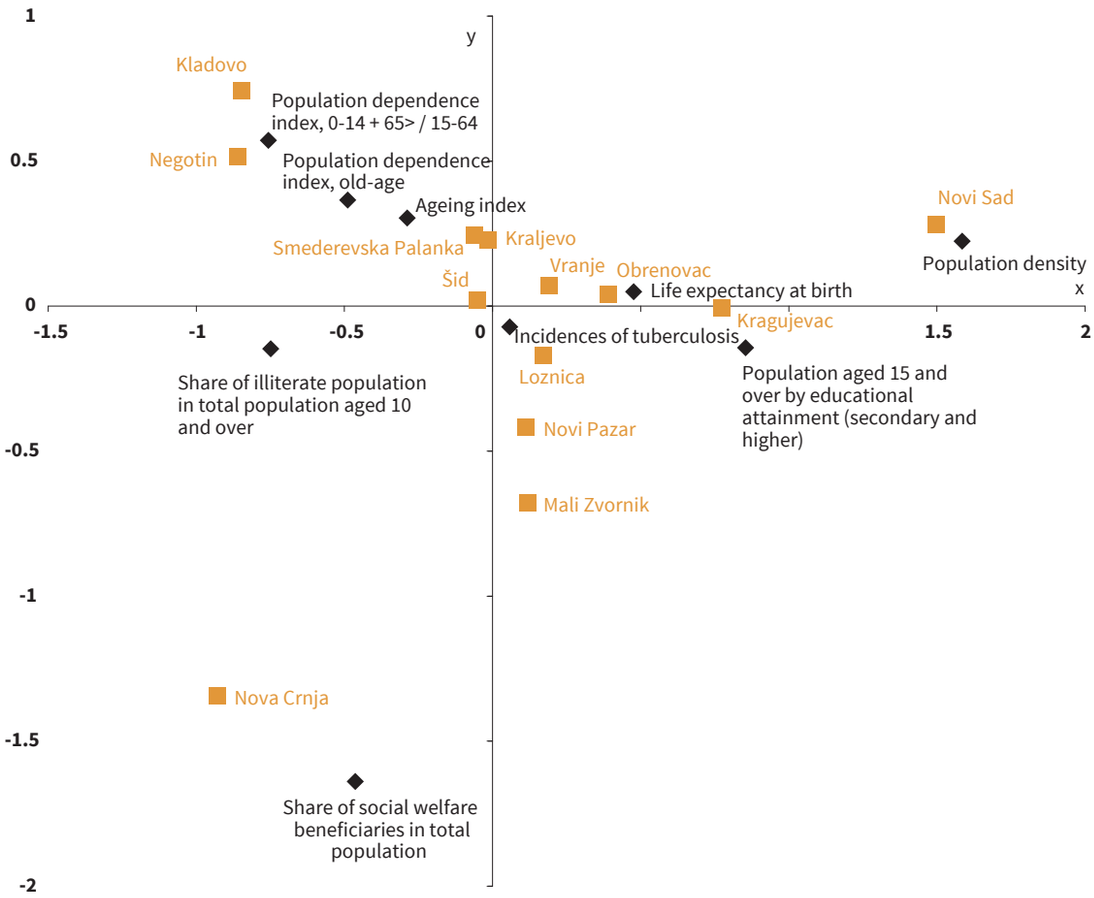
HUMAN CAPITAL			
Mark	**Indicator**	**Measurement unit**	**Orientation**
V1	Population density	per 1 km^2	Positive
V2	Aging index	Index	Negative
V3	Population dependence index, 0-14 + 65> / 15-64	Index	Negative
V4	Population dependence index, old-age, 65> / 15-64	Index	Negative
V5	Life expectancy at birth	Years	Positive
V6	Share of social welfare beneficiaries in total population	%	Negative
V7	Incidences of tuberculosis, per 100,000 population	Rate	Negative
V8	Share of illiterate population in total population aged 10 and over	%	Negative
V9	Population aged 15 and over by educational attainment (secondary and higher)	%	Positive

Kladovo and Negotin have the largest share of dependent population.

Speaking about the human potential of the targeted municipalities, clear distinctions among them can be made. As figure 13 shows, when looking at the horizontal axis (*x-axis*), Novi Sad and Kragujevac are the municipalities with the highest share of population aged 15+ with secondary or higher education and population density, which is not surprising considering their total population size. By contrast, Kladovo and Negotin have the largest share of dependent population, irrespective of whether all dependent inhabitants (children and older population) or only the older population are taken into consideration. Also, these two municipalities (Kladovo and Negotin) as well as Nova Crnja have a high share of illiterate population in the total population aged ten years or over. Additionally, looking at the vertical axis (*y-axis*), the analysis shows that Nova Crnja and Mali Zvornik are faced with the problem of a high share of social welfare beneficiaries from the total population.

It is difficult to categorize all the remaining municipalities on the basis of the given indicators for human capital.

Figure 13.
Human capital



The high share of social welfare beneficiaries from the total population in Nova Crnja and Mali Zvornik indicates that poverty can be easily aggregated as a consequence of natural catastrophes. With respect to Novi Sad and Kragujevac, their population densities seem to be an aggravating factor in cases of natural disasters.

Kladovo, Negotin, and Nova Crnja have a high share of illiterate population out of the total population aged ten or more years, which disrupts human capital in these municipalities.

Human capital, as well as social and institutional capital do not show a discriminative value according to the CRI; only economic, physical and natural capitals affect the overall CRI positioning of the municipalities.

Resilience of the municipalities in human parameters – The analysis points out that inhabitants of Kladovo and Negotin are particularly vulnerable to natural disasters because of the high share of dependent population in the towns' overall populations. The high share of social welfare beneficiaries from the total population in Nova Crnja and Mali Zvornik indicates that poverty can be easily aggregated as a consequence of natural catastrophes. With respect to Novi Sad and Kragujevac, their population densities seem to be an aggravating factor in cases of natural disasters, since even localized disasters can have an impact on a significant number of their inhabitants.

Moreover, Kladovo, Negotin, and Nova Crnja have a high share of illiterate population out of the total population aged ten or more years, which disrupts human capital in these municipalities.

The analysis did not generate enough information for the municipalities of Šid, Kraljevo, Obrenovac, Smederevska Palanka, Loznica, Novi Pazar and Vranje.

Therefore, human capital does not show significant discriminative value according to the CRI. However, further analysis despite limited insights, shows the importance of human capital for assessing resilience from a specific community perspective.

SOCIAL AND INSTITUTIONAL CAPITAL

Social and institutional capital were calculated based on the following indicators: political participation within the municipality (percentage of voters who voted in local elections), telephone subscribers, dropout rate from primary education; they were extended to include some other parameters of local institutional development. These social and institutional capital indicators are presented in table 12.

Table 12.
Social and institutional capital indicators

SOCIAL AND INSTITUTIONAL CAPITAL			
Mark	**Indicator**	**Measurement unit**	**Orientation**
V1	Telephone subscribers	%	Positive
V2	Coverage of children by the preparatory preschool programme	%	Positive
V3	Primary school - dropout rate	Rate	Negative
V4	Convicted adults by location of committing criminal offence, per 1,000 population	%	Negative
V5	Number of children in conflict with the law	%	Negative
V6	Computer literacy	%	Positive
V7	Percentage of voters that voted on elections for deputies of the municipal and city assemblies	%	Positive
V8	Ability to produce and implement local development strategies*	Rank	Positive

Note: *This is the only indicator not considered in the analysis because of its low discriminative ability – all 13 municipalities have a ranking of 0 or 3 on this indicator.

The proxy of political participation is the only indicator selected by the CRI to reflect the social capital concept. Based on this, Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac and Kraljevo are characterized by a high percentage of voters that voted in local elections.

By comparing the targeted municipalities on the indicators representing their institutional potential**,** the following patterns can be noted. The horizontal axis (*x-axis*) in figure 14 shows that Negotin and Kladovo are affected by a high primary school dropout rate when compared to all the remaining municipalities. The majority of them (especially Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac, Kraljevo) are on the contrary noted for the high level of coverage of children by the preparatory school programme.

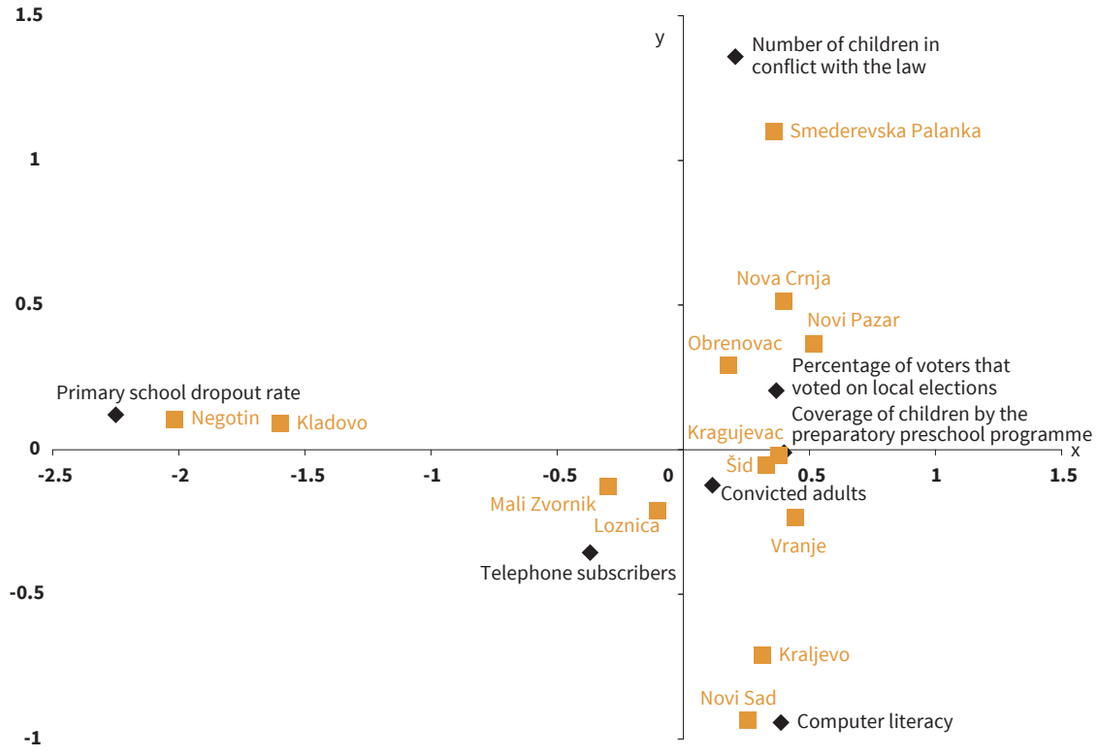
When the vertical axis (*y-axis*) is observed, Novi Sad and Kraljevo have a high share of computer literate population. Smederevska Palanka has an exceptionally high number of children in conflict with the law.

Loznica, Mali Zvornik and Obrenovac are not well differentiated from the remaining municipalities in terms of selected indicators.

The proxy of political participation is the only indicator selected by the CRI to reflect the social capital concept. Based on this, Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac and Kraljevo are characterized by a high percentage of voters that voted in local elections. On the opposite pole are Negotin and Kladovo, characterized by a lower level of political participation.

Again, analysis did not generate enough information for the municipalities of Loznica, Mali Zvornik, Obrenovac, but also Novi Sad.

Figure 14.
Social and institutional capital



The proxy for measuring social capital was reduced to political participation within the municipality - percentage of voters that voted in local elections (see table 12), while assessment of social capital is usually based on indicators depicting trust, norms and networks.

The limited data at the municipal level constrained insight into the value of social capital in safeguarding communities from natural disasters, which is one of the CRI limitations.

Resilience of the municipalities in social and institutional parameters – The high level of coverage of children by the preparatory preschool programme in Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac and Kraljevo indicates the general positive attitudes of citizens towards the municipalities in which they live. As a part of their broader inclusive culture, this potentially increases their institutional resilience. By contrast, Negotin and Kladovo have an issue with high primary school dropout rate. This indicates that certain minority and vulnerable groups are overlooked by the local municipal authorities, making them more exposed to risks during natural disasters.

Novi Sad and Kraljevo stand out in terms of the percentage of computer literate people, which becomes particularly important in the new digital era where information is quickly and easily transmitted through the Internet, playing an important part of the disaster warning system.

The analysis of institutional capital did not generate enough information for the municipalities of Loznica, Obrenovac and Mali Zvornik.

The following connection between social characteristics of the municipalities and their resilience can be made: Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac and Kraljevo have a high percentage of voters who voted in local elections, indicating their high political participation. High political participation might be correlated with their greater civic participation, which is highly important in all of the actions in response to natural disasters, irrespective of whether it concerns prevention or disaster response, or coping with the consequences. In this regard, special attention should be paid to Negotin and Kladovo, which are not high on this indicator.

The analysis of social characteristics did not generate enough information on the municipalities of Loznica, Obrenovac, Mali Zvornik and Novi Sad.

Social and institutional capital is one of the principal blocks in the capital-based approach to measuring resilience. However, in the case of the CRI for Serbia, social and institutional capital are not a differentiating factor in the overall CRI. Thus, social capital seems to be unimportant for the resilience of municipalities.

Due to the lack of available data at the municipal level, it was difficult to fulfil of conceptual requirements for social capital. The proxy for measuring social capital was reduced to political participation within the municipality - percentage of voters that voted in local elections (see table 12), while usually assessment of social capital is based on indicators depicting trust,

norms and networks. Although social capital was assessed by only one indicator that falls under social capital conceptual pillar, its relevance for the community resilience concept has been observed.

The limited data at the municipal level constrained insight into the value of social capital in safeguarding communities from natural disasters, which is one of the CRI limitations. The follow-up NHDR qualitative analysis shows that social capital plays a more important role when assessed as a separate feature of resilience and when based on aspects depicting trust, norms and networks.

CONCLUSION

Measuring the resilience of communities is a challenging task. Consensus about the unique characteristics of resilient communities is hard to reach in both policy and research circles. But if resilience is understood as a relative term, the viable solutions for measuring it can be yielded. Relative resilience is measured against specific contexts featured with specific risks and vulnerabilities.

A capital-based approach is increasingly used in attempts to measure resilience in the fields of sustainable development and poverty alleviation. It is mainstreamed to assess resilience through analysis of a number of capitals in a given context (units of analysis), usually economic, natural, physical, human and social capitals. Within the framework of this approach, the social capital component is given increasing recognition in boosting potentials for community resilience. Trust, norms and networks as components of social capital are seen as boosters in safeguarding communities from the different shocks they are exposed to.

Based on this approach, the CRI for Serbian towns and municipalities was developed. Further analysis scrutinizing the 13 selected municipalities was applied for this report. These first steps in measuring resilience in Serbia have demonstrated that economic and physical capitals are the main differentiating factors for the overall resilience of Serbian municipalities. While these capitals are undoubtedly vital for building up resilience, their positioning on the capital ladder is additionally influenced by the wealth of data available on economic and physical capital indicators for each municipality in Serbia.

As analysis in this chapter indicated, social and institutional capital as elements of the CRI do not appear to be significantly differentiating factors for the overall municipal positioning, but the differences occur when examining the resilience of the 13 municipalities factoring in these specific capitals. And yet, this aspect of community resilience in the Serbian context is under-researched and not the focus of policy. Moreover, the lack of interest in looking into the potentials of social capital for community resilience, and the lack of available data at the local level constrains the orientation towards this resilience factor. This is the reason that the role of social capital in community resilience requires further investigation and in-depth focus to complement insight into the factors of community resilience to natural hazards in the context of Serbia.

CHAPTER 2.
COPING WITH NATURAL DISASTERS IN SERBIA: SOCIAL CAPITAL IN ACTION

What is the role of social capital and its manifestations in building community resilience to natural disasters in Serbia? How does the manifestation of social capital act as a DRR resource in the communities? In addressing these questions, this chapter establishes a direct link between social capital, resilience and DRR principles in Serbian municipalities. It unpacks the importance of social capital for the resilience of communities by presenting research findings on the role of communication, partnerships and coordination, solidarity through volunteerism, humanitarian aid provision, social inclusion and trust.

Based on the evidence from the field research, the first section of the chapter discusses communication and information sharing through four phases of DRR (prevention, preparedness, response, recovery). It provides insights into the role of the municipal Emergency Situations Headquarters (ESHQs) in communicating with citizens in their communities, through the traditional media channels and the EWS. Information sharing between citizens is also presented. The role of social media, alternative ways of communication and word of mouth is brought to light.

The following section presents the findings on the importance of partnerships in enhancing the resilience of local communities. Partnerships between national and local DRR systems, between ESHQs and community, and between various non-state actors (civil society organizations, the private sector and citizens) are in focus.

The next section entails the research findings on citizens' engagement and volunteering The potentials of the local community to self-organize in moments of crisis are assessed as well as solidarity through volunteerism (including the collection of humanitarian aid) is further assessed.

The following section portrays aspects of social inclusion in the DRR system and local community, and the linkage to resilience. Gender aspects and solidarity towards vulnerable groups are also brought into focus. The final section of this chapter encapsulates the significance of trust as a community resilience litmus test, as it infuses all the bricks of the resilience wall in the domain of social capital.

COMMUNICATIONS: THE ROLE IN RISK CONTROL

Within the local DRR framework in Serbia, communication and information sharing largely relies on the activities of the main local DRR actors.

Communication as a means of connecting people is one of the key manifestations of social capital (Grootaert and van Bastelaer, 2001). Media, citizens, the private sector, public institutions are all participants in the communication process. They not only exchange information, but also aim to reach a mutual understanding. The reliability, inclusiveness and timeliness of information speak for the existence and flow of social capital at various levels in a community. The quality of information sharing between different actors and groups in a society indicate to what extent social networks, formal and informal, are developed and functional.

Within the local DRR framework in Serbia, communication and information sharing largely relies on the activities of the main local DRR actors: ESHQ and local representatives of the Sector for Emergency Situations (SEM) of the Ministry of Interior (MoI). ESHQ as a representative of the local self-government and the local SEM, sets and implements the DRR policy for its community and is responsible for risk prevention and preparedness

(including risk awareness), emergency situation management and recovery as well as for proclaiming emergency situations (Official Gazette of the Republic of Serbia, 2009a; Republic of Serbia, Government Office for Reconstruction and Flood Relief, 2015a)

Box 8.
Actors in the local Emergency Situation Headquarters

Although the local Emergency Situation Headquarters (ESHQs) does not rely on the same organizational structures in each municipality/city, there is a common nucleus represented in each local community. It consists of the Commander and Deputy Commander of the ESHQ, embodied in the President of the Municipal Chamber or Mayor of the city, and the Deputy President of the Municipal Chamber/Deputy Mayor of the city, then chief of the ESHQ and the members of the ESHQ. In most cases, other members come from the local self-government public/utility companies (infrastructure maintenance, energy, etc.), the communal inspection services, urban planning offices, central government branch offices, or institutions mandated to act in specific areas (such as social protection, health, agriculture, water and forest management, environmental protection, interior), the Red Cross, fire department, etc. In some instances, the local disaster risk reduction (DRR) and emergency management infrastructure is filled with representatives from the business sector and civil society organizations (CSOs).

Other important actors are general-purpose civil protection units, which are to be established by the local self-governments (LSGs). They are formed as temporary units at the *mesna zajednica* (community council) and are based on voluntary engagement. They are the closest link to the citizens within the local DRR system and are in charge of risk preventive and responsive measures, and the spread of risk-related information. The communication channels on which the local DRR officially relies are the media and EWS.

In the vast majority of sampled municipalities, information about risks or threats from hazards, which should enhance citizens' awareness and secure their prompt action, was beyond citizens' reach.

RISK PREVENTION AND RISK PREPAREDNESS

Sharing information about local risk assessments, risk plans and preparedness strategies with the wider community is one of the key tasks of the local DRR actors in Serbia. Yet, the evidence shows that in the majority of municipalities, information sharing on the community risk profile is non-functional because there is a lack of finalized risk assessments. At the time of the research, most of the sampled municipalities had not completed their risk assessments, including Obrenovac, which at the time of the visit was working it.

Consequently, DRR actors are only partially informed about context-specific risks and usually have developed plans for some risks but not for others. For example, 11 out of 13 municipalities have prepared plans in case of floods, but in this groups are missing municipalities with the highest vulnerability to floods, such as Obrenovac and Smederevska Palanka. Potential earthquakes are addressed in Kragujevac and Kraljevo, but not in the other municipalities vulnerable to this risk. Three out of eight municipalities conducted mapping of landslides, while only in a few municipalities forest fires were recognized as a threat, despite their continuous occurrence.

In the vast majority of sampled municipalities, information about risks or threats from hazards, which should enhance citizens' awareness and secure their prompt action, was beyond citizens' reach. This was the case even in cities that have developed risk assessments (Novi Sad, Kraljevo, Kragujevac). These documents are often treated as official documents, accessible only by relevant institutional officials and bodies in the DRR system. The evidence from the field shows that there is a lack of risk-informed planning, based on accessible and accurate systems of communication for hazard threats, for all population groups.

Box 9.
Risk assessment and risk plans

One of the key roles of the local disaster risk reduction (DRR) system is to assess local vulnerability to natural disasters. The assessments feed into risk reduction, response and recovery mechanisms at the grassroots level. Risk assessments also provide information about the exposure of people, livelihoods and economies to certain hazards, and the capacities of different population groups to deal with risks and assist in risk response and recovery.

In sum, **vulnerability assessments** should indicate how vulnerable the particular community and its population are, defining at the same time the risk management measures. These assessments are required by DRR legislation and should be performed from the central to local governance level.

A number of laws prescribe the mandatory activities for local self-governments in terms of the organization of institutions and development of **risk assessments, plans and strategies**, as well as local bodies to deal with these issues. Key legislation that is guiding local DRR work is embedded in the Law on Emergency Situations (2009), the Law on Fire Protection (2009), the Law on Health Protection (2005, 2009, 2010), the Law on Water (2010), the Law on Meteorological and Hydrological Activity (2010) and the Law on Forests (2010), among others.

RISK RESPONSE: EARLY WARNING

The early warning system

In addition to risk knowledge, risk awareness, and risk monitoring, one of the main features of an effective EWS is the quick dissemination of information and communication within the system and with different community actors and groups. When disaster hits, effective information sharing through the EWS not only saves lives, but also increases the risk protection levels for the community, simultaneously decreasing any potential economic and social shortfalls.

. When disaster hits, effective information sharing through the EWS not only saves lives, but also increases the risk protection levels for the community.

Forecasting upcoming natural disaster is in the hands of the relevant monitoring institutions such as the Republic Hydro-Meteorological Service of Serbia (RHMSS), the Ministry of Agriculture and Environmental Protection – Directorate for Water, and/or the Seismological Survey of Serbia. Early warnings should then be issued by the MoI, the National 112 Centre and the media. The National 112 Centre is an institutional channel to disseminate early warnings to regional, district and local DRR systems.

The research findings show that direct channels of communication between RHMSS and MoI Operational Centres, on the one side, with the local ESHQs on the other side, allow information to be spread quickly. As noted, in the municipality of Loznica, this immediately intensified preparations for the upcoming risks:

We received the data from the RHMSS through the sector for emergencies, also more specific warnings followed later on ... We knew that we should make preparations; we started counting how many sleeping bags and beds we had, which we later placed at the disposal of the police and army personnel.

Early warning system (EWS) by the MoI still comes through the Republic Operational Centre (1985). Yet, the research shows that this number is unknown to the majority of citizens in different cities and towns in Serbia (e.g. Mali Zvornik, Loznica, Novi Pazar, Negotin, Kladovo).

In other cases, communication between the local ESHQ and the EWS issuing authorities failed. Although early warning information was issued, it was neglected by the ESHQ. This delayed preparatory actions for defence from the floods. A representative of the local ESHQ in Mali Zvornik highlighted that the whole situation was taken lightly. "*But, even if we did take the EWS seriously, it would not matter much, we could not prevent what eventually happened, because the water came from an unexpected direction.*"

The majority of respondents indicated that warning sounds were strongly associated with the sirens used during the 1999 air attacks.

However, some ESHQs experienced a total lack of early warning information or this information was disseminated with delay, which affected the proper reaction to the upcoming risk. One of the explanations for such an occurrence is that the meteorological and hydro forecast system in Serbia is still not capacitated to predict torrential floods, as is the case in many other developing countries (UNISDR, 2006).

Communication of the local DRR authorities with non-state actors and the community as a whole is another important EWS segment. Although the Law on Emergency Situations (Official Gazette of the Republic of Serbia (2009b) anticipated the development of the National 112 Centre, the Centre is still "under construction".[32] For this reason, the dissemination of information of the EWS by the MoI still comes through the Republic Operational Centre (1985). Yet, the research shows that this number is unknown to the majority of citizens in different municipalities and towns in Serbia (e.g. Mali Zvornik, Loznica, Novi Pazar, Negotin, Kladovo).

The experiences from the 2014 floods show that early warnings for the upcoming disaster were not disseminated throughout the audio warning system – available sirens in the local community – largely due to lack of maintenance or their total unavailability. In the words of the Kladovo ESHQ representative, the EWS dissemination tools are technically under-capacitated, outdated and not adjusted to the particular local context and needs:

The warning system downstream from the Djerdap power plant is only now being built, partly because of what we experienced and partly because it is required by current legislation. It is only now that warning systems are being developed that can be used by municipal administrations as well. Until recently, we had nothing to work with in case of a major flood.

A similar standpoint was presented by an ESHQ representative in Novi Pazar:

These systems are out of date in all towns in the Republic of Serbia; we have no new sirens. The law required a new study to be made to examine the coverage (by sirens) of local settlements, since their distribution and perceptibility of warning signals has changed. The systems we have are in bad shape, and their working order is questionable: some still work, but most of them do not.

The issue of early warning through sirens further raised questions about the types of sounds to be used to warn about upcoming floods or any other natural disaster. The majority of respondents indicated that warning sounds are strongly associated with the sirens used during the 1999 air attacks. For instance, the ESHQ representative from the city of Kragujevac stated:

We have sirens that are 20 or 30 years old. We try to keep them in working order; however, bearing in mind what happened in May 2014, the truth is that such a warning system would not have been of much use; just imagine airing a siren sound that will remind the people of the 1999 air attacks. Also, we have no proper regulations in place [on] which siren sounds to use: the evacuation signal or the air raid signal.

Early warning and the media

Early information sharing to citizens about potential risk is always spread via local media, radio and television stations. The dissemination of regular and timely information through this channel was dependent on the timely coordination and cooperation of the ESHQs with media representatives. As noted by the Loznica ESHQ representative: "*At first we used the media. The ESHQ kept issuing media announcements that the area was under threat of a natural disaster ... We closely monitored the Drina River and other waterways and forecasts. We kept track of what was going on every hour.*"

In Serbia, risk awareness to a great extent relies on collective risk knowledge and information about previous risk experience. As shown in all municipalities, memory of past events plays an important part in individual and collective risk response.

Yet, in the case of occurrence of unexpected risk, the community response turned out to be much weaker.

The accuracy and availability of information through media channels differ in the visited municipalities. Some of the participants in the research claimed that there was information available about the localities of disaster, the need for evacuation, guidelines on the development of the crisis, appeals for collection of humanitarian aid and the need for the engagement of volunteers in particular localities. In Kladovo, the work of the media was praised:

... [I]n any case, the information kept coming in rapidly, Radio Kladovo and TV Kladovo kept broadcasting around the clock, and what mattered the most, they were reachable, in spite of Tekija and Brza Palanka being cut off. We also had the media broadcasts from Belgrade and Bor; they kept us well informed every step of the way. No one can say that information was not available; Only if you did not listen to Radio Djerdap and did not watch TV Kladovo. Although there was this one day when no information was available at all, but we still received updates through TV and telephone wires. Radio Djerdap was with us all the time.

In Mali Zvornik, a reporter at the local radio station explains:

I was in a position to see it all up close and to pass the information on, thanks to this intervention that came at the crucial moment when we lost telephone communications, Internet… Actually, at one point, all the means of communication broke down because of an accident on one of the roads. Still, some people had cell phones connected to other provider networks, and we managed to exchange at least some info. Since I am also a member of the municipal headquarters for emergencies working in coordination with the mayor, I used this opportunity to send out a call for help using the Internet, and that started the whole thing.

In some towns and municipalities, citizens had the possibility to follow direct broadcasting of the ESHQ meetings on local television stations such as in Kragujevac and Kraljevo. Still, according to some interviewees, due to the politicization of emergency situations and self-censorship of the local media, information was not taken seriously by the citizens, which affected an adequate reaction of citizens to the emergency.

Early warning and collective risk knowledge

In Serbia, risk awareness to a great extent relies on collective risk knowledge and information about previous risk experience. As shown in all municipalities, memory of past events plays an important part in individual and collective risk response, especially when the occurring natural disaster has familiar characteristics to the preceding one(s). In these cases, communities capitalize on the collective knowledge of the expected risk, as described in the municipality of Smederevska Palanka, by one of the ESHQ members:

... I was there in '99 when the flood hit. I was in a position to learn something from my experience back then. I think that this time we responded in a much, much better way, compared to '99. A lived experience is something that one cannot learn from books. And I believe that this time we acted exactly the way an emergency HQ should act.

Yet, in the case of occurrence of unexpected risk, the community response turned out to be much weaker. During the 2014 floods in Serbia, this was exactly the case: the municipalities prepared themselves for flooding based on previous experience from major rivers; however, they ended up being caught in flashfloods. Unexpected fast flooding was difficult to predict, which affected the risk response in May and September 2014 in most of the municipalities, but far greater in Obrenovac, Mali Zvornik, Kladovo and Loznica.

In the words of the ESHQ member from Obrenovac, everyone remembered the 1981 floods, which is why everyone was overconfident:

They remembered somebody's grandfather telling them of a flood that never reached their courtyards, let alone the thresholds, and then a new flood hits and suddenly the water is 2.20m high inside their homes. Also, in the villages along the Kolubara river, which were flooded in 1981, people shared stories about the flood reaching as far as their stables. So, all they had to do was to move the cattle uphill, but the truth is that the flood destroyed everything. It is a natural disaster, and people make preparations for the future based on their past experience. But when a flood comes, no one can know how far it will go, because nothing like this happened in the past. The elderly members of the local households made things worse with their predictions that were far detached from what was actually happening in the field.

A similar experience was presented in Kraljevo. This city was hit by an earthquake of 5.4 magnitude on the Richter scale in November 2010.[33] For the Serbian natural disaster context, this was a strong hit and largely unexpected, as indicated by both institutional representatives and other participants of the focus groups. As stated by an ESHQ member:

Before that, nobody even thought this could happen. And we needed to cope with this on our own. We didn't even have instructions from the higher levels in this system because no one had experienced anything like this for a long, long time, [nothing] like the experience we had in Kraljevo in 2010.

As accounts from the field showed, local community risk knowledge to a certain extent can substitute for the frail EWS, but only in the occurrence of expected risks.

RISK RESPONSE

Local DRR system and information sharing

The local DRR system deployed different means of communication among ESHQ team members during the risk response phase. In some municipalities, such as Loznica and Obrenovac, mobile field units were formed that gathered information about the severity of disasters directly from the field. This practice was explained by one of the ESHQ representatives from Loznica:

... [W]e had teams dispatched to specific locations in our territory, which covers 612km^2, including the town of Loznica and some of the hardest hit spots. The teams usually had three members. We had five or six mobile teams surveying the area, reporting to HQ, taking part in the meetings and implementing the necessary measures. Then the team members would go out again to keep monitoring the situation, assessing the need for sand bags, locating potential breaches on the embankments that needed fixing and people who needed evacuation.

As recounted, local civil protection trustees in several municipalities where they had been established (Smederevska Palanka, Obrenovac, Novi Pazar, Kraljevo) enforced local capacities in the fast dissemination of information. Importantly, they also gathered information from the citizens and provided it to the ESHQs for mutual action in responding to the upcoming hazard. As noted by the representative of the ESHQ in Novi Pazar:

When we had that emergency in 2012, this huge snowfall, certain areas were cut off, parts of town in higher altitudes and some villages. Our local council representatives knew everything; they knew that in this particular house was a man who lived alone and had no food. ... Thanks to them we had some feedback and were able to reach people who were in danger.

The work of situation centres as a means of information transfer in crisis situations was significant, such as in Loznica and Kragujevac. Situation centres gathered and spread information within the local system of DRR towards the citizens and also served as a means to gather information from the citizens about the endangered parts of settlements. Yet, most towns and municipalities have not set up the situation centres as a form of organization and management of information. As an ESHQ member from Novi Sad stated:

The town of Novi Sad should have had this a long time ago for its own emergency needs and daily communication. ... The question is not just whether these situation centres will be established, but also how they will be operated: are they going to work for 8, 12 or 24 hours, periodically, when a need arises or in case of emergency? Every local government body needs a centre of this type, especially

in emergency situations. We had a centre of our own, but it was not yet called a situation centre. This is what we need to do to improve the level of protection, especially through preventive measures.

Informal and alternative means of information sharing

Citizens and CSO members in the visited municipalities often indicated that they were faced with a lack of information about the nature of the disaster and the steps needed to be undertaken by parties in the system. Instead, the strength of 'word of mouth' proved to be dominant at multiple levels of networking in times of crisis. Informal networking actively supported the information flow between citizens, but also between citizens and members of the local DRR system. This was evident in both small- and medium-sized municipalities (e.g. Kladovo, Nova Crnja, Loznica, Mali Zvornik, Smederevska Palanka, Vranje, Kraljevo, Kragujevac, Novi Pazar) where these informal networks of friends, relatives and neighbours are prevalent.

Informal networking actively supported the information flow between citizens, but also between citizens and members of the local DRR system.

According to a member of the ESHQ in Kladovo:

One could go to the market place on Wednesday or Saturday and gather all necessary information on the situation in Brza Palanka and Tekija, because there were people bringing stuff to the market by boats. And in situations like these, what works best is this, so to say, the human network ....

The strength of social media was also reflected in the spreading of information among the youth population.

A similar point of view was shared in Kragujevac: "*The key channel of communication was mouth to mouth; people hear something and tell other people about it.*"

Almost all participants in the focus groups underlined that the most objective source of information in their communities is other people. An ESHQ member in Kraljevo explained:

In some situations, alternative means of communication were put in place due to interruptions in mobile telephone networks and electricity.

As for the media, I must say that I take their reports with a grain of salt, because they keep showing these images and we all have seen them so many times. I, for one, am fed up. I am more willing to trust the people sitting here and telling it as it happened than those commentators.

During the emergency situation, DRR authorities continued to share information with the public via local media, especially the social media. They fostered a quick dispersal of information when electricity was still unavailable in places hit by the natural disaster. The strength of social media was also reflected in the spreading of information among the youth population in almost all municipalities, which then impacted on the spectrum of mobilization of young volunteers to provide aid in risk response and later in recovery.

Box 10.

Links between statistical analysis and field research: computer literacy and social media

As the additional analysis based on the Capitals for Resilience Index (CRI) shows, increased computer literacy is a characteristic of larger towns such as Novi Sad and Kraljevo. This contributes to faster and more robust spreading of information. The field research additionally shows that the spread of information via social media was also remarkable in many other municipalities affected by the 2014 floods. For example, in Mali Zvornik, frequent and up-to-date information was duly shared through social networks and the most active *Mali Zvornik Informative Portal.**

Note: *Mali Zvornik
See: www.malizvornik.info/?lang=lat.

Misinformation spread via social media was also one of the issues during the 2014 floods. For instance, the mobilization of volunteers and aid collection was in some cases disrupted by posts on social networks that misguided volunteers and aid providers in Novi Sad. Collected money and assets have never reached those that needed help.[34]

In some situations, alternative means of communication were put in place due to interruptions in mobile telephone networks and electricity. Although the radio amateurs were active only in two visited municipalities – Kladovo and Obrenovac, their significance was crucial in transferring information when other means of communication were cut as a consequence of the disaster. These practices resulted in the successful and fast spreading of information as a representative of the ESHQ from Kladovo stated: "*The truth is that communication was a problem, everywhere. Of course, it is expected in emergencies, no electricity, no telephone communications, and so on. The amateur radio operators proved to best a most valuable asset [for information spread in our community].*"

In Obrenovac, all means of communication were also compromised. An Obrenovac ESHQ member explained:

When the telephone lines broke down, we had no way of knowing how far the flood spread and we could not get in touch with our teams. In the end, everything hinged on how much battery life one had left in one's phone. We then relied on radio amateurs ....

Since the local DRR system was blocked in some locations and could not rely on national assistance, information exchange entailed reaching out to cross-border DRR local systems, as was the case in Mali Zvornik, Šid and Kladovo. It also entailed cooperation and communication with the neighbouring municipalities. Information exchange in this area mainly involved activation of informal networks of communication. A number of less affected municipalities became actively involved in helping and organizing assistance for those most in need, most active being Novi Sad and Kragujevac.

As evidenced by the research, in the recovery phase, the magnitude of information sharing shrank.

RECOVERY

As evidenced by the research, in the recovery phase, the magnitude of information sharing shrank. Information sharing at the institutional level was mainly between local and national DRR representatives on recovery strategies to be implemented at the local level. Some ESHQs shared information on recovery processes and results through their websites (Obrenovac, Mali Zvornik, Kladovo). Some also engaged community councils in communication activities about humanitarian aid and recovery (Novi Pazar, Šid, Nova Crnja, Kraljevo). In most cases, the ESHQs continued to communicate with citizens through the local media, primarily TV and radio, informing them about progress in reconstruction works and recovery plans.

However, the decrease in the exchange of information with the public on the consequences of the crisis and recovery strategies was apparent. The loss of interest in recovery was also observed among citizens, unless they were directly affected by it. "*The interest of the public was shifted to other topics, and the interest in news about the floods was fading away*", highlighted a CSO activist from Obrenovac.

As pointed out on many occasions, the Government's Office for Reconstruction and Flood Relief was a reliable source of information on the overall efforts on recovery and reconstruction processes in Serbia before the end of 2015; the Public Investment Management Office, which took over of all rights and obligations from the previous Office, became the reliable source as of the beginning of 2016. The Office's website provides transparent information on all reconstruction efforts undertaken to date.[35]

* * *

The performance of the local DRR system and its impact on community resilience is conditioned by the ways that communication and information sharing is put in practice throughout all DRR phases. In Serbia, in general, there is a lack of information on risk prevention, mitigation and preparedness, and of information exchange between local ESHQs and the wider public.

Preparedness and early risk response to natural disasters depend on having context-based and timely information sharing through EWS mechanisms as a form of information exchange. Despite its vital role, the EWS in Serbia is a weak link in the DRR system in general, not only due to inadequate equipment and its availability, but also to the lack of capacities of communities and local governments to understand and disseminate timely information on hazards. These capacities are again dependent on the capabilities of local governments to assess and map potential risks. As a result, there was a considerable lack of information sharing on upcoming threats to citizens through systemic EWS channels.

According to evidence, local DRR systems duly relied on cooperation with the media in the early warning and general response phase. ESHQs' cooperation with the media was fair in most municipalities during the period of responding to crisis. Still, citizens showed distrust in the information channelled through the media.

When the system is disrupted, informal and alternative channels of communication take over. The networks within the system and in the community were thus additionally used for information dissemination. Relying on citizens' networks and word-of-mouth in sharing information in the community proved a common practice of the local ESHQs and the community in general, in both early crisis and the risk response phases. It was effective in most municipalities with both dense and dispersed populations and directly impacted on life saving and decreased damage.

However, communication through informal networks also has negative aspects. Information sharing on occurring disasters often relied on collective risk knowledge. Even when the risk is considerable, presenting an important manifestation of social capital, it cannot compensate for DRR procedures for dealing with risks in the local community. The category of unexpected risk caused the wrong community reaction, triggered by reliance on local risk knowledge and experience.

There are some good examples of local DRR response that relied on alternative means of communication. Kladovo and Obrenovac fostered information

sharing among ESHQ members and with citizens in times of crisis via radio amateurs. Prompt engagement of civil protection trustees in Kraljevo and Novi Pazar contributed to better information exchange between citizens and ESHQ at the beginning of the crisis. They had the key role in facilitating information about the level of risks in their communities, endangered territories and the people in need in assistance. The Situation Centre established in Kragujevac proved an efficient model of information exchange in various directions, from ESHQ to citizens and vice versa, including communication within the local DRR system.

Finally, recovery from the crisis is characterized by a decrease in information flow to the wider public. Prompt information on reconstruction plans, their implementation and financial flows for relief could be accessed through the responsible national institutions. However, the magnitude and dynamic of their transmission was not the same as in the previous DRR phase. At the same time, citizens' interest in the crisis diminished as well as in alternative and informal ways of communication and information sharing. This is understandable as the level of risk decreased and the interest of the public slowly shifted to other community topics.

PARTNERSHIPS: A VEHICLE TO ACCESS RESOURCES AND COMPETENCES

The more extended and decentralized the partnerships are across one community, in formal or informal ways, the stronger the overall community ties.

Partnerships and cooperation at various community levels are an indicator of the strength and the nature of social capital created in the community. Partnerships could be defined as relationships that involve the close and continuous cooperation between parties who agree on joint rights but also joint responsibilities. The more extended and decentralized the partnerships are across one community, in formal or informal ways, the stronger the overall community ties. Thus, partnerships are an indicator of the collective ability to deal with stressors through their established collaboration. As such, partnerships are a significant contributor to community disaster resilience.

In the DRR framework, the ESHQ is the key actor in building formal and informal partnerships and collaboration in the disaster risk domain. The activities include cooperation within the ESHQ mechanism, with national DRR actors, the private sector and CSOs from the community, and cooperation with citizens in all phases of the DRR cycle. The policy and legislative frameworks also anticipate the role of the mentioned non-state actors.

In risk prevention, as evidenced through the research, cooperation within the local ESHQ is sporadic.

Partnerships with non-state actors in risk prevention and preparedness are rare and rarely formally established, except with citizens in civil protection, or with the private sector in some municipalities (Loznica and Kladovo).

RISK PREVENTION AND RISK PREPAREDNESS

Cooperation within the DRR system

According to the reviewed documents and reports from the field, the ESHQs' work is normally subject to various regulations that that define the scope of work, organizational principles and the dynamic of ESHQs annual meetings, including the application of different models of work in case an emergency situation is declared. In risk prevention, as evidenced through the research, cooperation within the local ESHQ is sporadic. There are three or four annual number of meetings, or in some cases, there is no defined time frame for convening them regularly. Therefore, as repeatedly reported by the interviewees, one of the common characteristics of the ESHQs' work is ad hoc organization. As the research results show, this is more common for local communities that are smaller and population. The bigger communities such as Novi Sad and Kragujevac build the ESHQs' work in a more structured fashion and meet more often.

Although the national DRR system has a monitoring role and is in charge of controlling local DRR actors with respect to their risk preparedness, cooperation between ESHQ and national DRR actors is also irregular. Most often, it is based on a lopsided exchange of information on the obligations of local communities to establish an effective local DRR system.

Partnerships with civil society organizations and the private sector

Partnerships with non-state actors in risk prevention and preparedness are rare and rarely formally established, except with citizens in civil protection, or with the private sector in some municipalities (Loznica and Kladovo). These partnerships are established through contracts that define their obligations and responsibilities during crisis situations. This is the only evidence of private sector participation in the DRR phases of preventing and mitigating risk including risk preparedness.

Although the roles of CSOs, humanitarian organizations, academic and research institutions, the media and the private sector in prevention and disaster reduction activities are envisaged by the DRR policy and legal framework, collaboration with these non-state actors is evidently missing in risk prevention. Only a few organizations such as the Aarhus Centre network, based in Novi Sad, and the Fenomena Association from Kraljevo were involved in cooperating with the DRR system locally in designing and employing risk preventive measures.[36]

Coordination and cooperation with the Red Cross in this phase is fostered through participation at joint ESHQ meetings and joint planning for better risk preparedness. However, the Red Cross is an exception because it constitutes part of the ESHQ.

Where established, formal public-private partnerships resulted in better coordination and organization of ESHQs and other involved parties in risk response and recovery.

RISK RESPONSE

Cooperation within the DRR system

Collaboration between national and often regional DRR authorities, and between national and local DRR authorities is generally weak, as evidenced in the research. Occasionally, the corrective factor in increasing collaboration between these two actors is related to informal connections (based on friendship community or family relations), established between ESHQ members and national DRR officials. As a Nova Crnja ESHQ member stated:

For example, we have a man who is now the state secretary at the national level. So, personally, being our man from Crnja, thank God, he is rooting for Nova Crnja and he is our only connection at the republic level. As for the Province, we have no one.

Still, some examples show that in times of severe crisis, as was the case in the municipalities of Obrenovac, Kladovo or Šid during the 2014 floods, the whole DRR system is drawn in dense collaboration. In such cases, the risk response and recovery praxis are in the hands of the highest DRR authorities, while the local ESHQs facilitate decisions from national or regional DRR actors.

Partnerships with the private sector

Cooperation with the private sector evolves in the risk response as businesses show full readiness to step in and provide assistance to their local community. The private sector reacts proactively by offering support directly to the ESHQs. In situations in which local ESHQs faced different kinds of material, physical or human resources shortages, examples from the field showed that the private sector was a key collaborator. This practice was present in many municipalities such as Smederevska Palanka, Loznica, Mali Zvornik and Kladovo. In Nova Crnja, for example, the availability of mechanization or trucks for the purpose of reaction in crisis situations was just one call away, as underlined by an ESHQ representative: *"If I called a truck driver and asked him to take his truck to Kosjerić the next day, for free, he would make no fuss about it."* Although, according to CRI, this municipality is characterized by a small number of private companies, it still manages to use the existing resources of private companies to compensate for the lack of physical and material resources of the LSG for risk response purposes.

The private sector also showed its potential to act collectively and expand self-organization in the provision of food and basic assets to assist the wider population during the crisis. For instance, in most of the sampled municipalities, small shop-owners were the first to react and provide food to populations in need. The cooperation is still ad hoc, although legal provisions allow for systemic engagement of the private sector in all DRR phases.

Where established, formal public-private partnerships resulted in better coordination and organization of ESHQs and other involved parties in risk response and recovery. Examples include the municipalities of Kladovo and Loznica. In Kladovo, the private companies *Djerdap usluge* and *Tekijanka* demonstrated how cooperation with the local government may affect the resilience of the community:

... People in the private sector were the best prepared: Djerdap usluge, Tekijanka which is running a hotel, the private sector in general ... Djerdap usluge A.D. Kladovo is a private enterprise, a joint stock company with close ties with the local government. We have had excellent cooperation in less severe emergencies of the first degree when we had an opportunity to practise our communication skills, which we unfortunately had to use for this emergency of the second degree, which required a swift reaction.

In Loznica, similarly to Kraljevo, the local ESHQ has a list of private companies that can be engaged during emergencies.

Box 11.

Links between statistical analysis and field research: partnerships with the private sector

The field research only partially corroborates the results of the additional statistical analysis of 13 municipalities. According to both methods, Loznica stood out as a strong municipality in the number of private sector companies, and this economic strength was utilized to boost the resilience of the community. In Kladovo, although it does not have a high number of active private businesses, it has other positive economic characteristics. Companies there significantly contributed through collaboration with the ESHQ in risk response. However, the field research indicated that other municipalities such as Novi Sad and Vranje, which are economically strong and rich in resilience potential, as per the CRI, did not make full use of this resource.

ESHQs most often cooperated with local volunteer fire-fighter brigades in addition to the professional fire-fighters.

Yet, the cooperation with CSOs was noted as weak.

Partnerships with the civil society organizations

Risk response involved spontaneous collaboration with civil society organizations (CSOs) as a result of the need of the local DRR structures to mobilize all available resources of the community during the crisis. Yet, the cooperation with CSOs was noted as weak. For example, representatives from CSOs from Kraljevo who work in the area of natural disasters stated that there was a distance between local self-government and CSOs, rooted in the lack of trust towards CSOs: *"The people from the municipal administration kept a distance, who are we to interfere, we are just registered as an association, now we pretend to know everything… In short, I believe that this is the major issue here."*

As voiced by CSO representatives from Novi Pazar, the very concept of cooperation between LSGs and CSOs is differently understood:

People from the NGO sector and people from local government have different views of cooperation, something they may perceive as cooperation, we may see differently. ... When people from the NGO sector say cooperation, we mean cooperation of equal partners working together on the same task. On the other hand, I have this impression that if they do not cooperate, they will miss out on a lot; they will not be able to make use of our capacities.

The local authorities cooperated with the CSO sector mainly to compensate for the lack of specific human and physical capacities. The organizations whose expertise and physical capacities are usually used in emergency situations range from local fire-fighter associations, amateur radio associations and scouts associations, to associations that were able to provide support to endangered citizens. In Loznica, the association of SUV owners assisted the local ESHQ in solving critical issues during the emergency:

There was some kind of solidarity demonstrated by citizen associations ... I don't know what they are called, this association of SUV owners ... When we had a communication breakdown at the road section between Loznica and Lesnica on the road from Šabac to Loznica. They came with their SUVs and managed to establish a transport route for the people and [provided] equipment, medicine and everything, and they volunteered to do it. They never asked for their expenses to be covered.

ESHQs most often cooperated with local volunteer firefighter brigades in addition to the professional firefighters. Although under-capacitated in terms of equipment, the members of these volunteer firefighter associations showed astonishing readiness to assist the ESHQs during the emergency situation. In Smederevska Palanka, local fire-fighter units relied on collaboration with volunteer units:

... The firefighting units in Palanka are regional units. Sixteen firemen-rescuers work there, and that is not enough. We compensated for the lack of people by engaging volunteer firefighters, people who brought their own equipment, their own pumps, and helped us pump the water out.

The local Red Cross offices are the exceptions from the generally weak collaborative practices between ESHQs and local organizations. The Red Cross is a mandatory part of the organizational DRR structure and is treated as a partner by the DRR authorities. It serves in many cases as an important link between the DRR system and the citizens and CSOs.

Evaluation of multi-level coordination and cooperation

Box 12.
Evaluation of multi-level coordination and cooperation

The ESHQs assessed cooperation and coordination in the local DRR system as very good (4.24 points), but were least satisfied with cooperation with national, regional and district DRR actors .

Local CSOs gave the lowest scores to cooperation and coordination with the national DRR system (2.36 points) and evaluated cooperation with local ESHQs slightly better, but still not satisfactory (2.82 points).

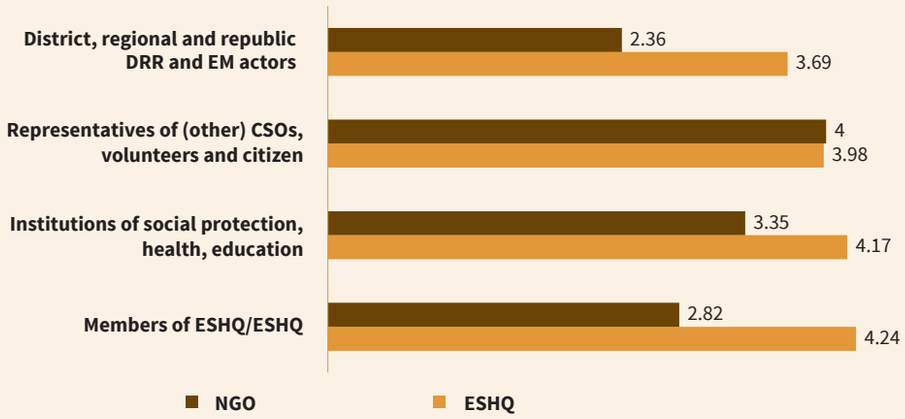
The National Human Development Report (NHDR) team evaluated the levels of cooperation and coordination through a short survey. All of the focus groups participants evaluated, inter alia, cooperation and coordination on a scale of 1 to 5. The evaluation was based on a Likert scale: 1 – poor; 2 – below average; 3 – average; 4 – above average; and 5 – excellent. The sample includes 12 municipalities, excluding Vranje (see Annex 1 on methodology).

The participants were asked to assess cooperation: (i) with and within the members of Emergency Situation Headquarters (ESHQ); (ii) with health, educational and social protection institutions as members of ESHQs; (iii) with and among civil society organizations (CSOs); and (iv) with district, regional and republic actors in the disaster risk reduction (DRR) system.

The figure shows that the members of the ESHQs assessed cooperation and coordination in the local DRR system as very good (4.24 points), but were least satisfied with cooperation with national, regional and district DRR actors (2.82 points). The cooperation of ESHQs with institutions of social protection, education and health institutions involved in ESHQ work was also evaluated as very good (4.17 points). ESHQs also gave a high score to cooperation with local CSOs and citizens who are not part of the disaster risk reduction system.

In contrast, local CSOs gave the lowest scores to cooperation and coordination with the national DRR system (2.36 points) and evaluated cooperation with local ESHQs slightly better, but still not satisfactory (2.82 points). They evaluated cooperation with other local CSOs as above average (4.0 points). Cooperation with social protection, health and education institutions was assessed as good (3.35 points).

Cooperation and coordination:
average scores by civil society organizations and Emergency Situation Headquarters



Note:
DRR=disaster risk reduction; EM=emergency management; CSO=civil society organizations; ESHQ=Emergency Situation Headquarters; NGO=non-governmental organizations.

Cooperation with citizens

Cooperation with citizens occurs only during emergency situations. Citizens' willingness to assist and participate in risk response bolstered ESHQ capacities to deal with the crisis. Their self-organization and volunteering will be discussed in more detail in the following section.

The local ESHQ's cooperation with citizens is also shown through the establishment and work of civil protection trustees in several municipalities. Trustees are entities that have or should have the key role in the first risk response in *mesna zajednica*, coordination with the DRR municipal system, and mobilization of the local community in response to shocks. As explained in Kraljevo, by an ESHQ member:

We have a special department working with local councils. They are in contact every day, 365 days a year. ... We call the mayor, the mayor calls the local council board, and the board issues a decision specifying which area of the local council was under greatest threat and needed prompt action. They would send us a memo: we need a bulldozer or a truck or a heavy machine in this particular area, and then we would organize what was needed with the team in charge.

Due to the training for civil protection trustees, these units work fast and are the first to respond to a crisis, which is of particular value in widespread municipalities.

The networks of civil protection trustees are still in the inception phase of their formation in most of the municipalities.

As noted, due to the training for civil protection trustees, these units work fast and are first to respond to a crisis, which is of particular value in widespread municipalities. For example, when a fire broke out in the summer of 2013 in Studenica, which is around 60 km from Kraljevo, a civil protection trustee reported the fire to the police and firefighting units, and organized evacuation based on the learned procedure. Due to his quick reaction, no casualties were reported nor losses in material assets.

However, as a form of civic engagement and cooperation between citizens and DRR structures in the local community, the networks of civil protection trustees are still in the inception phase of their formation in most of the municipalities.

Box 13.

Links between the statistical analysis and field research: political participation as a proxy for civic engagement

The field research rarely corroborates the findings from the statistical analysis of 13 municipalities (see Part 2, Chapter 1). Although strong civic engagement in the form of political participation is registered in Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac and Kraljevo, almost all of these municipalities have shortcomings in establishing cooperation between civil society organizations (CSOs), including citizens, with Emergency Situation Headquarters (ESHQs) as representatives of local self-government. The only exception is Kraljevo, in which there is evidenced collaboration between ESHQs and CSOs, and also increasing engagement of citizens in civil protection trustees networks.

Cross-border cooperation

Cross-border cooperation is also tied to the risk response phase and is usually ad hoc. For example, cooperation with Croatian and Bosnian DRR authorities was triggered during the May 2014 floods. It assisted significantly in information exchange and coordination of the necessary response actions across both sides of the borders, and its character was local. During the severe torrential floods in Mali Zvornik, which is on the border with Bosnia and Herzegovina, Zvornik on the Bosnian side of the border saved people and assets, and provided direct assistance. In Šid, the situation was similar, as explained by an ESHQ member:

Thanks to cooperation with the HQs in the neighbouring places in the Republic of Croatia, we received the information that the levee was about to break. It was about 6 or 7 a.m. when people started talking about it, and the president called a special meeting for 10 a.m. – that's when we decided to evacuate the village of Jamena.

RECOVERY

This research shows that the recovery from natural disasters rarely triggered public-private partnerships, or partnerships with CSOs. Recovery of private companies destroyed in floods was partly covered by the recovery funds.

Furthermore, locally led recovery from crisis rarely used the potential of partnerships with local CSOs, their know-how, and most notably, their networks across the CSO sector.

Finally, recovery from shocks and stressors did not systemically depend on the support and partnerships from citizens in the affected communities, including civil protection units, which represents a lost resource in this DRR phase.

* * *

Partnerships and collaborative practices point to weak links in local DRR systems and practices. Risk prevention, mitigation and preparedness do not include the participation of non-state actors. Local resources of non-state actors (the private sector, CSOs and citizens) that already exist in the community are mostly not envisaged and planned to be included in the local DRR system.

Collaboration of the local ESHQs with national and regional DRR authorities also proved to be weak. This prevents the DRR system from continuously acting in harmony. In risk response, however, local ESHQs rely on national DRR structures and on the mobilization

of non-state actors, primarily the private sector, to compensate for physical shortages. The public-private partnership is mainly informal. Kladovo and Loznica stand out as good examples, but also, in the majority of the municipalities, private businesses offered first-hand assistance in the emergency response (e.g. Smederevska Palanka, Mali Zvornik, Nova Crnja). The additional statistical analysis indicated that Loznica was the only municipality with any considerable potential in this regard.

At the same time, partnerships with CSOs are not recognized as beneficial although they can provide necessary human resources and know-how. As a consequence, ESHQs missed the opportunity to strengthen cooperation with CSOs and thereby bolster the capacities of their local risk response. Kraljevo, Novi Sad, Kladovo and Mali Zvornik are the communities in which the ESHQ collaboration with CSOs was most evident.

The networks of civil protection trustees emerged as an effective instrument in increasing community resilience through civic engagement and partnering with municipal DRR authorities. Yet, to date they have usually been activated in emergency situations only. Through the engagement of civil protection trustees, which comprise their volunteer engagement in established civil protection networks, the local community is intensely interconnected and more prepared to be actively involved in emergency situations. These relationships are, in most situations, informal, based on personally deeply established relationships of friends, relatives and neighbours. This practice is particularly evident in Kraljevo, Smederevska Palanka and Novi Pazar.

There is a reduced engagement of non-state actors in the recovery. Yet, as shown, the strong, informal relationships between citizens with the representatives of the DRR system certainly fostered capacities to adequately respond to the community's shock. But if citizens' assistance remains unplanned and not accounted for in times of risk prevention and preparedness, the opportunities to capitalize on the resource of citizens' engagement decreases. ESHQs did not capitalize sufficiently on the willingness of citizens to partner with them and provide them with their assistance.

Finally, the additional statistic assessment based on the CRI shows that there is a correlation between political participation and civic engagement in some cases, as shown in box 13.

Overall, abrupt and unplanned partnerships prevent the local DRR system from continuously acting coherently to increasing resilience through social capital.

VOLUNTEERISM: THE STRENGTH OF THE COMMUNITY

Volunteering is "unpaid work [that] involves time, energy, skills and/or abilities given freely" (Donnelly and Harvey, 2013: 55-71) to the community.

Volunteer engagement in risk prevention and risk preparedness has been recognized by the local and national DRR system, but it is rarely used as a tool in risk prevention.

One of the most important community responses to threats is active civic participation in the form of voluntary engagement. Volunteering is "unpaid work [that] involves time, energy, skills and/or abilities given freely" (Donnelly and Harvey, 2013: 55-71) to the community.

Volunteerism is firmly connected with active civic participation in civic associations of all kinds that characterize organized community life. Yet, volunteerism also emerges as a result of self-organized community members who act for the common interest out of associational realms. It is an act of solidarity and support in times of crisis.

Key actors within the ESHQ system mandated with preparedness of volunteers are the Red Cross and civil protection trustees, as presented in the previous section. The Red Cross is in charge of mobilizing the network of its volunteers and the provision of humanitarian aid.

RISK PREVENTION AND RISK PREPAREDNESS

Volunteer engagement in risk prevention and risk preparedness has been recognized by the local and national DRR system, but it is rarely used as a tool in risk prevention.

Engagement in networks of civil protection trustees represents the form of volunteer engagement of citizens in *mesna zajednica*. Led by local ESHQs and LSGs, in general, nominated civil protection trustees undergo theoretical and practical training to become certified trustees in their community. The municipality of Kraljevo, as an example of best practice in establishing functional civil protection trustees networks, has provided numerous training sessions to civil protection volunteers and established a Training Centre in Rudno near Kraljevo.[37] Further engagement of civil protection trustees and their deputies comprises visits to educational institutions to train students, teachers and other staff on the main principles of civil protection.

Similarly, the Red Cross network regularly organizes training and practical exercises in first aid provision and prompt response in crisis situations for their volunteers at the local level. Many of the trained volunteers become certified first aid instructors who in turn provided training to the wider public. This practice is represented in all the local communities visited. As mentioned, self-organized citizen action has not been recognized by the local (and national) DRR system, and is missing in the planning and preparedness phase.

RISK RESPONSE AND RECOVERY

Volunteering in crisis

Volunteer engagement during crises increase quickly and reaches considerable levels, as shown during the 2014 floods and the 2010 earthquake in Kraljevo.

Volunteer engagement during crises increase quickly and reaches considerable levels, as shown during the 2014 floods and the 2010 earthquake in Kraljevo. It continued to be active in early recovery from crisis at the same levels. For this reason, volunteer engagement cannot be strictly analysed in separate DRR phases since it shows the same characteristics during the response and (early) recovery periods. Later phases of recovery usually do not include spontaneous volunteer work.

During the risk response and early recovery phases, volunteers are engaged through formal, institutional or associational membership – DRR local structures and particularly the Red Cross including local civil society organizations – and informally, as a result of self-organization to support endangered neighbours, friends, family and other members of the community. As reported by a member of the ESHQ from Kladovo:

Neighbours and family members were in danger, and everybody wanted to help. What surprised me the most when I went out to visit these locations was the number of people who were not directly threatened, but anyway came out with their own machinery to help. The people from the Centre for Social Work [a member of the local ESHQ] were out all the time, helping clear the terrain … 20, 30 or 40 of them went out to help the endangered households clean up the mess.

Self-organization of citizens

Citizens also self-organized using their own assets and material resources to participate in the risk response and recovery.

Citizens also self-organized using their own assets and material resources to participate in the risk response and recovery. Individual activism was not unusual, as shown in Kladovo:

For example, there was this one man who came to us (ESHQ members) when the rain was the heaviest. He had his own machine, without a cabin, a bulldozer, and he dug a passage right through a hill so that water could pass through. We watched him, soaking wet, stepping on that bulldozer, pressing on and on. People like him, people with big hearts, they helped us (ESHQ) immensely. They joined in on their own, without any instructions from headquarters or anyone. He saw what was needed to be done and he did it.

In contrast to this example, the neighbouring municipality of Negotin, which experienced severe floods, had scarce volunteer mobilization and engagement, including support and help from neighbours and other fellow citizens.

The inter-municipal exchange of volunteers

People from all over the country were coming to help out severely affected municipalities. Examples from Kraljevo, Šid, Kladovo, Obrenovac and Negotin showed that recruitment of volunteers from other cities and municipalities was fast and strong.

The inter-municipal exchange of volunteers was common practice during the risk response. As reported, people from all over the country were coming to help out severely affected municipalities. Examples from Kraljevo, Šid, Kladovo, Obrenovac and Negotin showed that recruitment of volunteers from other cities and municipalities was fast and strong. Novi Sad was the leading town in providing volunteers to other towns and municipalities during the 2014 floods, while Negotin were least involved in these efforts.

Kraljevo, for instance, experienced a huge inflow of volunteers during the 2014 floods:

We had so many [volunteers] that we could not give assignments to all of them. People who responded to our call and volunteers, not only from Kraljevo, but Kruševac, Novi Sad… 200 people came here in just one day. We had no place to provide accommodation; we did not know how to feed them all, and they asked for nothing, just a place to sleep, something to eat during the day and somewhere to work.

A similar experience was shared in many other sampled municipalities. Volunteers were coming in large numbers, willing to assist in any possible manner. As accounted in Šid by an ESHQ member: "*... many people came to us back then. They also came from other villages using the transport that was provided. They came here by the busload and helped, so many of them.*"

The volunteering was primarily related to the provision of manual work, the collection of humanitarian aid, the distribution of aid and the provision of first aid, as voiced from the field.[38]

Management of volunteers within disaster risk reduction system

The lack of established coordination and cooperation between the local DRR system and volunteers, and the inability of the DRR system to adequately manage the inflow of volunteers and the provision of their services were often reported as problems.

The lack of established coordination and cooperation between the local DRR system and volunteers, and the inability of the DRR system to adequately manage the inflow of volunteers and the provision of their services were often reported as problems. A young volunteer from Kragujevac provides the following example:

I was a volunteer. I don't know who came to meet us, or who was in charge of organizing the volunteers. They gave us gloves, protective masks for the nose and mouth. I can't remember if they gave us the boots as well. That was okay, but I think we needed something more to protect us from infections.

In addition, as indicated by an ESHQ representative from Šid:

The people at the ESHQ should have known better who was authorized to issue and distribute information. That was not properly organized. No harm done, but that could have caused bottlenecks. We had cases where 50 people were required, but somebody sent out a hundred. Then the rest of the volunteers would sit around ... all day.

Another issue was the exposure of the volunteers to potentially risky, threatening situations during the risk response and early recovery.

Another issue was the exposure of the volunteers to potentially risky, threatening situations during the risk response and early recovery. These were issues for which local self-government did not have ready solutions in many cases. In Kladovo, a local ESHQ member commented on the safety of volunteers:

... If I take a volunteer to work under my supervision, I take responsibility for his safety, being the leader of the operation. If anything goes wrong, they have no coverage for the duration of the action, no insurance at all. That was a big problem. Thank God, nothing went wrong.

As reported, citizens willing to help in crisis situations were usually those who were not trained to perform crisis related tasks.

ESHQ officials responsible for managing volunteers often had concerns about the capabilities of volunteers to perform certain tasks. In some situations, as stated in Kraljevo, the inflow of volunteers became a burden for the local authorities: "*[Volunteers] come here open-hearted and willing to help, but the fact is that they put themselves and others in harm's way. When we discussed the procedures for admission of the volunteers, it was a fierce debate.*" The same concern was also reported in Mali Zvornik, Loznica, Šid and Smederevska Palanka.

After the devastating earthquake that hit Kraljevo in 2010, the mobilization of volunteers from other municipalities was immense, as indicated by an ESHQ official from this town:

More than 1,000 volunteers came to Kraljevo, some of whom stayed for a month and a half or two months, working in individual households. They were carpenters, rebar installers, people like that; all of them were given shelter, and their contribution was highly appreciated here. Some of these master craftsmen stayed here for as long as two months, people from unions, miners, etc.

In early recovery from crisis, volunteers also encountered managerial issues concerning the local organizing bodies. A doctoral student from Kragujevac explains his experience:

I was in Smederevska Palanka at that time. The student's parliament and our association organized transport to Smederevska Palanka. We went there to clean up after the flood, and I must say that the organization of the work was poor ... we could have done much more to help them, but there was no one to meet us. They gave us some equipment, not much though, and the protection was not adequate. That was my personal experience of the flood, and it was a high risk affair.

Similarly, in Novi Pazar, there was an apparent lack of coordination of mobilized volunteers.

Training and recruitment of volunteers

As reported, citizens willing to help in crisis situations were usually those who were not trained to perform crisis related tasks. In Kragujevac, this issue was particularly highlighted:

With no training to speak of, in an unfamiliar environment, what is it exactly that we as ordinary citizens or representatives of the NGO sector can do, without putting ourselves or others at risk? One volunteer here said that he brought his children along… For God's sake, you should have at least some idea of where you are going and what is awaiting you there. I understand, this was an emergency, but that does not mean that we shouldn't plan in advance and provide training at least for those people who are usually active in this field, the people from the NGO sector and

various associations, a site-specific training that will prepare them for what can happen on the ground.

The most represented category of volunteers was youth – high school and university students, primarily male.

The results from the field acknowledge that although all age groups took part in volunteering in the recent crises throughout Serbia, the most represented category of volunteers were youth – high school and university students, primarily male. They were also Red Cross volunteers and student volunteers from high school associations and local Youth Offices, and from other associations and networks. The total number of volunteers who were engaged in response and recovery from floods is not known. However, for example, in the first month after the May 2014 floods, the Red Cross engaged 919 volunteers in total (Vasiljević, 2014).

In Kragujevac for example, a Red Cross representative explained their volunteer recruitment and organization:

The collection of humanitarian aid was largely facilitated spontaneously through social media activism as was the volunteer engagement in the affected communities.

We have a unit of young volunteers; they are under 27 years of age. Here, we used volunteers from the secondary medical school and the School of Medicine. We also engaged older volunteers, those above 65, because they have these weekly meetings at our premises and are readily available. Scouts offered help and worked for two nights with our volunteers, but otherwise, we used our own volunteers, 24 hours a day.

The Youth Office in the municipality of Loznica engaged 250 young volunteers in cooperation with the local ESHQ.

There was a particularly high level of self-organization of youth to undertake volunteer work in all municipalities. The channels of informal mobilization of young volunteers were usually activated through social media announcements. Social networks for mobilization of volunteers were highly active in all Serbian towns and municipalities.

The channels of informal mobilization of young volunteers were usually activated through social media announcements.

The motivation of young volunteers to assist in the risk response and recovery was simply based on the need to support those who are left with nothing.[39]

RISK RESPONSE AND RECOVERY: COLLECTION OF HUMANITARIAN AID

Informal and formal collection of humanitarian aid

Informal and formal engagement in the collection and facilitation of humanitarian aid for the affected parts of the community was common during or after the crisis. This manifestation of solidarity was described by a representative of the scout association from Kragujevac:

When the Government declared the scale of the disaster, we organized our own initiative and spent five days collecting aid. We put up posters and informed the public. We always had one of the boy scouts, elementary or high school students present there, and in five days, we collected four cubic meters of food and some clothing. For example, someone goes to a supermarket, sees our poster announcing that our boy scouts are collecting aid for the victims. They buy some stuff there at the supermarket and leave it on the table placed there for this purpose. Five days later, the aid we collected was sent to Šabac. Four boy scouts brought the aid on the way there.

Most self-organized groups collected humanitarian aid was in the form of food, hygiene kits, clothes, school kits and money.

The collection of humanitarian aid was largely facilitated spontaneously through social media activism as was the volunteer engagement in the affected communities. This kind of engagement contributed to the fast spread of information and mobilized a vast virtual community inside and outside of the country. A successful example in this regard was activism in aid collection in Mali Zvornik whose informal group of citizens mobilized considerable assistance from abroad:

There were people from Australia to Toronto and British Columbia, for example, and we have been in contact recently with people from Vancouver. Some of them did not want to send money but they sent goods, or they sent individual donations, and we coordinated distributing of aid through the church, through informal contacts in villages and schools.

Similar cases were presented in Novi Sad, Kragujevac, and Kladovo. As accounted in Novi Sad by an ESHQ member:

During the floods of 2014, we responded quickly; we sent out a call for donations from abroad. We paid the reporters and a photographer and then sent photographs to be used for fund-raising purposes. Then we had projects for rehabilitation of these areas. Then we contacted local HQs, informed them that we had these special indoor dryers or a truck that is how we operate. We responded quickly and provided aid.

Collection of humanitarian aid for all

Humanitarian aid was usually collected not only for the closest endangered community, but for all endangered municipalities across Serbia.

Humanitarian aid was usually collected not only for the closest endangered community, but for all endangered municipalities across Serbia. It extended to also include Bosnia and Herzegovina. An official from the Novi Sad ESHQ, who was active in sending out help to Serbia and Bosnia and Herzegovina, explained:

We organized actions in local councils. Our units worked in 25 local councils, where through the actions of the volunteers we provided water, packages for babies. We also cooperated with the School of Medicine, which organized aid collection. The goods were brought to our storage in Petrovaradin and then distributed to affected areas. How did we know where to send help? We coordinated our actions with the authorities and directed aid based on the information we received. We sent aid to Šabac, Sremska Mitrovica, Doboj in Republic Srpska, Bosanski Šamac and Bjeljina (in Bosnia and Herzegovina).

Municipalities that are both strong and weak in economic capital, as per the additional analysis based on the CRI, were collecting aid.

Box 14.

Links between statistical analysis and field research: economic potential and aid collection

The 2014 floods showed that the economic potential of a community did not matter for aid collection. Municipalities that are both strong and weak in economic capital, as per the additional analysis based on the CRI, were collecting aid. Consequently, Novi Sad and Kladovo, as relatively well-off municipalities, found themselves in the same group as Mali Zvornik and Smederevska Palanka.

In a number of sampled municipalities, the problem after the floods was the surplus of supplies and the poor organization and distribution of humanitarian aid.

Management of humanitarian aid

While the community was active in collecting humanitarian aid, the DRR structures faced problems in the management of humanitarian aid. In a few cases, however, as in the case of the Red Cross from Smederevska Palanka, professional standards in collection, management and distribution of aid were followed because the volunteers were trained and knew the rules for reception and distribution of humanitarian aid, and on how to keep records

The lack of coordination in the community in the collection of aid resulted in fragmented collection and misallocation in aid distribution and a disruption of solidarity.

The municipality of Loznica also did not face a problem in humanitarian aid management, as stated by an ESHQ representative:

As regards the distribution and delivery of humanitarian aid, we received lots of aid, and we organized it properly with all the procedures in place. Everything was arranged, and the aid was sent to the sports centre. Administrative procedures for the aid were organized through local councils, presidents and board members. They also followed the procedure and distributed the help on the basis of lists they delivered to us, the lists of the most affected families. Unlike many other towns, as we heard, we had no problems. We did it properly, and the aid kept coming in for a month after the flood, so we had to redirect it to the Red Cross, which continued distribution according to the same principles',

On the contrary, problems occurred and were particularly noted in Novi Pazar, Smederevska Palanka, Kraljevo, Šid. In a number of sampled municipalities the problem after the floods was the surplus of supplies and the poor organization and distribution of humanitarian aid. An ESHQ representative from Novi Pazar tried to explain what was the cause of a problem:

For example, during the floods, and in general, Pazar as a town, the local government, our people here, they all helped a lot through ... humanitarian aid They volunteered a lot, but then again, we still had these examples of division and strife, instead of acting in unity through a single channel We had different groups sending aid to different places, independently.

The sporadic organization of humanitarian aid resulted in misconceptions and misinformation about the issue. In a considerable number of cases, it was reported that humanitarian aid reached those who were not affected by the natural disaster or that the principles of distribution were unfair. This was the case in Smederevska Palanka, Šid and Kraljevo. As stated by a civil protection trustee in Jamena, in the municipality of Šid:

... [A] man who came to my office said, how come my neighbour got a fridge and a stove, and I got nothing. ... I was a little upset by then, so I said, let us check; it is impossible that your house is in category 6, and you received nothing. So we go to his place, and there was a new house in his yard! Well, I said, if you prefer a washing machine to a new EUR30,000 house, please go and trade it in with your neighbour.

The lack of coordination in the community in the collection of aid resulted in fragmented collection and misallocation in aid distribution and a disruption of solidarity. As a citizen from the municipality of Šid reported:

It is only human, of course, that there have been many examples of solidarity, people helping one another to move cattle, to load and unload stuff, but when the time came to make the exact classification of aid; there were problems. People started fighting, accusing each other… which is not unusual, 'they gave you this, and I got nothing', and so on.

Still, on the positive side, solidarity was the driving force in coping with previous natural disasters. As an ESHQ official from Kladovo underlined:

When we visited people and asked what they needed, they told us they needed no bread, since they could go out with boats and buy the bread themselves. So they told us to give it to someone needed it more, and they only wanted water and fuel because they could move only between two bridges. ... And later, when the civil society organizations joined in, everyone provided help to their ability.

The high levels of care and solidarity in the community were reflected by a decrease in criminal behaviour and a total absence of thefts from damaged stores, homes or other facilities.

It is also worth noting that the high levels of care and solidarity in the community were reflected by a decrease in criminal behaviour and a total absence of thefts from damaged stores, homes or other facilities.. According to the ESHQ member from Kladovo, there was no panic, no looting the shops, no pillaging and no chaos: *"People behaved under these difficult circumstances, even when they were unable to reach either Tekija or Brza Palanka. In any case, Kladovo is a small place, people talk, and the messages travel fast."*

* * *

Active civic engagement in the form of volunteerism and the collection of humanitarian aid was most extensive in the risk response and recovery from natural disaster. Close ties in the community affected the immediate reaction of citizens to support friends, family and neighbours. Vast support also quickly spread to other communities and people in need. This directly reflects the value of norms of support or norms of reciprocity that makes one of the key elements of social capital.

Both the formal and informal organization of volunteers were widespread and boosted the resilience resource. This resource is also an investment since the greatest bulk of volunteers were young women and men who will be able to maintain the culture of volunteerism in the future.

Still, the key obstacle to this engagement was the poor management of volunteers. This highlights the lack of planned organization of volunteers and of understanding by local DRR authorities of the importance of this resource for emergency situations. The ad hoc organization and coordination of volunteers negatively impacted on their deployment.

Collection and provision of humanitarian aid in times of crisis stresses the power of community to mobilize vast networks (strong and distant) and activate them for the common good. Although these networks usually dormant during regular times, they trigger the perpetual mechanism of social capital. Their social capital is reflected in their quick reaction when support is needed.

The unfair distribution of humanitarian aid in some cases decreased the trust within the community because some personal interests were above collective ones. On the positive side, the general solidarity expressed during the past natural disasters constituted an indispensable resource of risk response and recovery. Consequently, communities capitalized on this resource, whether they recognized or ignored its potential.

In terms of the level of volunteerism, the majority of municipalities gave positive examples – Kladovo, Novi Sad, Kraljevo, Kragujevac, Šid, Mali Zvornik, Loznica, Vranje, Obrenovac and Novi Pazar. Yet, some municipalities such as Negotin suffered from a lack of this type of citizen engagement. Novi Sad was the top municipality in organizing inter-municipal exchanges and directing volunteers to other municipalities throughout Serbia, while Negotin was the least engaged municipality in this domain. The issue of volunteer management was immanent for most municipalities, for example, Šid, Novi Pazar and Smederevska Palanka. In contrast, Loznica represents the municipality with a high potential in managing the inflow and duties of the mobilized volunteers. Social media activism on mobilizing volunteers and humanitarian aid was widespread, particularly in Mali Zvornik, Novi Sad, Kragujevac and Kladovo.

Qualitative results and the results based on the CRI analysis correlate only to a certain degree. Increased engagement in the collection of humanitarian aid was notable not only in economically rich municipalities such as Novi Sad and Kladovo, but also in poorer municipalities. The different levels of computer literacy in the sampled municipalities also did not impact on social media activism. As shown, social media played an important role in the collection of aid and the mobilization of volunteers in almost all communities, regardless of their statistical characteristics.

Finally, the level of political participation as one of the indices of the CRI in the domain of social capital may be only partially positively associated with volunteer engagement as a form of civic engagement. Yet, in order to comprehensively understand the significance of volunteering for community resilience, another factors relevant for social capital manifestations should be introduced into the analysis, as previously discussed.

THE SOCIAL INCLUSION ENGINE: GENDER AND VULNERABLE GROUPS

Social inclusion assumes wider social participation that enables individuals to achieve positive social, economic and political ends. At the core of the concept of social inclusion is participation and access to citizens' rights, which imply the engagement and active participation of deprived social actors. The quality and the levels of social capital are, among others, manifested in socially inclusive processes in the community. The resilience of communities is determined by the status of social inclusion in the community.

The key local DRR actors mandated to take care of vulnerable groups in planning and preparedness, response and recovery are the local ESHQs. Centres for social work and health centres and health facilities, as members of the ESHQs, are key providers of information about vulnerable populations, and are key actors when the crisis emerges. The Red Cross branch offices are also an important actor, especially in the evacuation phase and the subsequent placement of people in need.

Local DRR remains poorly equipped with detailed accounts of vulnerable populations, their location and specific needs.

RISK PREVENTION AND RISK PREPAREDNESS

Vulnerability assessments in the community

One of the principle functions of the DRR system is to contribute to decreasing communities' vulnerabilities to natural disasters. These vulnerabilities concern marginalized and vulnerable population groups (children, persons with disabilities, the frail elderly, poor households, etc.) whose capacities for risk preparedness and response are weak. However, as evidenced by the research and presented in the previous sections, there is a general lack of assessment of local vulnerability from natural disasters. Local DRR remains poorly equipped with detailed accounts of vulnerable populations, their location and specific needs.

According to their mandate, centres for social work (CSWs) have information about some of the key vulnerable groups in the communities, such as the frail elderly and children, persons with disabilities and poor households, who are the beneficiaries of their services. Yet, the information and registers on vulnerable groups in municipalities through the CSWs are incomplete, because they are not mandated to map all vulnerable populations in a community. Furthermore, the information that CSWs can provide is often outdated and lacks precision. Consequently, plans and procedures for involving and caring for vulnerable groups in risk preparedness are missing, except for the general priority evacuation practice for women, children and the elderly.

The most severe situation in this regard concerns information on vulnerable Roma populations in the community. The severity of the problem surfaced in communities in which the impact of disasters was of a higher intensity, such as Obrenovac.

Participation of women and vulnerable groups in the DRR system

Current Law on Emergency Situations (Official Gazette of the Republic of Serbia (2009b) does not address women's participation in the system, nor does it assume the inclusion of other vulnerable groups in the system and their empowerment through rising risk awareness and preparedness. In contrast, following the Sendai Framework, the emerging DRR policy framework in Serbia highlights the importance of the inclusion and participation of different actors and stakeholders, including vulnerable groups, particularly women, into the DRR system.[40]

The research showed that prevention and preparedness strategies at the local level rarely involve women in decision-making and participation in the DRR structures.

However, as evidenced above, some initial efforts are slowly being made in gender mainstreaming in the DRR local system. Women's CSOs have been supported in mainstreaming gender in DRR in 20 Serbian mu-

nicipalities. To date, a total of 316 women, 52 children and 120 students have been trained on volunteering in emergencies, civic engagement, psycho-social support, and how to act during emergencies (UNDP, 2016a). In addition, 69 women were trained as anti-hail shooters and 22 as rescuers.

The municipalities of Obrenovac, Smederevska Palanka, Kraljevo, Kragujevac, Šid and Kladovo (see box 15), selected for this research, also participated in some of the activities. Some of these initiatives are supported by UNDP Serbia with the aim to mainstream gender into the local DRR practices.

Box 15.
Vulnerable groups' inclusion in the DRR local system in Serbia, initiated by UNDP

In **Obrenovac**, the Roma Women and Children Centre *Daje*, supported women, especially Roma women from illegal settlements, in overcoming trauma caused by floods; the *Sexual and Reproductive Health and Rights Association of Serbia* (*SRH*), worked on increasing women's participation in decision-making processes specifically in developing local action plans for responding to emergency situations; the citizens association *Together* is empowering women to take a proactive role in responding in emergency situations; *Mountain Rescue Service of Serbia* (*GSSS*), works with women in providing training on rescue practices.

In **Smederevska Palanka**, the Roma women and children centre *Daje* was also active. The women's association *Femina*, expanded its SOS help-line portfolio to women victims of domestic violence by providing help, psychological and social support and information during emergency situations in Smederevska Palanka. Women and other volunteers at the SOS help-line were trained in volunteer management and coordination of volunteers during emergency situations.

In **Kragujevac**, the association *Viktorija* works towards establishing a women's network to assist in prevention, rehabilitation and reconstruction in flood-affected areas in Kragujevac, Svilajnac, Paraćin, Kraljevo and Čačak.

In **Kraljevo**, the association *Fenomena* works towards increasing the participation of women in disaster risk reduction (DRR) management policies and procedures, specifically through the development of gender-sensitive local action plans to respond to emergency situations as well as expanding its SOS help-line portfolio for women victims of domestic violence with providing help and information during emergency situations.

In **Kladovo**, the *Mountain Rescue Service of Serbia* (*GSSS*) provided training to women in rescuing practices during emergency situations. The specialized training and drills include first aid assistance, the evacuation of victims, communication and coordination in the field during emergencies.

In Šid, the *Association of Business Women*, Novi Sad (*PAZ*) is empowering women to participate in decision-making processes in local communities to detect natural hazards, prepare preventive measures, and properly respond in emergency situations from a gender mainstreaming approach.

In Kraljevo, activities related to the involvement of women in the local DRR system were dynamic. By the end of 2015, the Civil Protection Department of the LSG (ESHQ member) and the women's association Fenomena coordinated training and certification of 30 women who were appointed as civil protection trustees in the three most vulnerable communities. In addition, this cooperation established a Volunteer Female Firefighters Association in Kraljevo with 21 female members, which is an innovation in the context of Serbian municipalities in general. As explained by the representative of CSO Fenomena:

The objective of these workshops was to have the women undergo training in the provision of civil protection services and organize them at the local level. The women were well motivated and cooperative, displaying solidarity, dedication and prudence.

According to the representatives of Fenomena, the involvement of women in this system contributed to the mobilization of increased engagement of the whole local community on matters of risk protection. According to a Fenomena activist, the involvement of women in this system is beneficial, *inter alia*, because:

Women are in general more emotional; they empathize more and are very close to one another, and in certain situations, they act with more sobriety than men. We have the impression that they are more practical and more dedicated,

because most of them are also mothers. This means that they are willing to make sacrifices, they have a developed sense of responsibility for others.

Although Kraljevo is a leading example in mobilizing women into the DRR local structure in the civil protection system, the data show that, in 2015, no women were trained in civil protection in Obrenovac and Negotin. In Kladovo, one woman was trained, and in Kragujevac, 12. In total, 13 women from these municipalities were selected for the training compared to 68 men. The data are also corroborated by UNDP.[41]

RISK RESPONSE AND RECOVERY

Evacuation of vulnerable populations

During the evacuation, as reported, the DRR system acted in line with legal provisions on safeguarding and evacuating the elderly, women and children first. Still, in most of the municipalities, there was no coordinated systemic action for protecting the most vulnerable groups in risk response. This was notably the case in Smederevska Palanka, Obrenovac, Kragujevac, Negotin and Kladovo, and particularly in relation to the endangered Roma population whose settlements are on the verge of flooding areas.

In contrast, the health care system in most of the crisis situations provided swift and proper care of the elderly and the sick. It also offered needed health assistance to those not registered in the health system, such as a certain number of Roma in these municipalities.

Citizens support to vulnerable citizens

As a result of the unavailability of a strong systemic support for vulnerable groups, citizens took over the responsibility of assisting in safeguarding children, the elderly, people with disability, and Roma. In Mali Zvornik, for instance, teachers took over the responsibility of taking care of evacuated children and the elderly. One teacher evacuated of all vulnerable inhabitants in a village near Mali Zvornik before professional rescuers came. Similarly, a female ESHQ official from Obrenovac had the following experience:

I tried to evacuate one half of a village consisting mostly of elderly people. Some of them drowned because the water was 3.5 meters high, that is, over the rooftop. My husband owns a couple of boats, and we managed to pull out some of these old people who later ended up in the accommodation centre in Bežanijska Kosa. It all happened so quickly, at various meeting points; people were coming from all over; it was chaos, nothing was arranged in advance; everything played out thanks to the people we accidentally met along the way; we all tried to help.

In addition, it was often the case that citizens who were not directly endangered by the natural disaster hosted evacuated people. Most of them were children, elderly persons, women and persons with disabilities. This was particularly evident in Mali Zvornik, Loznica, Obrenovac, Kladovo.

Box 16.
Links between statistical analysis and field research: dependent population and social inclusion

According to the Capitals Resilience Index (CRI) additional analysis, the share of the dependent population from the total population as an element of the CRI human capital is highest in Kladovo and Negotin. This presumes a high degree of social vulnerability and increased challenges in evacuation and risk response in these municipalities. In Kladovo, the community quickly mobilized to provide care for those who were weak and vulnerable, while in Negotin, the response was moderate, according to the field research.

Support to the Roma population

As evidenced, different levels of solidarity were shown to different vulnerable population during the crisis and recovery. Yet, citizens did not show much solidarity towards the Roma population, whose settlements were strongly devastated in the 2014 floods. According to an observer from Obrenovac: "*Roma were taking advantage of the crisis situation by actively seeking humanitarian aid. Then they were trading it for money.*" Participants also commented on the very modest willingness of Roma population to volunteer, even in their own settlements, as reported in Kragujevac and Smederevska Palanka.

* * *

All DRR phases insufficiently recognize the needs of vulnerable groups. This results in an ad hoc approach to these groups when the crisis strikes, especially with respect to evacuation. Furthermore, local (and national) DRR in Serbia still lacks a gender-sensitive approach and is not attentive to the inclusion of women.

Initial efforts in gender mainstreaming in the DRR system are underway. Kraljevo represents a best prac-

tice municipality that established networks between women CSOs and the LSG, and coordinated action involving women in the system of civil protection. Yet, the involvement of women in decision-making in the local and national DRR structures is more the exception than the rule.

The situation with respect to inclusion and care of vulnerable groups such as the elderly, children and ethnic minorities during risk prevention and preparedness activities is more than worrying. There is a lack of information on vulnerable groups, which are the base for solid risk planning, preparedness and response. The lack of risk preparedness demonstrates that community vulnerability is neither anticipated nor assessed. In general, preparedness plans are unified and are the same for all population categories, except for evacuation procedures that give priority to women, children and the elderly; however, social inclusion practices in general are not considered a community resilience factor.

The gaps in the system were covered by individual or group solidarity and the informal engagement of citizens in the community; citizens took over the responsibility of intervening for the benefit of others including vulnerable populations.

However, the exclusion of Roma from regular community life and their weak links with the system were apparent. This is a manifestation of the gaps in social capital and the inability of the system to foster resilience through social inclusion practices. Such attitudes and behaviours are expanding the gap between the Roma population and the local dominant population, and further nurture discrimination.

Finally, statistical analysis based on the CRI partially provided insights into municipal vulnerabilities and resilience. According to the CRI, Negotin and Kladovo are particularly vulnerable to natural disasters because they have the largest share of dependent populations. While in Kladovo the evacuation of vulnerable citizens was high, in Negotin it was moderate, as the field research confirmed. Stepping into the community for documenting their practices is important in getting reliable data on the significance of human action and their networks in crises and beyond.

TRUST: THE HEART OF LOCAL RESILIENCE

Trust refers to a willingness to believe that someone's actions are appropriate and pursued in a mutually supportive manner. The distinction between forms of trust can be made: on the basis of particular trusting in someone; having developed general capacities of trusting unknown people; and trust in the formal system, which is a form of political trust (Fukuyama, 1995; Herreros, 2004; Misztal, 1996; Onyx and Bullen, 2000).

Trust is an all-encompassing indicator of how social capital will be manifested in the community – the way in which information will be shared, partnerships established, volunteerism practised and social inclusion fostered. Trust, together with norms of support and reciprocity, are the essence of social networks and their productivity. As such, it impacts on the vitality of the community, and on its resilience to different kinds of shocks.

RISK PREPAREDNESS

There is generally little trust in the formal system because the local DRR system often fails to involve a greater share of the private sector, CSOs and citizens in the preparedness phase. By contrast, in the community, trust operates independently from the links with the formal system.

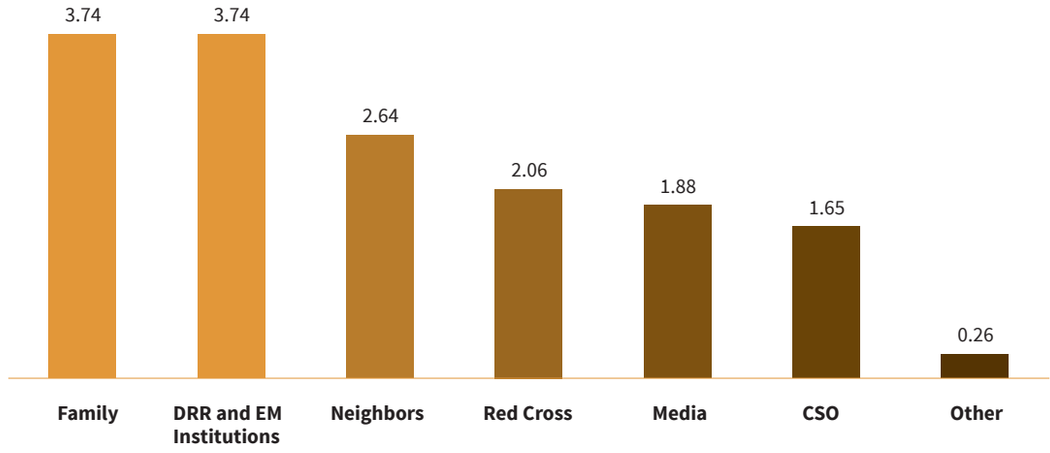
RISK RESPONSE AND RECOVERY

Trust in times of crisis

The survey among focus groups' participants who evaluated the levels of trust and the characteristics of trust in the community in emergency situation pointed to a changing nature of trust in times of crisis. Trust in the local DRR system increases from the community as a whole. Moreover, connectedness within local ESHQ members rises during the crisis.

The combined scores by both CSO and ESHQ focus group participants about trust reveal that the trust in family was equal to the trust in DRR authorities during the crisis (figure 15) and was above average, standing at 3.74 points on the Likert scale of 1-5 (1 – poor; 2 – below average; 3 – average; 4 – above average; 5 – excellent). Trust in neighbours in all municipalities was less prominent, between fair and good (2.64 points). In contrast, the citizens in the sampled municipalities, regardless of their affiliation, had the least trust in the CSOs (1.65 points). The trust in the media was also low, at 1.88 points, while the trust in the Red Cross was below average (2.06 points).

Figure 15.
Trust of CSOs and ESHQs combined – average scores

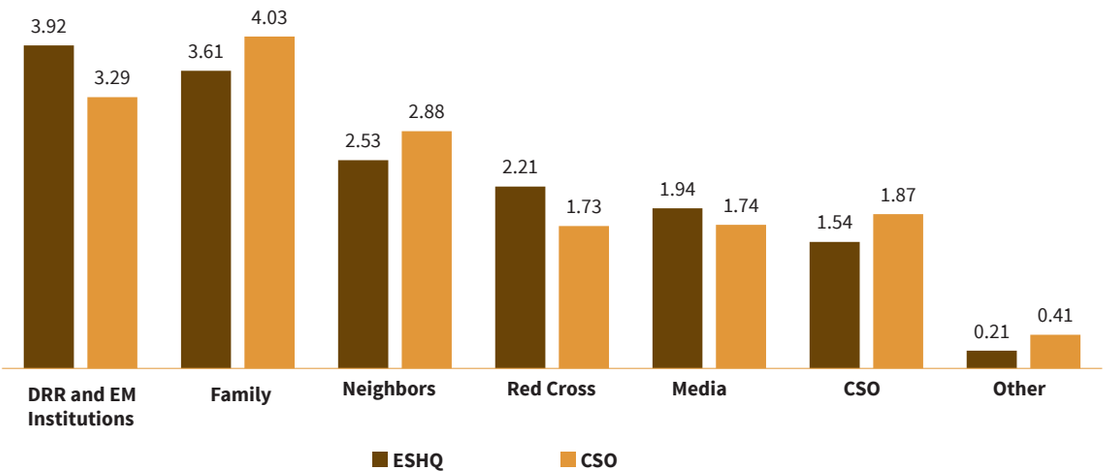


Trust of ESHQ members and civil society organizations

When the level of trust is assessed separately and only among the ESHQ members, the scores almost completely follow the above pattern (see figure 16). ESHQ members rank trust in DRR structures as the highest (3.92 points) followed by trust in family, which is also close to very good (3.61 points). The weakest trust the local DRR system shows is in citizens' associations (1.54 points). These results correspond with the levels of cooperation established between the CSOs and the local DRR system, and with the levels of information flow between them. Trust in the media is also low, below average, at 1.94 points. The trust in the Red Cross and neighbours is slightly above average, at 2.21 points and 2.53 points, respectively.

In contrast, CSO representatives have more trust in family than in the DRR system. They still considerably rely on the local DRR system in times of crises, as figure 16 shows. The level of trust in family is above average (4.03 points), while trust in the DRR system is ranked as slightly above average (3.29). While cooperation between CSOs was assessed as satisfactory in times of crisis, the levels of trust show the opposite. The level of trust of CSOs in other CSOs is almost the lowest on the trust scale (1.87). The CSOs have lower trust only in the Red Cross (1.73) and the media (1.74). Trust in neighbours is higher than the trust displayed by the ESHQs, but it is still slightly below average (2.88).

Figure 16.
Trust: Average scores by the CSOs and ESHQs



Note: ESHQ=Emergency Situation Headquarters; CSO=Civil Society Organization; DRR=Disaster Risk Reduction; EM= Emergency Management

Assessment of trust by municipalities

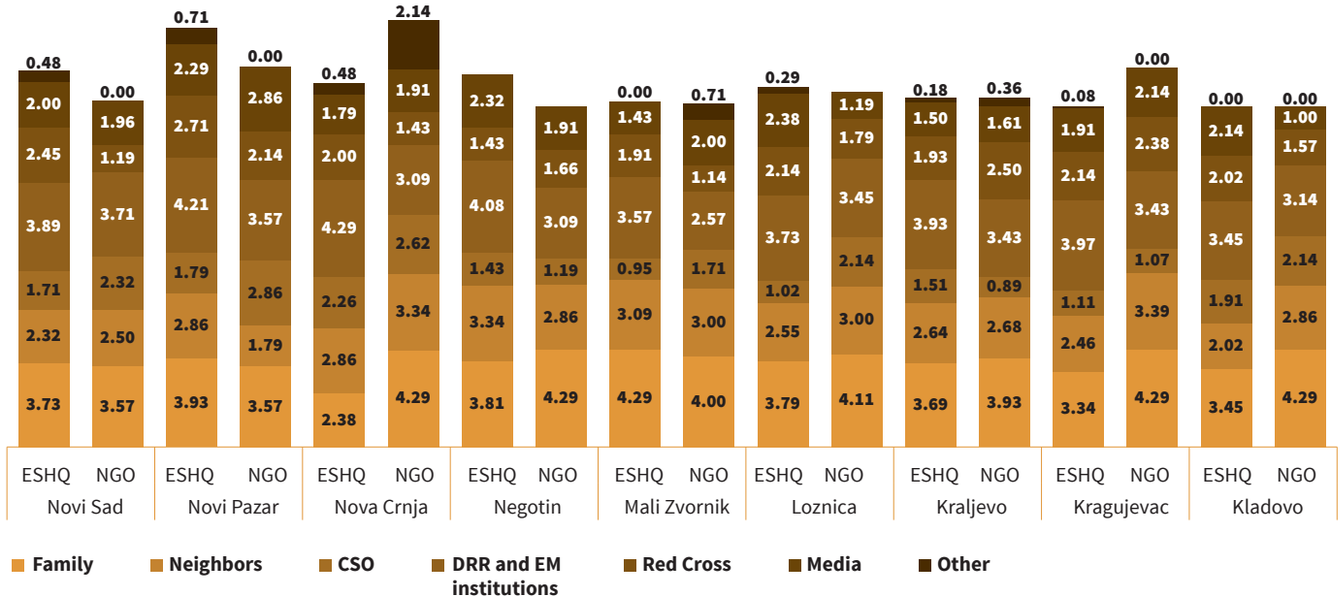
When the sampled municipalities are compared,[42] including both CSOs and ESHQs (figure 17), Šid and Novi Pazar are among those with the highest level of trust in the DRR local authorities (4.01 points); Mali Zvornik has the lowest levels of trust in the DRR system, at 3.07 points. In general, the levels of trust in the DRR system are considerable.

By contrast, Mali Zvornik and Negotin have the highest trust in family. In these cities, neighbours are also trusted and are in third place, followed by trust in the DRR local authorities and in family. The lowest trust in family is in Nova Crnja and Šid. Nonetheless, the family still ranks well, ranging from 3.01 to 4.13 points. Mali Zvornik, Negotin and Nova Crnja trust in neighbours more than others, with an average rank above 3 points. At the same time, all of the other municipalities ranked neighbourly trust between fair and good, with the exception of Šid, which has the lowest trust in neighbours, at below average (1.71 points).

Trust in CSOs is generally low, ranging from poor in Smederevaska Palanka (0.95 points) to fair in Nova Crnja (2.38 points). In all of the other cases, trust in CSOs was assessed between poor and below average. There is a similar assessment of trust in the media, with the lowest trust shown in Obrenovac (1.19 points). All of the other municipalities evaluated trust in the media as fair or below average; in Šid and Novi Pazar only, trust in the media scored slightly better, at 2.38 points.

There was little trust in the Red Cross; it was the lowest in Mali Zvornik (1.43) and the highest in Šid (2.86). All other municipalities assessed trust in the Red Cross at below average, at 1.79 to 2.55.

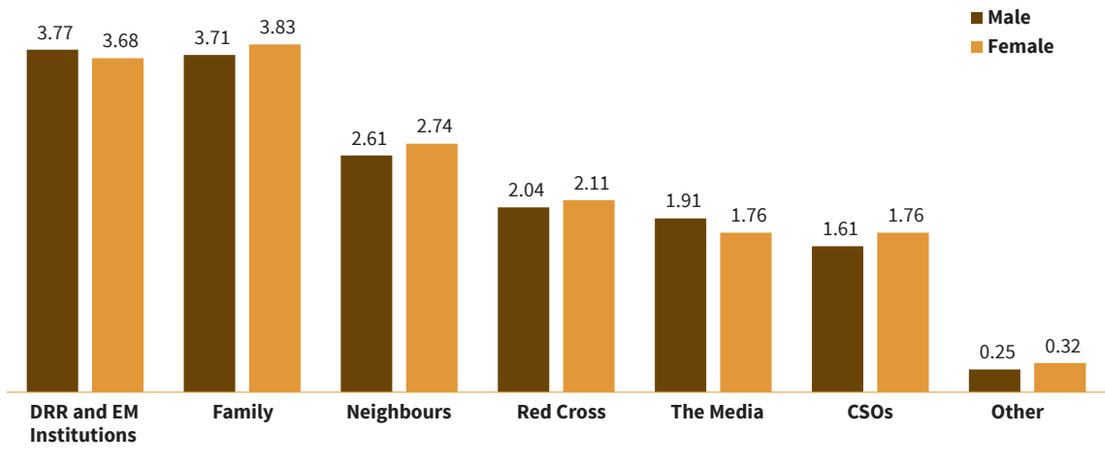
Figure 17.
Trust: Average scores, by municipality/city and type of organization (CSOs and ESHQs)



Gender and trust

When analysing the results of the questionnaire on the levels of trust using a gender dimension (see figure 18), it is clear that women, more than men, trust in family, while both men and women amply trust in local DRR institutions in times of emergency situations. Moreover, women more than men trust in neighbours and friends. Females equally distrust CSOs and the media, while men have the least trust in CSOs.

Figure 18.
Trust – Average scores by gender



Finally, recovery from natural disasters to some extent keeps levels of trust at the same level between family, friends and neighbours in the community. The trust in the DRR system at the local level decreases, notably in relation to the transparency of recovery and relief processes and the fair distribution of aid to those affected by the disaster.

Box 16.
Links between statistical analysis and field research: political participation and trust

Novi Pazar, and Šid showed the highest levels of trust in local DRR authorities, which corresponds with the CRI results on the high political participation in these municipalities. Kladovo is marked by the CRI as the municipality with the lowest political participation, which also correlates with modest levels of trust in this municipality in DRR authorities.

In contrast, Negotin shows considerable trust in the system actors during the crisis according to the research, but this municipality, as per CRI, shows one of the lowest levels in political participation.

The results of the CRI-based municipal analysis only partially corresponded with the results of the field research; the CRI dimension did not include trust in assessing social capital as a factor of resilience, which could be one of the reasons.

These results indicate the higher level of embeddedness of women in the local community including their ability to mobilize and create higher levels of social capital compared to men.

* * *

Trust is the litmus test of a community's wellbeing. The good and above average scores in trust show that informal relationships between family, neighbours and friends support and provoke instant reaction in times of crisis in the form of information exchange, cooperation, volunteering as well as care of vulnerable members of the community (see previous sections).

Trust in the system and DRR authorities increases during the crisis. There is a significant trust in ESHQ and among local members of the ESHQ. As seen in previous sections, in increased citizen engagement during the crisis.

The lack of trust in CSOs from the local DRR system showed that the levels of trust follow the patterns of cooperation and established partnerships between two parties. By contrast, CSOs showed a high degree of trust in the local DRR system and low trust in other CSOs. This shortage in trust apparently did not affect the mechanisms of cooperation between different CSOs that acted for the common aim.

When inspecting gender dimensions in creating and maintaining trust, it is evident that women are trust incubators. They refresh relationships and trust at multiple levels in the community for positive ends. Implicitly, these results indicate the higher level of embeddedness of women in the local community including their ability to mobilize and create higher levels of social capital than men.

Comparing the results of this survey with the CRI poses problems. The CRI dimension does not include trust in assessing social capital as a factor of resilience, but indirect correlation can be established between the level of political participation in the visited municipalities and levels of trust. Political participation (including all levels of civic participation such as volunteerism for example) is, dependent on the types and levels of trust. Increased political participation can be associated with high trust in local government, or in this case, in DRR structures, but, as shown, this association is not straightforward.

CONCLUSION

Resilience of communities is shown in their capacity to facilitate, quickly and in coordinated fashion, the process of preparedness and response through actions of many stakeholders, national and local, government and non-government. Resilient communities have the capacity to rely on internal strengths and resources to confront natural hazards (Murphy, 2007). How stakeholders cope with risks, including their adaptive and transformative capacities, is the key manifestation of resilience. Social networks and ties between them, formal and informal forms of civic engagement, communication, social inclusion, trust and solidarity are key constituents of social capital and also of resilience.

COMMUNICATION AND COMMUNITY RESILIENCE

The quality of communication and information sharing are directly linked to resilience. This shows the capabilities of the networks in the system and the community to quickly transmit information that can save lives and property, and impact on decreasing the inevitable damage.

As evidence from this report suggests, when formal channels of communication are inefficient and institutions are overwhelmed, the protection and rescue of endangered citizens and property depend on the capabilities and resilience of the local community. In responding to crises, communities in Serbia significantly relied on informal channels of communication. In the majority of cases, the DRR system also utilized these communication channels and benefitted from them. On some occasions, the DRR system also actively sought the support of alternative communication channels, which improved its overall performance. Word-of-mouth dissemination of early warnings is a manifestation of strong connections in the local community and between the local DRR system and community representatives.

The issue of trusting media information is discussed in this research with regard to the self-censorship tendency of some local media, accompanied by tendencies of local authorities to politicize emergency situations. For this reason, informal word-of-mouth to spread information was used in these communities during the crisis. It also compensated for the lack of available information.

Although informal information channels dominate in information sharing within the DRR local system and the community, they are certainly not the only active channel used during the period of risk response. An equally important role is played by the situation cen-tres (where established, mostly in bigger communities) of the local DRR, which impact on the availability and smooth flow of information during the crisis in a formal way. They connect with the media and ensure the dissemination of necessary information to citizens.

The lack of information in such circumstances affected the proper organization and strategies in the emergency situation and consequently the ability of local communities to cope with risks. As accounts from the field show, only when the system and community act in synergy, the informal and alternative channels of communication can be utilized to the maximum for community resilience.

PARTNERSHIPS AND COMMUNITY RESILIENCE

Partnerships and cooperation within the DRR structures and with the community are in the majority of cases characterized by informal, rather strong ties.

Local communities are rich in resources, but the potentials of private sector, CSOs and citizens are recognized by the ESHQs only in the times of crisis. The nature of partnerships in Serbian communities is strongly embedded in personal connections and friendships, whereas formal collaboration within DRR system and with the community is weak.

Although the local DRR system capitalized on the robustness of this social capital in risk response, counting primarily on the private sector to compensate for physical shortages, the cooperation was in most cases ad hoc and reactive. At the same time, partnerships with CSOs and private sector are not recognized as a source of necessary human know-how.

When the cooperation between state and non-state actors is planned, as shown in a few communities, the local DRR system gained in speed and efficiency in responding to the crisis, which minimized losses in lives and assets, and also increased the pace of recovery.

Collaborative practices of the local ESHQs with the national and regional DRR authorities mirror the cooperation with the community actors. While generally weak, collaboration increases in the risk response. However, late local reaction to upcoming risks, as shown in several municipalities, directly implies fragmented and underdeveloped cooperation and coordination within the overall DRR system.

General-purpose civil protection units are an integral part of the DRR system and are based on the partnership and direct participation of citizens in all the DRR phases. Where present, their contribution has been significant, but so far they have only been established in a small number of municipalities.

Networks established between local DRR system and the non-state actors showed a potential for increasing local resilience. However, ESHQs did not capitalize sufficiently on the willingness of citizens to partner with and provide their assistance.

VOLUNTEERISM, HUMANITARIAN AID PROVISION AND COMMUNITY RESILIENCE

One of the most valuable resources found in the local community that assists the risk response and recovery is mutual support provided by citizens to citizens. Formal and informal volunteerism is high across Serbia in times of crisis. This is a manifestation of solidarity and social cohesion. Volunteerism is most commonly realized through the provision of manual work and the collection and distribution of humanitarian aid. Close ties in the community affect the supportive actions of volunteers.

Volunteerism in Serbia is characterized by a high inclusionary component of all population categories, but particularly young men and women motivated to actively participate in ameliorating community life. This is a promising result because it instils the culture of support and activism for the betterment of the local communities. The support provided from citizens to citizens is not constrained by the physical boundaries of the affected community; it spreads where needed to others affected by the natural disasters across local communities and across the country's borders.

Motivation as an important factor in volunteering and, as evidence shows, in spontaneous volunteering in times of crisis (Barraket et al., 2013).

However, failure of the system to securely and effectively manage the inflow of volunteers and the provision of their services, constrained the full utilization of volunteers' action as a powerful resource of the community in times of crisis.

As evidenced in other studies, active civic participation is essential in dealing with natural disaster (Stockholm Resilience Centre, 2015: 14). This is particularly evident when the DRR local system and the community face material, physical and financial drawbacks. In the context of Serbian municipalities, the ability of the community to self-organize in humanitarian aid collection including voluntary engagement through informal community networks demonstrates the high solidarity potential. Active civic participation should therefore be considered by the DRR system as a manageable category. Local self-governments should plan on this community resource in times of crisis and recovery.

SOCIAL INCLUSION AND COMMUNITY RESILIENCE

The positive association between social inclusion and resilience depends on how the inclusion of women and vulnerable population categories is operationalized in the DRR system and in the community in all DRR phases. The evidence shows that in local communities in Serbia, vulnerable populations, as well as women, are barely involved in risk preparedness and response activities.

Women are more exposed to risks and vulnerable in times of crisis. At the same time, they are a resourceful force of solidarity and more effectively mobilize citizens in the local community as evidenced also in other studies (Renzulli, Aldrich and Moody, 2000:523–546). Furthermore, women treat disaster events or potential threats more seriously than men. This contributes to better preparedness and risk awareness (Cutter, Tiefenbacher and Solecki, 1992: 5-22; Fothergill, 1996: 33-56). Still, these aspects are not fully understood by the DRR stakeholders. At the same time, the community's motivation is also not very strong. The inclusion of women and women's organizations in all levels of disaster response and recovery planning, coordination and implementation is lacking and thus is necessary (UN, 2014).

There was scarce treatment of issues of inclusion of vulnerable population categories (the elderly, people with disability, ethnic minorities, children, etc.) within the DRR local (and national) structures. Also, the wider community also failed to establish workable links with representatives of this population. This indicates a lack of social integration (Shortall, 2008: 450-457).

The reasons for these occurrences are related to the types of networks developed in the community as a whole. Reliance on family and friends that prevails in the context of Serbian communities and with regard to engagement in crisis situations may have negative implications for the processes of social inclusion. Strong in-group ties often restrict inclusion of those 'other' and 'different'. For this reason, people with disability, for example, the elderly, and poor and ethnic minorities are often exempted from mainstream society. The prospects for their coping with risks in such circumstances are endangered. This weak social capital directly restricts resilience.

TRUST

Trust and solidarity are directly shaped by the local context. During a crisis, individuals are primarily concerned with protecting their own and their family's security. It is therefore important that individuals trust in community capacities to this end. Trust lubricates social capital and directly affects the volume of resilience of municipalities. When trust is well developed, it facilitates community action and cooperation at multiple levels.

According to evidence, trust is well developed in networks that are informal, either within the institu-

tional, community or in the intersection of these two domains locally. Local communities in Serbia show significant levels of trust in family members and friends. To an extent, they also trust their local DRR system, but only in times of crisis. Yet, trust in the system as a whole is weak.

But in the context of natural disasters, as results show, acting for the common aim sometimes does not need to establish strong trusting relations among a wide range of institutional and community members. This is not surprising, since some recent studies on social capital in the Serbian context yielded similar results (Kovač, 2015). Additionally, when inspected through a gender lens, women tend to show higher levels of trust than men in both the local DRR system and community networks.

The nature of networks and ties, trust and solidarity show that most of the visited Serbian municipalities are enabled to cope with natural disasters. However, their adaptive capacities as a manifestation of resilience vary. Weak cooperation between national and local DRR structures, and between local government and non-government actors, cannot be compensated with strong informal ties and trust within local communities. This affects and decreases community resilience in Serbia.

FINAL REMARKS

Does social capital make communities in Serbia more resilient? Social capital of the community has shown to be one of the key factors in community resilience to natural disaster in Serbia, especially in moments of acute crisis. The social capital that serves as a DRR local system and community resource in Serbia is characterized by strong ties, informal contacts, and high trust in family, neighbours and friends. Their support is important in times of crisis and is less evident in the preparedness and recovery processes.

There is a need for greater recognition of social capital, which should be systematically built into the DRR system, both nationally and locally, allowing for its translation into resilient community practice and action. If recognized, community practices may indicate and strengthen new directions in the development of DRR policies. Together they increase community potential for resisting, absorbing, accommodating to and recovering from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions (UNISDR, 2009). Accordingly, human development will be better ensured and people's capabilities and wellbeing less endangered, allowing them to cope and adjust to adverse events (UNDP, 2014a).

RECOMMENDATIONS:
HOW TO BUILD RESILIENT COMMUNITIES IN SERBIA?

RECOMMENDATIONS FOR BUILDING RESILIENT COMMUNITIES IN SERBIA

One of the key assets of the paradigms of resilience, DRR and human development is the empowerment of people, communities and countries, which is also the key idea underlying the social capital concept. These recommendations are thus focused on the strengthening and inclusion of social capital aspects in the existing national and local DRR systems to further enhance their inclusionary features, based on the additional statistical analysis and field research in Part Two of the report. Other recommendations relate to enhancing the policy and institutional framework of the DRR system in general, as they facilitate boosting of the system's inclusionary characteristics.

RECOMMENDATIONS: THE CAPITALS OF RESILIENCE INDEX

The recommendations in this section reflect the findings of the additional CRI statistical analysis, presented in Chapter 1, Part Two, of the report. Results of the analysis yielded a set of general recommendations for researched municipalities in the domains of each capital of resilience of the CRI.

NATURAL CAPITAL

Natural capital[43] is generally weak in the visited municipalities. Agricultural and land protection measures to natural disasters should be increased in seven municipalities: Smederevska Palanka, Obrenovac, Mali Zvornik, Šid, Kladovo, Vranje and Negotin. Taking into consideration that the first five are exposed to floods and have a high share of agricultural land, with high percentage of large plots, these measures could have a significant positive impact not only on the individual level of the owners of the plots, but also on the entire agricultural industrial production, affecting the gross product and prosperity of the municipality as a whole. Protective agricultural and land protection measures are also required in Vranje and Negotin. The measures should be tailored to safeguard numerous small-scale farmers from floods and forest fires, whose even limited exposure to risks may lead to poverty.

The analysis did not generate enough information for developing recommendations for the other six municipalities.

ECONOMIC CAPITAL

The results of the CRI analysis indicate that Novi Sad and Vranje have the greatest potential for building resilience with reference to characteristics and the level of economic capital.[44] They have the highest gross municipal product, a high number of active companies per 1,000 population, and a high number of employees compared to the population. Taking into account the exposure to fires of Novi Sad and Vranje, and potentially other hazards such as floods, education on preventive and protective measures should be institutionalized through the corporate social responsibility activities of the numerous companies these municipalities have.

The promotion of insurance policies with support of local administration is recommended for Smederevska Palanka and Loznica. These municipalities affected by floods are characterized by high vulnerability because of their high number of entrepreneurs whose businesses and property could be endangered in the case of natural disaster.[45]

Furthermore, given the potential of Kladovo's and Obrenovac's public budgets, they can afford to set up a modern and efficient DRR local system. Stronger DRR municipal policy followed by adequate budgetary planning and investment in building up the DRR structure should be fostered and is highly recommended for these municipalities.

Mali Zvornik, Negotin and Smederevska Palanka have the weakest resilience potential in economic parameters. This indicates their high reliance on external support and their weak ability to strengthen their resilience to natural disasters by local investment through an increase in economic capital in general. This also calls for greater donor support of programmes for enhancing DRR in these municipalities.

The analysis did not generate enough information to provide solutions for the remaining municipalities of Nova Crnja, Kragujevac, Kraljevo, Šid and Novi Pazar.

PHYSICAL CAPITAL

Underdeveloped road infrastructure and distance from the regional centre affect accessibility and provision of aid in case of natural disasters, such as in Novi Pazar. Therefore, investment in these elements of physical capital[46] should be fostered. Enhanced connectedness of the municipality to other regional centres should be strategically planned including through public-private partnerships.

Good educational and health infrastructure in Nova Crnja, Mali Zvornik, Negotin and Kladovo should be planned for adequate use in emergency situations as care centres. The plans should be developed to provide solutions for these facilities to fast adapt in crisis situation.

Novi Sad, Kragujevac, Kraljevo and Vranje, although not superior in terms of educational and healthcare facilities, stand out for their high number of doctors per population. Bearing this in mind, the existing quality of health provision can be used for supporting training activities of first aid provision in these cities to targeted citizens' groups and in other municipalities lacking this form of capital. These same municipalities are, however, at risk of significant material losses in the case of national disasters, considering the large total value of their residential area per square metre. Local DRR policies measures should thus stimulate increased insurance practices of citizens in these municipalities.

HUMAN CAPITAL

As regards human capital,[47] the high share of dependent population increases the vulnerability of Negotin and Kladovo to natural disasters. Inclusionary practices for the dependent population (children, the elderly, people with disability) should be a part of plans and programmes of local DRR structures in these municipalities because they have the highest share of dependent population. Specific guidelines through DRR cycles should be developed with the aim to increase awareness and preparedness to natural disasters of these population groups.

The high share of social welfare beneficiaries from the total population in Nova Crnja and Mali Zvornik indicates that poverty can be easily aggregated by the inability of social services and economic support to overcome the consequences of natural catastrophes. Specific welfare measures should be tailored to the population of municipalities of Nova Crnja and Mali Zvornik to prevent their slipping into poverty. Protective measures for social welfare beneficiaries should be also introduced in risk response and recovery policies at the local level. This additionally implies that there is a need for greater involvement of external resources in emergencies.

Strengthening information sharing at all levels of society and between the community and DRR authorities at the local level is particularly important in municipalities with high population density, such as Novi Sad and Kragujevac, which, in the case of natural disasters, can increase exposure with significant consequences. Developing information-sharing platforms within the local DRR should be part of DRR local policy.

SOCIAL AND INSTITUTIONAL CAPITAL

The analysis did not encompass key dimensions of social capital[48] such as trust, norms (solidarity) and networks; instead, it used political participation as a proxy for all these aspects, partly because of the lack of data in these domains on municipal level. According to the analysis, a high level of political participation may indicate a higher level care of citizens for the prosperity of their communities and broader inclusive culture of the municipalities.

Through increased political engagement, citizens in Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac and Kraljevo (with a high percentage of voters that voted in local elections) can advocate for the inclusion of CSOs and informal citizens' groups in the local DRR system. In contrast, in Negotin and Kladovo (with a low percentage of political participation), links between LSGs, citizens and CSOs should be established in the DRR system, potentially with the support of external, more experienced CSO and DRR actors.

Local DRR policies in Novi Pazar, Nova Crnja, Smederevska Palanka, Vranje, Šid, Kragujevac and Kraljevo should focus on designing procedures for increased information sharing to pre-school institutions

about risks from natural disasters and protection practices, given the high number of children in pre-schools. Local DRR policies should also have provisions on the training practices to be delivered to children and teachers in these municipalities.

Special attention should be paid to developing local DRR policies with the view to answering the need for increased inclusion and outreach to all vulnerable population categories in order to decrease vulnerability to natural disasters in in Negotin and Kladovo. These municipalities also face a high primary school dropout rate, which is related to the increased vulnerability of this population group that also may have blockages in information sharing about risks from natural disasters.

Novi Sad and Kraljevo should develop local DRR programmes for rapid information sharing through social media channels in times of crisis and also distributing information on risk prevention, protection and response practices, for example, through short films. Novi Sad and Kraljevo have a high percentage of computer literate people, which is an asset for rapidly disseminating DRR information.

The CRI has provided limited data on social capital and its role in 'building back better'. Moreover, recommendations stemming from the CRI findings provide more general directions for DRR local engagement within the domain of particular capitals of resilience. As such, the recommendations in this domain do not specify time-scales within which they should be met.

RECOMMENDATIONS: SOCIAL CAPITAL AS RESILIENCE AND A DISASTER RISK REDUCTION RESOURCE

The recommendations in this section are developed based on the findings in Part Two, Chapter 2 of the Report. They concern each thematic area of the social capital manifestation practices in the Serbian local DRR system and the communities with reference to the risks from natural disaster in risk prevention, preparedness, response and recovery practices. The recommendations are designed to reflect a time-scale for implementation by local/national institutional DRR actors.

COMMUNICATIONS AND INFORMATION SHARING IN PREVENTING AND REDUCING RISKS

Short-term Recommendations: Risk preparedness and risk response

The recommendations include enhancing the EWS system and information management based on IT solutions as well as alternative and informal channels of communication.

EWS capacities should be updated through a better differentiation of potential risks and relevant warning sounds, including renewal of EWS equipment. The mobile application for receiving early warnings in case of different natural disasters can be developed through a science competition in Serbian high schools and universities, and supported by the national DRR institutions, Public Investment Management Office and/or donors. It can then be download free of charge by citizens through the LSGs portals.

The use of social media and Internet portals of LSGs, inclusion of amateur radios into DRR communication policies, and communication training and organizational set-up that implements these new practices should be enhanced through the national and local DRR system. Dissemination of generic information via social media and Internet portals of the local LSGs activities on risk preventive practices will raise awareness on risks and increase citizens' preparedness to risk response. This also includes dissemination of practical guides for citizens about procedures to be enacted in emergency situations.

Communicating through amateur radios when the electricity is down should become a part of the DRR strategy.

Establishments of situation centres in municipalities in Serbia should be fostered to increase information flow. The situational centres should be constantly accessible and disseminate information on potential threats to various institutional actors and communities.

Video billboards could be developed to use existing resources in the community to transmit information; for example, they can serve to disseminate warning information if connected with the situation centres. They can also be used for sending out messages and raising awareness about the importance of risk prevention, mitigation and preparedness, and on procedures for risk response and recovery. This would be a sustainable and profitable investment by local or national government because it could be leased to advertisers when there are no early warnings or risk awareness-arising activities.

Mid-term Recommendations: Risk prevention and preparedness

The recommendations focus on the development of inclusive outreach plans at the local level to reach every citizen, with a particular emphasis on vulnerable groups. They also draw up the establishment of DRR communication teams and further strengthening of the EWS capacities.

Documents about the categories and size of the vulnerable population in municipalities that have low information accessibility with proper outreach plans should be developed by LSGs.

In the mid-term, establishment of DRR communication teams at national and local levels should be followed by provision of training to team members in effective information sharing about DRR principles and potential risks from natural disasters. Development of an outreach strategy for the communication teams should be initiated. At the same time, the training of civil protection trustees to volunteer in communication activities should also be included.

Further investment of the local DRR structures (through plans, programmes and projects of the LSG) is required in order to build alternative information sharing tools, for instance, developing local DRR mobile units to directly deliver information during risk response to the community by spreading the word and and providing instructions on response procedures. The use of all-terrain vehicles that can manage high water and difficult terrains for this purpose is recommended. Moreover, planning of information dissemination about risks should involve the design and use of alternative information-sharing tools that do not require electricity.

Enhancement of the EWS through the establishment of national 112 number further should be ensured. Strengthening institutional capacities of the EWS shall also include developing and instituting information on risk knowledge in a community and broadly and inclusively communicated risk assessments and plans.

COOPERATION, COORDINATION AND PARTNERSHIPS AS VEHICLES FOR ACCESS TO RESOURCES AND COMPETENCES

Short-term Recommendations: Risk prevention, preparedness and risk response: multi-level cooperation and coordination

Inter-municipal cooperation on risk awareness and preparedness activities within the local DRR system should be promoted. This can be achieved by institutionalizing forums for sharing lessons learned and best practices in building up better DRR systems at the local level in prevention, mitigation and risk preparedness. Moreover, inter-municipal cooperation on establishing risk reduction plans should increase productiveness in this domain and thus is recommended. Cooperation between municipalities from the same geographic location should be systematically improved.

Mid-term Recommendations: Risk prevention, preparedness and risk response: multi-level cooperation and coordination

The levels of cooperation and coordination between local and national DRR actors should be enhanced. In addition to planning protocols for increased cooperation and coordination, the incentives for building forums for national and local DRR officials should be established and implemented. Direct networking of local and national actors should be encouraged through meetings and events for exchange of best practices, both national and international, and discussions on positive incentives and the challenges of the system at all levels. In this regard, a body should be established that would be in charge of this networking aspect within the DRR system as a whole.

Moreover, cross-border cooperation should be further promoted and institutionalized in the DRR system at both the national and local levels. Preparation of risk municipal plans that also entail mapping of the potentials of cross-border and neighbouring municipalities in case of crisis is recommended for institutionalizing cross-border exchange and cooperation.

Officials from the *mesna zajednica* should be increasingly involved in the local DRR system. They should serve as incubators for mobilizing citizens' networks into the DRR system via civil protection trustees' engagement. The *mesna zajednica* should represent the focal point of local DRR in the community that is able to incubate community potential for risk prevention and response. The Law on Local Self-government (Official Gazette of the Republic of Serbia, 2014a) includes provisions on the work of the local councils; however, this work should be further defined by a separate law on local councils that would include provisions related to local councils' obligations in the field of DRR. This would enable increased security and sustainability with respect to natural disaster risks in the smallest parts of the community.

Short-term Recommendations: Risk prevention, preparedness and risk response: partnerships in the community

Mapping of the potentials of the private sector in risk response, preparedness and prevention is recommended because the capacities of the private sector can compensate for the weak physical and financial resources of the LSGs.

Moreover, local DRR should instigate measures to motivate citizens in *mesna zajednica* or/and *kucni savet* (home councils) to actively monitor and report possible threats and risks for their territory (waste in river beds, etc.) in order to increase the engagement of citizens and care for the community as well as foster networking between citizens and the DRR system.

Mid-term Recommendations: Risk prevention, preparedness and risk response: partnerships in the community

Cooperation and partnerships with the private sector should be institutionalized. A roster of private businesses that can support DRR efforts in risk prevention, preparedness and response phases should be established by the local DRR system.

Moreover, local DRR structures should establish cooperation with chambers of commerce at local, regional or national levels to promote the benefits of establishing public-private partnerships for risk preparedness and response. Chambers of commerce could become a focal point in networking private businesses and local DRR.

Local DRR should account for CSOs capacities in fostering DRR and community resilience. Partnerships between local DRR and CSOs should be developed to foster the capabilities of DRR in the community in general. CSOs can compensate for the lack of human capacities and know-how of the local DRR and could provide inputs in risk planning, prevention and preparedness. CSOs connections with the community could activate citizens' networks during the risk response.

Moreover, cooperation with citizens should be fostered through the involvement of citizen networks into the local DRR system through civil protection trustees. It is also advisable to ensure its localization by appointing civil protection trustees at the level of the *kucni Savet* (Home Councils) in the buildings of *mesna zajednica*.

In this manner, the continuous development of civil protection tailored to respond to the demands of the community is required. Training of civil protection trustees is required so that they can nourish and increase the civil protection network further and raise awareness in the community.

The municipality of Kraljevo can serve as a best practice model for other municipalities in Serbia on how civil protection should be set up and engaged. In Kraljevo, a vast network of civil protection trustees has been developed with a wide involvement of women. They represent a future resource for the local DRR system, which should be well planned and developed to be used in DRR phases.

VOLUNTEERISM AND COLLECTION OF HUMANITARIAN AID

Volunteerism and provision of humanitarian aid as acts of solidarity within formal and informal organizational structures should be further strengthened and better organized and promoted among youth in order to build up a culture of volunteerism and solidarity in the local community.

Short-term Recommendations: Risk prevention, preparedness and risk response: Volunteerism

Understanding the capacities of volunteers in local communities should be fostered. This includes mapping of potential volunteer capacities in formal volunteer organizations and informal volunteering at the level of the local DRR. Thus, a local volunteer register should be developed as an additional asset that the DRR system may rely on.

Moreover, in order to build on volunteer capacities, it is essential that local DRR structures have enough equipment to enable volunteer work during risk response. In addition, protection measures such as insurance for volunteers in risk response situations should be enabled.

Mid-term Recommendations: Risk prevention, preparedness and risk response: Volunteerism

Development of strategies and activities with regard to the promotion of volunteerism in risk preparedness and response directed towards youth should be ensured by the local DRR system. Promotional activities can include messages related to the benefits of volunteerism for youth and their community: development and strengthening of solidarity practices and networks in the community, gaining new experiences and contributing to the common cause.

It is of great importance that the regulation and management of organized volunteer work in risk response is ensured by the local DRR system. A focal point responsible for the management and distribution of volunteer resources should be established at the local DRR level.

In order to further increase local volunteer potential as a resource in crisis situations, training of volunteers in the main principles of response to risks from natural disasters should be ensured. This can be facilitated by the local DRR system in cooperation with the formal organizations of scouts, mountain rescuers and humanitarian organizations, among others. In this way, the local potential for risk response would be increased.

The regulation of volunteer work in risk preparedness and risk response should be ensured. The safety of volunteers in crisis situations should be addressed

through legal provisions (Law on Volunteering) and insurance practices.

Finally, the development of instruments for the quick and safe engagement of volunteers from the local DRR register should be ensured. For instance, the development of a free mobile application that sends out relevant messages to the volunteer network in the community should be supported.

Short-term Recommendations: Risk prevention, preparedness and risk response and recovery: humanitarian aid collection and distribution

In order to properly build on solidarity practices in humanitarian aid collection, rosters of local humanitarian organizations and other CSOs that are active in the field of humanitarian aid collection in general should be established. Their potential for aid collection could be used in risk response. However, the organization between humanitarian aid collectors and the local DRR system should also be set up.

Mid-term Recommendations: Risk prevention, preparedness and risk response and recovery: humanitarian aid collection and distribution

It would be beneficial to delegate a focal point role to the DRR official for coordinating with organizations and citizens who are active in humanitarian aid collection. It is also essential to keep registers of distribution of humanitarian aid in risk response and recovery at the local level by the DRR focal point for humanitarian aid collection. These registers should be publicly available at LSG web portals.

Finally, humanitarian aid distribution management must be enhanced at the local level to directly respond to the needs of those affected by natural disaster. Management of distribution procedures should be planned and applied by the DRR focal point for humanitarian aid.

GENDER AND SOCIAL INCLUSION

Short-term Recommendations: Risk preparedness and risk response: Gender mainstreaming

There should be a continuous recruitment of women in civil protection in light of best practice models such as the case in Kraljevo. Municipalities that apply best practices should thus be supported to transfer know-how in gender mainstreaming in civil protection to other municipalities in Serbia.

In the short term, women's organizations that are rooted in the community and have knowledge about women capacities to impact resilience should be engaged to mobilize and train women in DRR and civil protection principles. Cooperation with the local DRR structure and civil protection is important in this regard. Thus protocols of cooperation should be developed for this purpose.

Mid-term Recommendations: Risk preparedness and risk response: Gender mainstreaming

In order to foster gender mainstreaming in DRR, it is important to ensure that the participation of women in the DRR structures at national and local levels is constantly increasing. It is particularly important to involve more women in decision-making related to DRR. To this end, policy documents on gender mainstreaming in DRR should be further developed and appropriately implemented.

Moreover, support to women's self-help groups should be ensured in the community. Their role in risk preparedness, response and recovery should be fostered by empowering them to understand and exercise their role throughout the DRR phases. Women's self-help groups should network with groups and institutions that assist in providing psychological support to victims of the disasters.

Finally, risk preventive measures, plans and risk assessments should also account for the role of women in the local community in DRR and in civil protection.

Short-term Recommendations: Risk preparedness and risk response: Social inclusion of vulnerable groups

It is essential that local DRR in cooperation with Centres for Social Work (CSWs) ensure that mapping of vulnerable populations according to specific vulnerability categories is performed.

Moreover, an inclusive DRR system should account for the involvement of vulnerable population in the work of the system. DRR at both the local and national level should appoint a focal point to develop strategies for the involvement of particular vulnerable groups in the system (people with disabilities, Roma, etc.).

In order to increase local resilience potentials, it is essential to establish cooperation between relevant CSOs active in the social inclusion of Roma, the elderly, children, people with disabilities and local DRR. Together, they should be active in developing training curricula and delivering training on DRR procedures to vulnerable groups. Particular emphasis should be put on the development of the training curriculum for children and teachers in DRR procedures and rising awareness among children about risk prevention in the community. These programmes may be implemented as a part of extra-curricular activities in primary and secondary schools in the local community and in cooperation with educational institutions.

Special attention should be paid to the issue of Roma inclusion in the DRR system, considering the high level of their vulnerability to natural disaster and the negative impact to resilience of the community. The role of Roma coordinators in the LSG should be expanded to be involved in the work of the local DRR system. Roma coordinators would bring the Roma community closer to the system and wider community in general, and could act as focal points towards this population. They could be engaged in promoting the importance of risk prevention and preparedness to this population, and be active in liaising with organizations concerned with Roma inclusion into developing guidelines and training for this population about the risks from natural disasters and improvement of their position in this regard.

Mid-term Recommendations: Risk preparedness and risk response: Social inclusion of vulnerable groups

Local risk plans and assessments should deal with the social inclusion of vulnerable populations of the community. The vulnerability of the community to risks is directly decreased when attention is paid to the aspect of vulnerable population in strategic DRR documents at the local level.

In order to decrease further community vulnerability in the DRR context, it is required that specific strategies for each vulnerable population in risk response are developed at both local and national levels.

Equally important is setting up the plans and programmes for raising awareness among specific vulnerable groups on risks from natural disasters.

Finally, special attention should be paid to the aspect of vulnerability of the community concerning the position of Roma settlements (often in the highly flooding areas). Strategic DRR solutions at the local level should include alternatives for Roma settlements and also include this aspect of resilience in risk plans and assessments.

TRUST

The levels of trust in the community in multiple networks is an indicator of the social capital potential to act as a DRR resource. But increasing and maintaining trust in the community and within institutional levels is a complex and long-lasting process. Therefore, strategies for boosting and maintaining trust in the Serbian context and within the DRR auspices comprise bolstering the development of each manifestation of social capital process such as information sharing and communication, partnership building, cooperation and coordination, development of solidarity practices through volunteer engagement and by increasing the social inclusion of vulnerable population groups including gender mainstreaming into DRR. Therefore, recommendations to increase trust and foster community resilience must be strategic and ingrained in the principles of DRR work, in general, and with reference to efforts in fostering social capital, in particular.

Strategic Recommendations: Risk awareness, preparedness, response and recovery

Levels of trust heavily depend on the transparency practices of the institutions and their actions for the common interest. The principle of transparency of the work and results of local DRR structures should therefore always be applied and manifested in all DRR processes. Providing prompt and reliable information on the work and plans of DRR structures, the risk profile of the community, investments in risk prevention, mitigation and preparedness, and the role and responsibilities of citizens in this process should be a mandatory task of the local DRR. This would enable and increase citizens' participation as a watchdog in the community, which can support the system in its efforts to make communities more resilient to natural disasters.

Moreover, the provision of information on relief and recovery efforts is also an important step in increasing trust in the community. Proof of transparent work, the distribution of humanitarian aid and any other sup¬port precisely where needed are all factors in increasing trust in the local DRR system. Care for the community that eliminates corruption such as activities that use crisis situations for individual benefit is exactly what is needed to increase trust in the system. Trans-parent work should entail independent evaluation of recovery investments by the DRR at both local and ag¬gregate (national) levels.

The development of partnerships at various levels will increase trust in the system of DRR. Coordination and cooperation with different community actors will increase participation in DRR and consequently trust between the actors in cooperative actions.

Regular involvement of the community representatives in the work of DRR via CSOs, informal community groups and citizens' networks including vulnerable group representatives should become a practice that would gradually increase mutual understanding and trust between all involved actors.

Finally, continuous liaising with the research community in the field of natural hazards and social and economic issues is strongly needed. This should become standard practice at local levels. This kind of networking could increase trust in the local DRR as it operates with scientific facts and uses knowledge to increase the resilience of the community.

RECOMMENDATIONS: IMPROVING THE DISASTER RISK REDUCTION LEGAL AND INSTITUTIONAL FRAMEWORK

These sets of recommendations are related to improving general shortfalls in the DRR system in Serbia, which were discussed throughout the research for the NHDR. They concern the policy and institutional framework and practices for establishing a more effective and responsive DRR system in Serbian municipalities.

FINANCE INSTRUMENTS

Financial capacities of the local and national DRR system should be developed. Separate budget lines of the local self-government and its DRR system should be created to better support planning, assessment and response to natural disasters. Information on budgetary support and forecasts on required funding to ensure implementation of the DRR ambitious architecture should be provided early in the annual budget planning process, both nationally and locally.

Insurance policies for citizens and local governments should be further promoted. Insurance and other *ex-ante* risk financing mechanisms form a critical part of a comprehensive disaster risk management strategy, and have the potential to play an important role in DRR.

LEGAL FRAMEWORK

Recent developments in developing a new DRR legal framework should be further supported. Keeping in mind changes in the key legal document in the field, and given the excessive number of legal acts and by-laws relevant for the DRR, their harmonization is very important, because they directly impact on abilities of communities to prepare and respond to risks. Delayed implementation of related legislation also impacts on the effectiveness of key sectoral laws, and consequently on the effectiveness of local self-governments in risk planning. Moreover, accompanying by-laws should be developed shortly after the adoption of the law, because they are actually the instruments for policy implementation.

Mainstreaming DRR into strategic documents is also required: the DRR approach has been integrated mainly in laws and strategies related directly to DRR and emergency management; other documents, in particular those regulated to economic and social development, do not sufficiently consider DRR issues and climate change adaptation.

There is a need to ensure a contextual approach to natural disaster risks in local municipalities and thus use contextually tailored methodologies for local risks assessment, risk preparedness and response. Furthermore, local risk preventive planning documents should include measures for spatial and urban planning, the elevated role of inspection, and should include a sound and effective sanctions regime to be implemented (related to illegal construction at risk-prone areas, water and forestry maintenance, and communal services such as cleaning of river banks, channels and beds of watercourses).

HUMAN RESOURCES

It is important to invest in the further professionalization of staff in the local ESHQ to deal with risk planning, risk assessments and general procedures on risk response and recovery.

ANNEXES

ANNEX 1
METHODOLOGY

THE STUDY'S MAIN RESEARCH QUESTION IS:

Why and how social capital is vital for the resilience of Serbian municipalities exposed to natural disaster risks?

In addressing the research question, the National Human Development Report (NHDR) Team's main methodological approach was a qualitative, multiple-case study approach, which investigates contemporary phenomena within its real-life context. Data collection methods included: (i) desk research; and (ii) case study research based on focus groups and individual interviews.

The research was complemented with the presentation and analysis of data from the multi-dimensional Capitals for Resilience Index (CRI) for Serbian Municipalities, newly developed by the Serbian Statistical Office and supported by UNDP. The Index aims to measure the capacities and resilience of Serbian municipalities to economic, social or natural risks, based on nationally available data. By examining inter-linkages between five capitals (natural, physical, economic, human and social and institutional capital) through a series of indicators, the aim was to create a single measure for the multidimensional phenomenon of resilience.

The desk research consisted in a review of the relevant primary and secondary documentary sources that addressed issues of natural disaster and resilience nationally, but primarily locally. The literature related to the level of local exposure to selected natural disaster risks. Similarly, a desk review of the literature on context-specific social capital was conducted.

In scoping the desk review process as well as designing the focus group and interview schedule (questionnaire), the set of indicators defined in the Sendai Framework for Disaster Risk Reduction (UNISDR, 2015) in combination with the United Nations Report on Progress and Challenges in Disaster Risk Reduction (UNISDR, 2014b) were consulted.

Case study research was based on focus groups and individual interviews with relevant stakeholders in 13 municipalities facing natural disaster risks. Focus groups were with Emergency Situation Headquarters (ESHQs) and with activists from civil society organizations. Interviewees came from the ranks of national and local self-government officials, civil society associations and citizens.

The NHDR Team also used the small-scale survey method to test the additional perspectives on particular research questions. This was primarily related to questions about trust and cooperation and coordination mechanisms established at the institutional and community level in times of risk response as indicators of social capital. The method was applied through face-to-face interviews, after the completion of each focus groups discussion. The survey was carried out in 12 municipalities, excluding Vranje. Here, the questionnaire for focus groups was tested and on this basis, the survey on trust and cooperation was subsequently included.

Since the concepts of *municipality* and *local community* are often confused, it is important to clearly distinguish them. In the context of this research, *municipality* is the local-level government body, the territorial administrative unit of the local community. Municipalities derive their social, economic and political power locally. The local community, by contrast, is bounded by geographical lines, by the lines of the neighbourhood; it is rooted in place and local networks of relationships. Thus, local community is not necessarily bounded by administrative borders and governance matters.

METHODOLOGY APPLIED IN THE SELECTION OF 13 MUNICIPALITIES

The municipalities were selected on the basis of their exposure to the most common natural disaster risks in Serbia: floods, fires and earthquakes. table 1 presents the selected 13 municipalities.

Table 1.
The selected 13 municipalities

NO	MUNICIPALITIES
1	Novi Sad
2	Vranje
3	Kragujevac
4	Kraljevo
5	Šid
6	Novi Pazar
7	Nova Crnja
8	Obrenovac
9	Smederevska Palanka
10	Kladovo
11	Loznica
12	Negotin
13	Mali Zvornik

The selection reflected as much as possible a regional/spatial distribution: Vojvodina (three municipalities – Sid, Novi Sad and Nova Crnja), eastern Serbia (two municipalities – Negotin and Kladovo), central Serbia (three municipalities – Obrenovac, Smederevska Palanka and Kragujevac), western Serbia (two municipalities – Loznica and Mali Zvornik), western-southern Serbia (two municipalities – Novi Pazar and Kraljevo) and southern Serbia (one municipality – Vranje).

Table 2 presents the most common disasters in the 13 municipalities. Combined references were consulted as per the data shortfalls. In some official assessments, Kraljevo was not recognized as prone to earthquakes, while Obrenovac was not among the municipalities at risk of floods and landslides.

Although located in different parts of the country, and on diverse terrains, from flatlands and plateaus to mountains, all of the 13 municipalities were affected by floods and torrential flooding the last decade, and in the case of Nova Crnja, by pluvial flooding in 2011. All but one (Nova Crnja) are situated on the river banks, and often more than one river runs through their territories. Four municipalities were among the most affected by the 2014 floods (Republic of Serbia, 2014): Obrenovac, Mali Zvornik and Smederevska Palanka in May, and Kladovo in September.

The majority of municipalities (eight out of 13) have been exposed to flood-triggered landslides. Seven municipalities were identified as prone to forest fires. Kraljevo is the only municipality that was hit by the earthquake in 2010; other municipalities are still identified as exposed to this risk, such as Kragujevac, Loznica, Negotin, Novi Sad and Vranje.

Table 2.
Cumulative data on the most common risks from natural disasters in 13 Serbian municipalities

CITY/ MUNICIPALITY	FLOODS	LANDSLIDES	FOREST FIRES	EARTHQUAKES
	risk	risk	risk	risk
Obrenovac	✓	✓		
Kladovo	✓			
Kragujevac	✓	✓	✓	✓
KRALJEVO	✓	✓	✓	✓
Loznica	✓	✓	✓	✓
Mali Zvornik	✓✓			
Negotin	✓		✓	✓
Nova Crnja	✓			
Novi Pazar	✓	✓	✓	
Novi Sad	✓	✓	✓	✓
Šid	✓			
Smederevska Palanka	✓	✓		
Vranje	✓	✓	✓	✓
Total no.	**13**	**8**	**7**	**6**

Source: Republic of Serbia, Ministry of Interior (n.d-b)

Population density is usually considered one of the common risk drivers: the higher the density, the greater the risk of potential consequences of hazards. Table 3 shows that population density is highest in Novi Sad – the second largest city in Serbia. It is also high in Loznica, Kragujevac and Novi Pazar. However, these data should be considered together with other characteristics of these cities and municipalities in order to estimate their vulnerability to disasters (for example, institutional capacities and skills to prevent and manage emergences, and a tradition of voluntary and professional firefighting units). In addition, poorly maintained and overstretched public infrastructure, which includes transport, energy, drainage systems and communications, has become an important risk driver (UNDP, 2016b) of many cities and municipalities in Serbia, including those selected for this research.

Table 3.
General data/demography in 13 municipalities/cities

CITY/ MUNICIPALITY	AREA SQ. KM	SETTLEMENTS	INHABITANTS	INHABITANTS/SQ. KM
Obrenovac	411	29	71 419	174
Kladovo	629	23	23 097	37
Kragujevac	836	57	175 209	210
Kraljevo	1 530	92	120 971	79
Loznica	612	54	85 631	140
Mali Zvornik	184	12	13 854	75
Negotin	1 089	39	42 526	39
Nova Crnja	273	6	12 120	44
Novi Pazar	742	99	89 262	120
Novi Sad	699	16	306 853	439
Šid	687	19	37 968	55
Smederevska Palanka	421	18	55 282	131
Vranje	860	105	87 234	101
Average	690	44	86 264	127

Source: Republic of Serbia, Statistical Office (2010).

Based on the combined sources, it may be concluded that the selected municipalities primarily face hazard of floods, followed by landslides, forest fires and earthquakes. However, information and estimates on their exposure to risks vary from source to source. It is not consistent and data is scarce.

SAMPLE STRUCTURE OF FOCUS GROUPS

The field research was carried out from 15 October to 15 December 2015. A total of ten individual interviews and 27 focus groups were held during that period, and 210 people took part in the research. In addition, 27.4 per cent of all focus group participants were females, and 72.6 per cent, males (figure 1).

Figure 1.
Sample structure according to gender (%)

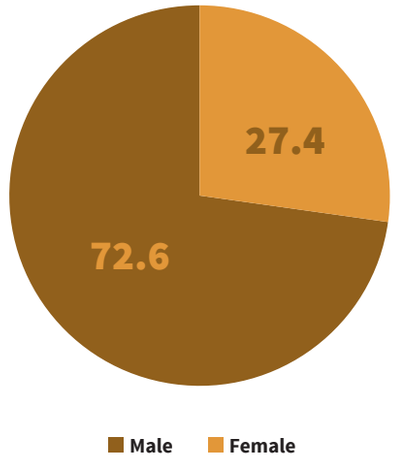
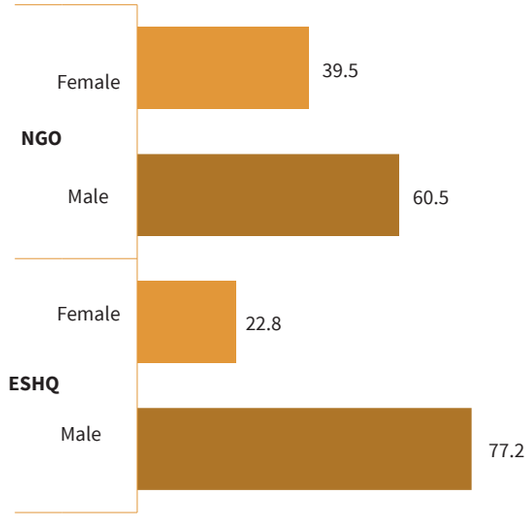


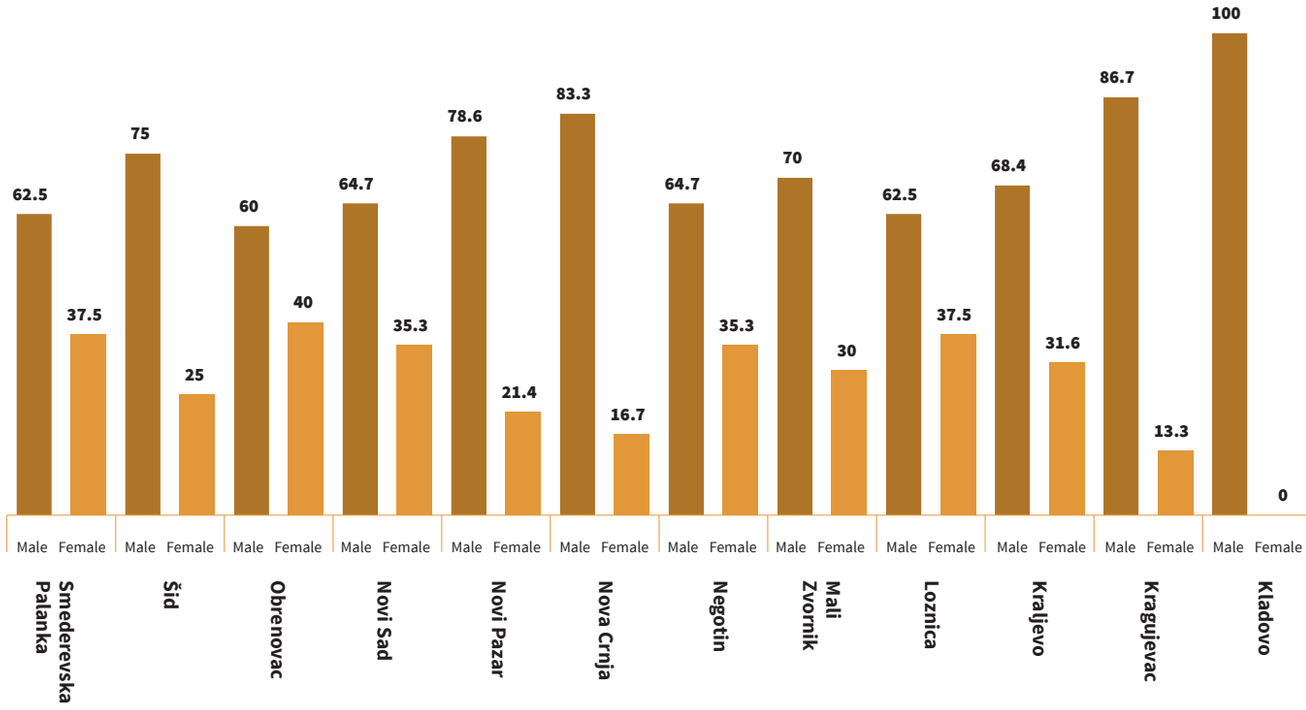
Figure 2.
Sample structure, by type of organization and gender



As presented in figure 2, males dominated in focus groups held both with civil society organizations and Emergency Situation Headquarters (ESHQs). Although female interviewees are in the minority, their ratio is higher among civil society organizations (CSOs) (39.5 per cent) than in the ESHQs (22.8 per cent).

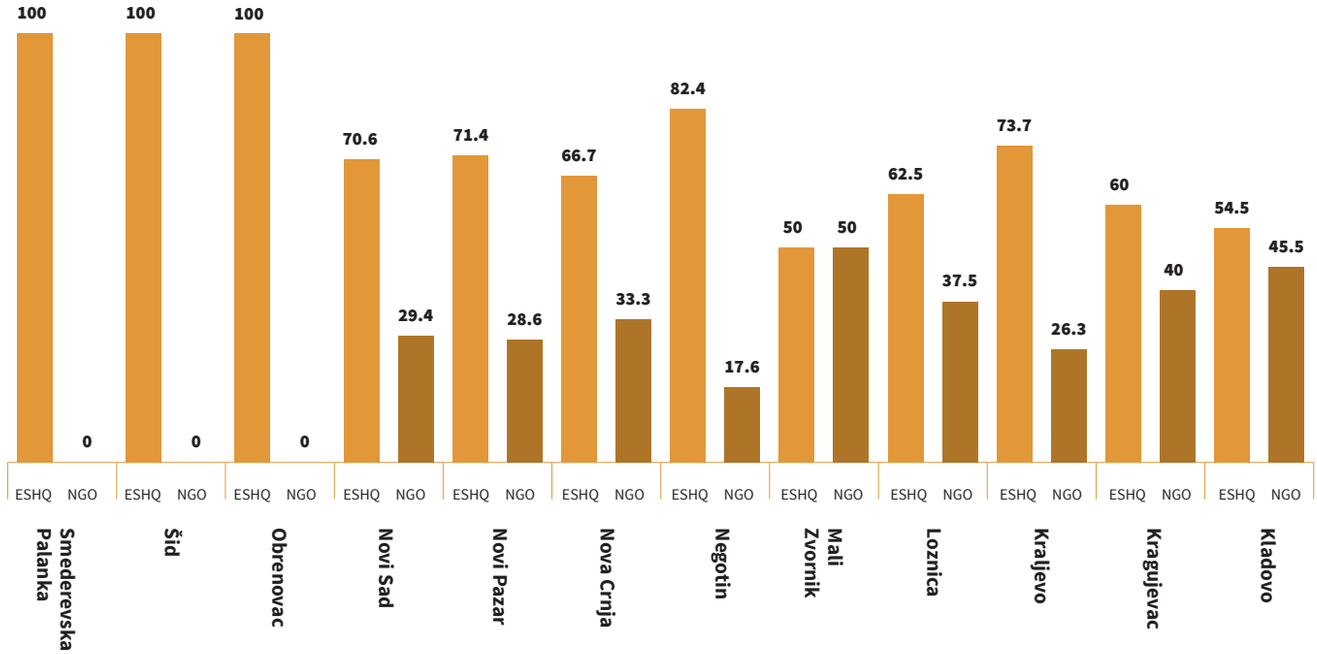
The highest ratio of female participants in focus groups was in Obrenovac (40 per cent), whereas the lowest was in Kragujevac (13.3 per cent). In Kladovo only, there were no female participants in the focus groups (see Figure 3).

Figure 3.
Sample structure according to city/municipality and gender



In three municipalities – Obrenovac, Sid and Smederevska Palanka – focus groups were held only with the ESHQ members (figure 4). In general, there were more members of ESHQs than members of CSOs. Only in Mali Zvornik were both groups of equal numbers. Kladovo is another municipality where there was a relatively high number of CSOs.

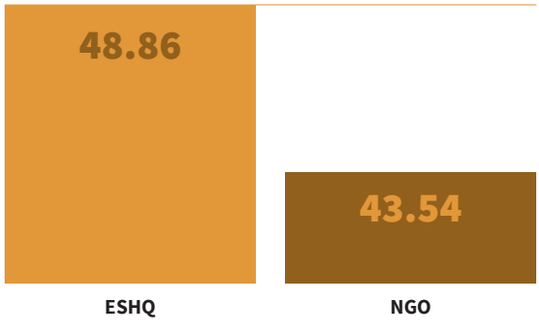
Figure 4.
Sample structure according to city/municipality and type of organization



Note: ESHQ=Emergency Situation Headquarters; NGO=non-governmental organization

Interviewees in the ESHQs were on average older than the CSO participants. The average age of the ESHQs members was 48.86 years, while the activists and citizens were on average five years younger (43.54 years old). The average age of respondents is presented in figure 5.

Figure 5.
Average age of respondents, by type of organization



Note: ESHQ=Emergency Situation Headquarters; NGO=non-governmental organization

METHODOLOGICAL LIMITATIONS

The methods employed in this study had the following limitations:

a. The scope of individual interviews differs from the scope of the focus groups: ten individual interviews was held in comparison to 27 focus groups. This was due to the previously conducted research design, which involved focus groups as the most effective methodological strategy in data collection for this study, considering the time available for fieldwork. Despite this limitation, the design was flexible enough to incorporate additional research methods to enrich the collection of data.
b. Constraints in accessing particular documents on the field, mainly relating to DRR policy documents and local budgets. However, during the interview phase, information from documents that were not available for desk research were provided by some of the key informants, who collaborated in this study.
c. Constraints in data sources with respect to municipal natural disaster risks: There is no national database that can serve as a reference and reliable single source for the selection of the municipalities based on the types of risks they are exposed to. This limitation was overcome through efforts in accessing different types of sources to identify 13 municipalities for the qualitative research.

ANNEX 2

Methodological procedure for structuring the composite Capitals of Resilience Index

The ranking of municipalities will be carried out according to the calculated composite indicator for each municipality separately. For structuring the composite index, the idea incorporated in the *Ivanović* distance method will be applied.

*The **capacities of municipalities to overcome problems** is characterized by a series of indicators. Therefore, the ranking of municipalities becomes a multidimensional issue. Introducing the composite indicator represents the idea of creating a single measure for multidimensional phenomena – the Resilience Index: a composite indicator is used with the aim to offer a simplified interpretation of the phenomenon, which is described by a large set of individual indicators. It can be regarded as a way of illustrating and simplifying composite issues, simultaneously allowing users the possibility to follow and compare all dimensions of the survey subject.*

The importance of each of 39 indicators, which contribute, to some extent, to creating a synthetic composite indicator, is not easily observable if regarded individually. To have a clear image of the phenomenon that will be described, it is important to understand how they are interlinked and how they interact. These indicators are classified into five groups that do not incorporate the same number of indicators (natural, physical, economic, human and social and institutional capital), each of which bears a certain value for the final descriptive indicator of the observed phenomenon.

In order to avoid the risk of creating a false image or a simplified conclusion, the entire procedure of the composite index creation will be transparent and based on objective methodological principles.

- In the survey, for each indicator, the data average for the period 2011-2013 is applicable.
- Missing values shall be processed by applying the following pattern:
  - Municipalities within towns and cities will be assigned the data value for the town/city that they belong to.

- The missing value for a town/city that is divided into municipalities will be substituted by the mean value of data for its municipalities.
- The missing value for other towns/cities will be substituted by the mean value of the observed indicator for all observation units.

- Because of varied measures of indicators, data normalization procedures will be applied by the metrics:

$$y_i = 1 + \frac{99 \cdot (x_i - x_{\min})}{x_{\max} - x_{\min}},$$

where all indicator values will be set to the rank [0, 1].

- Since the *Ivanović* distance method requires the same-direction features, all indicators of negative mark will be reoriented, namely:
  - For the index: $y = \frac{1}{x}$;
  - Other: $y = 1 - x$ (because of possible zero values).

- *Ivanović*'s methodological concept, i.e. that I-distance is based on the fact that the composite index for measuring a multidimensional phenomenon is created to avoid all possible overlapping of information, expressed for related indicators (Ivanović, 1977). Therefore, before undertaking the final calculation of composite index by this approach, the combined procedures of multivariate analysis will be implemented in order to reduce the number of indicators of the group of related indicators that are 'information-excessive'.
- The entire procedure of multivariate analysis will be carried out by applying the statistical software R[49] and combining the method of main components, factor and cluster analysis for each group of indicators that were previously standardized.

***

A. First, based on the analysis of the main components, the percentage of total variability will be tested, based on which the number of representative factors will be initially determined. This approach explains the variance of data through linear combinations of original data, by which the original correlated set of indicators is reduced to a new smaller set of non-correlated variables. The first criterion for determining the number of factors will be the inclusion of those factors whose variance is larger than one (own value is larger than one), since it indicates the extent of importance assigned to each factor. Also, as a supplementary criterion, the cumulative percentage of the total variability that is explained by the factors that have own value around and larger than one will be applied.

B. Determining the representative number of factors within the groups of indicators will serve as an assumption for the number of clusters where all indicators within a group can be placed. Since the idea of cluster analysis is the grouping of variables so as to ensure cohesion inside and separation outside the cluster, it can be assumed that the number of factors represents the number of centroids (centres in multidimensional space), around which certain variables will be grouped. For safety reasons, *NbClust* package in statistical software R will also be applied so that the most representative number of clusters within the group of indicators can be confirmed by the method of *k-means* (non-hierarchical method of assigning variables to the cluster with the nearest centroid) and the Hubert index. Non-hierarchical grouping will serve for the linking of related indicators, which is expected to feature a sensible, natural relationship. This would be the first step in discovering the duplicity in the information they carry.

C. In the final stage of the multivariate analysis, in order to ensure a more facilitated interpretation of results and identification of the major factors of the group, the rotation of factors is anticipated, i.e. the original matrix transformation. The *Varimax* method will be applied for an orthogonal rotation of factors, which will reduce to minimum the number of factors required for the explanation of the variable. In this way, the interpretation of factors is facilitated, and the quality of results remains unchanged, in line with the fact that the value of communality and the percentage of the explained variance remain unchanged. The features recognized as redundant can be neglected in calculating the composite index, in accordance with the methodological conception of *Ivanović* distance.

- The anticipated stage of calculating the composite index will include the application of I-distance to the previously transformed, same direction-oriented, normalized and reduced indicators.

METHOD – DETAILED EXPLANATION:[50]

When $X = \{X_1, ..., X_k\}$ is a set of indicators (or features, in this case k=39), and $P = \{P_1, ..., P_n\}$ is a set of observation (municipalities, in this case n=172), for the defined pair of municipalities $\langle P_r, P_s \rangle$, it is possible to compare the respective values of all variables of X and, if differences appear, to define the discrimination effect of the feature $X_i : d_i(r,s) = x_{ir} - x_{is}$, i.e. the discrimination effect of the feature $X : d_X(r,s) = \langle d_1(r,s), ..., d_k(r,s) \rangle$.

Since the differences $d_i(r,s), i \in \{1,...,k\}$ should be weighted so that their share in the distance $D(r,s)$ is in reverse proportion to the standard deviation[51] of the respective features X_i, the differences appear in the form

$$\frac{|d_i(r,s)|}{\sigma_i} \text{ or } \frac{d_i^2(r,s)}{\sigma_i^2},$$

and I-distance is directly expressed as the function of them, i.e.

$$D(r,s) = F\left(\frac{|d_1(r,s)|}{\sigma_1},...,\frac{|d_k(r,s)|}{\sigma_k}\right)$$

or

$$D(r,s) = F\left(\frac{d_1^2(r,s)}{\sigma_1^2},...,\frac{d_k^2(r,s)}{\sigma_k^2}\right).$$

For a certain set of features $X = \{X_1,...,X_k\}$, I-distance between two entities is defined as:

$$D(r,s) = \sum_{i=1}^{k} \frac{|d_i(r,s)|}{\sigma_i} \prod_{j=1}^{i-1}\left(1 - r_{ji.12...j-1}\right),$$

where $d_i(r,s)$ is the distance between the values of variables X_i for the defined pair of municipalities, σ_i standard deviation from X_i, and $r_{ji.12...j-1}$ is a partial coefficient of the correlation between X_i and $X_j, (j<i)$[52].

The structuring of I-distance anticipates, as the initial step, the integration of the full discrimination effect of the feature X_1, i.e. the feature containing the largest amount of information on the phenomenon by which the ranking is carried out. Thereafter, the part of the discrimination effect of another feature that has not been already covered by the discrimination effect of the first feature is added, and so forth (Ivanović, 1977).

The method of I-distance ensures the formation of the matrixes of inter-distance, namely the relation on the basis of the composite index, which in this case shall represent **the resilience of municipalities (capacity of municipalities to overcome problems).**

Before starting to establish the ranking list, it is necessary to fix an entity, which shall serve as a benchmarking point on the scale, in our case, of the resilience of municipalities. The selection of a benchmarking point of this kind must not affect the relative position of municipalities in their order. This resulted from the feature 'independence from the start', which I-distance incorporates,[53] and which is defined as follows:

It is always possible to structure two factious municipalities P_+ and P_-, the respective values of which are features X_i^+ and X_i^-, randomly selected, however, in a way that for each observation unit and each selected feature $X_i^- \le X_{ir} \le X_i^+, i \in \{1,...,k\}$. If D_-^r and D_-^s represent the distances that respectively correspond to the pairs of entities $\{P_-, P_r\}$ and $\{P_-, P_s\}$, and D_+^r and D_+^s to the pairs $\{P_r, P_+\}$ and $\{P_s, P_+\}$, then the condition $|D_-^s - D_-^r| = |D_+^s - D_+^r|$ is satisfied, i.e. a unique solution is ensured.

In practice, a factious municipality with the values of features corresponding to the respective minimum values in the set of observed municipalities is most frequently taken as a base unit.[54] Accordingly, the feature value of the factious municipality P_- is defined as:

$$X_i^- = \min_{1 \le r \le n}\{X_{ir}\}, \quad i \in \{1,...,k\},$$

In this way, defined factious municipality P_- would be the less developed unit in the set P.

I-distance between the municipalities P_r and the factious less developed municipality P_- defines the relative development extent for the municipality P_r.

If D_r is used to mark the value of I-distance of the municipality P_r from P_-, and $d_i(r) = x_{ir} - x_i^- \ge 0$ to mark the respective discrimination effects, then the form of I-distance can be expressed as

$$D_r^- = \sum_{i=1}^{k} \frac{d_i(r)}{\sigma_i} \prod_{j=1}^{i-1}\left(1 - r_{ji.12...j-1}\right).$$

In case of a large number of features, **square I-distance is usually used**,

$$D_r = \sum_{i=1}^{k} \frac{d_i^2(r)}{\sigma_i^2} \prod_{j=1}^{i-1}\left(1 - r_{ji.12...j-1}^2\right),$$

with the aim to avoid losing the effects of lower-rank features.

An additional reason for using squared I-distance is in simplifying the formula structure, since

$$\prod_{j=1}^{i-1}\left(1 - r_{ji.12...j-1}^2\right) = \left(1 - r_{i.12...j-1}^2\right)$$[55]

and than Dr becomes final **Capitals for Municipalities Resilience Index**:

$$D_r = \sum_{i=1}^{k} \frac{d_i^2(r)}{\sigma_i^2} \prod_{j=1}^{i-1}\left(1 - r_{ji.12...j-1}^2\right)$$

- For each municipality of the set P, this distance can be defined. If then all municipalities are ranked by thus obtained I-distance values, the result will be the ranking list of municipalities by the extent of their development, as presentedly assumed.
- Since the square I-distance requires a smaller number of operations, and therefore less computer time than usual,[56] for this survey, it will just be used for calculating composite indicator and ranking municipalities, while the factious, less developed municipality (P_-)[57] will be selected for the base unit.

- The software used for this purpose is *KROKI (Klasifikacija i Rangiranje na Osnovu Kvadratnog I-odstojanja*, Classification and Ranking Based on I-distance, Zvonko Štajner, Dejan Živković, Statistical Office of the Republic of Serbia), which provides the ranking list of observation units based on square I-distance and an array of accompanying results related to I-methodology. The order of entries into the model will meet the technical criterion, envisaging that after the leading indicator, the model is first entered by the indicator with the maximum determinant of correlation matrix, extended by the type and column corresponding to the indicators out of the model.
- The multivariate scheme and expert heuristics will determine the necessity to define the leading indicator. If this is proved unnecessary, the respective function in the algorithm will be taken over by the *Freshet*-distance:

$$F(j)=\sum_{i=1}^{k}\left(\frac{x(j,i)-xm(i)}{s(i)}\right)^2,$$

Where $x(j,i)$ is the value of the indicator $X(i)$ for the unit j, $xm(i)$ is the minimal value of the indicator $X(i)$, and $s(i)$ is the standard deviation of the indicator $X(i)$.

Analysis and results of ranking municipalities by the composite Municipalities Resilience Index

- All 39 indicators in the survey were classified into five groups, unequal by number of indicators.
- The value of each indicator is the average for the 2011-2013 period.
- Before carrying out the multivariate analysis through the statistical software R, all indicators were equally directed, observing the principle described within the methodological procedure for structuring the composite indicator.

NATURAL CAPITAL

Mark	Indicator	Measurement unit	Orientation
V1	Agricultural area	%	positive
V2	Number of settlements	number	positive
V3	Utilized agricultural area	ha	positive
V4	Land area covered by forest	%	positive
V5	Average size of plots	m2	positive
V6	Total number of plots	number	positive

ECONOMIC CAPITAL

Mark	Indicator	Measurement unit	Orientation
V1	Active companies	per 1,000 population	positive
V2	Active entrepreneurs	per 1,000 population	positive
V3	Employees comparing to population number	%	positive
V4	Net average salaries and wages	RSD	positive
V5	Per capita revenue of the budget of the cities and municipalities	RSD	positive
V6	Municipal gross product	RSD million	positive

PHYSICAL CAPITAL

Mark	Indicator	Measurement unit	Orientation
V1	Distance to regional centre	km	negative
V2	Housed residential area per capita	m^2	positive
V3	Households connected to the water supply system	%	positive
V4	Households connected to urban wastewater collecting system	%	positive
V5	Length of modern road as a % of total roads	%	positive
V6	Number of doctors per 1,000 inhabitants	rate	positive
V7	Number of elementary schools per 1,000 pupils of primary school age	per 1,000 pupils	positive
V8	Number of health care institutions	per 1,000 population	positive
V9	Number of teachers per 1,000 pupils in primary schools	per 1,000 pupils	positive
V10	Total value of residential area per m^2	RSD	positive

HUMAN CAPITAL

Mark	Indicator	Measurement unit	Orientation
V1	Population density	per 1 km2	positive
V2	Aging index	index	negative
V3	Population dependence index, 0-14 + 65> / 15-64	index	negative
V4	Population dependence index, old-age, 65> / 15-64	index	negative
V5	Life expectancy at birth	years	positive
V6	Share of social welfare beneficiaries in total population	%	negative
V7	Incidences of tuberculosis, per 100,000 population	rate	negative
V8	Share of illiterate population in total population aged 10 and over	%	negative
V9	Population aged 15 and over by educational attainment (secondary and higher)	%	positive

SOCIAL AND INSTITUTIONAL CAPITAL

Mark	Indicator	Measurement unit	Orientation
V1	Telephone subscribers	%	positive
V2	Coverage of children by the preparatory preschool programme	%	positive
V3	Primary school - dropout rate	rate	negative
V4	Convicted adults by place of committing criminal offence, per 1,000 population	%	negative
V5	Percentage of children in conflict with the law	%	negative
V6	Computer literacy	%	positive
V7	Percentage of voters that voted on elections for deputies of the municipal and city assemblies	%	positive
V8	Ability to produce and implement local development strategies	rank	positive

- Indicator redundancy shall be determined by multivariate analysis, applying the statistical software R .

Multivariate analysis in statistical software *R*

- *Principal Component Analysis* (PCA) contributes to finding the best variation representative by using a small number of variables in a multidimensional set of data. *R* features several functions from various packages by which PCA can be carried out (*prcomp(), princomp(), PCA(), acp()*...). Whichever is selected, a set of own values of cumulative proportion is obtained within the results; these values provide information on data variability, as well as the table of loadings, which represent a sensible relation between the variables.
- Before starting to use some of the incorporated PCA functions, as a first step, the data standardization is undertaken

$$Z = \frac{X - E(X)}{\sigma(X)},$$

where $E(X)$ is expected value, and $\sigma(X) = \sqrt{Var(X)}$ is standard deviation of X), because of the difference in variance and unit measures with input variables. In this way, the partiality on the part of those variables that express the largest variance in original data is avoided.
- For the needs of the first part of the multivariate analysis within the survey, the incorporated function *princomp()* from the package stats, the form *princomp(x, cor=T)* was applied. The first argument of this function is $n \times p$ matrix (n - number of entities, p - number of variables). The second argument is cor, positioned *TRUE*, if sample correlation matrix is used in the PCA procedure, and *FALSE*, if sample covariate matrix is applied. Within output resulting are standard deviations of components (square roots of own values) and cumulative proportion, which describe the amount of information carried by the components. These are only indicative for the selection of the number of explaining variables within the group of indicators. The number of variables with standard deviation (approx.) of close to one and over one, i.e. the number of those having a total at least 70 per cent of cumulative proportion, is the representative number of variables around which the other are concentrated. Also, for visual estimation of the number of components explaining a larger part of data variability, the *screen plot* can be used, which presents the ratio of own values and the number of components in a declining order in relation to the number of components. After a sharp decline, the curve tends to the flat, since this part corresponds to the components carrying the leading variability. Therefore, it is an adopted rule to take as many variables as existing before the sharp curving.
- Further on, the function *Nb Clust* was applied from the same named package, form *NbClust(data, distance="euclidean", min.nc=2, max.nc=15, method="k-means")*. Contained in this package are 30 various indices for determining the number of clusters, not all of which, depending on the set of data, need to be used (the selection is automatic). The software instructs the user on the best scheme of clustering, by using the various results obtained on the basis of combining these indices with the selected distance measure and the cluster method. The selected method *k-means* and the distance matrix is measured on the basis of Euclidean distance. The minimum number of clusters is two, and the maximum is varying, depending on the number of variables in the group.

  Euclidean distance:

$$d(x,y) = \left(\sum_{j=1}^{d} (x_j - y_j)^2 \right)^{\frac{1}{2}}$$

  K-means meted is one of the most adopted methods for non-hierarchical classification, i.e. the method of reallocation. Each observation is assigned to the cluster with the nearest centroid, while the calculation of centroid is carried out according to the current relations between clusters. Following each observation assignment to the cluster, the centroid is recalculated; in the case of certain observations, it is not the nearest any longer, the reallocation needs to be implemented. The procedure is iteratively repeated until convergence is achieved and established.

  As more clear indicators of the optimal number of clusters within the group, the table with results and the bar plot were applicable.

- According to the implemented analysis, the representative number of clusters within the group was determined. Applying this number, *k-means* non-hierarchical clustering is carried out with the aid of the incorporated function *k means* (package: *stats*) on transposed data, with the aim to obtain the distribution of variables by clusters. Also, as a part of output in this stage, the ratio between_*SS/total_SS* is achieved, which is basically the quality measure of k-means classification. *SS* abbreviation stands for the *Sum of Squares*; therefore, *total_SS=between_SS+within_SS* is the usual decomposition of deviation to deviation inside and outside the cluster, namely

$$\sum (y_{ij} - \bar{y})^2 = \sum (\bar{y}_i - \bar{y})^2 + \sum (y_{ij} - \bar{y}_i)^2.$$

The ideal grouping would assume cohesion inside and separation outside the cluster, i.e. this ratio should be as close to one as possible. This is a quality indicator for the selected number of clusters and the respective grouping by the *k-means* method. In compliance with the obtained results, the required changes need to be made.

- The final stage of the multivariate analysis assumes the implementation of *Varimax* orthogonal rotation, with the aim to have a facilitated interpretation of results. The package *psych* includes the procedures for reducing the complexity of the observed data. In case of PCA analysis, these procedures are related to the reduction of data; however, the interpretation of components is frequently carried out in conditions similar to those applied for describing latent variables estimated by factor analysis. For the purpose of this survey, the function *principal* was applied, which reduces the recalculation of component loadings to factor analysis, whereby from the initial k selected principal components obtained is the best k -dimension approximation of the correlation matrix $n \times n$, where n is the total number of principal components. This matrix actually ensures an insight into the extent of correlation of each of the variables with the initial principal components. Within the output, for each variable obtained there is also the measure of communality, h^2 and the measure of uniqueness u^2 component. If a variable is informative, h^2 is large, and u^2 small, since variables with large h^2 have more in common with other variables.

Software output and comments

NATURAL CAPITAL

PCA analysis on standardized data (result of princomp function):

Importance of components:

	Comp.1	Comp.2	Comp.3	Comp.4	Comp.5	Comp.6
Standard deviation	**1.6506500**	**1.2860116**	**0.9037224**	**0.61266899**	**0.48804353**	**0.43733848**
Proportion of variance	**0.4541076**	**0.2756376**	**0.1361190**	**0.06256055**	**0.03969775**	**0.03187749**
Cumulative proportion	**0.4541076**	**0.7297452**	**0.8658642**	**0.92842476**	**0.96812251**	**1.00000000**

Considering the standard deviation and cumulative proportion, the first three components are maximum explanatory components (the third one is of the own value close to one, but has a large percentage of cumulative proportion).

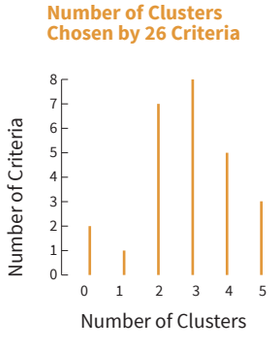
Result of NbClust function:

***** : The Hubert index is a graphical method of determining the number of clusters.**
In the plot of the Hubert index, we seek a significant knee that corresponds to a significant increase of the value of the measure, i.e. the significant peak in Hubert index second differences plot.

***** : The D index is a graphical method of determining the number of clusters.**
In the plot of the D index, we seek a significant knee (the significant peak in the D index second differences plot) that corresponds to a significant increase of the value of the measure.

****

*** Among all indices:**
*** 7 proposed 2 as the best number of clusters**
*** 8 proposed 3 as the best number of clusters**
*** 5 proposed 4 as the best number of clusters**
*** 3 proposed 5 as the best number of clusters**



******* Conclusion *******

*** According to the majority rule, the best number of clusters is 3**

****

```
> table(nc$Best.n[1,])
0 1 2 3 4 5
2 1 7 8 5 3
> barplot(table(nc$Best.n[1,]),
+         xlab="Numer of Clusters", ylab="Number of Criteria",
+         main="Number of Clusters Chosen by 26 Criteria")
```

According to 26 used criteria, the optimal number of clusters for this group of indicators is three.

Result of kmeans function with predetermined number of clusters (three):

K-means clustering with 3 clusters of sizes 1, 2, 3

Clustering vector:

V1	V2	V3	V4	V5	V6
3	2	3	1	3	2

Within cluster sum of squares by cluster:
[1] 0.00000 40.37911 163.85881
(between_SS / total_SS = 72.0 %)

The distribution of variables by clusters (equal/corresponding to their natural relation) is the following:

- Cluster 1: *Land area covered by forest (V4)*
- Cluster 2: *Number of settlements* and *total number of plots (V2* and *V6)*
- Cluster 3: *Agricultural area, Utilised agricultural area* and *average size of plots (V1, V3* and *V5)*

The ratio *between_SS / total_SS* of over 70 per cent indicates a sufficiently good quality grouping of indicators within this group.

Result of principal function with included Varimax rotation and a defined number of desired factors (three):

Standardized loadings (pattern matrix) based upon correlation matrix

	PC2	PC1	PC3	h2	u2	com
V1	-0.03	0.82	0.35	0.80	0.203	1.3
V2	0.88	-0.28	0.03	0.86	0.144	1.2
V3	0.29	0.44	0.75	0.84	0.157	2.0
V4	0.39	-0.84	-0.04	0.87	0.132	1.4
V5	-0.31	0.09	0.91	0.93	0.067	1.2
V6	0.94	-0.04	-0.13	0.90	0.103	1.0

The smallest value of h^2 and the largest value of u^2 indicators are noted for V1 and V3 variables. Both indicators are in the cluster with the variable V5, and therefore, observing the nature of indicator, it can be concluded that V5 (*average size of plots*) also contains the data for V1 (*agricultural area*) and for V3 (*utilized agricultural area*). However, the variable V5 in approximate correlation matrix bears a high degree of correlation (0.91), the largest h^2 and the smallest u^2, which makes it stand out from the others. The heuristic proposal by experts corresponds to the previous analysis, and therefore, with the aim of facilitated interpretation of the results and to eliminate redundant indicators (due to the applied method of I-distance for calculating the composite indicator), it proves necessary to eliminate these two indicators from the further procedure.

ECONOMIC CAPITAL

PCA analysis on standardized data (result of the princomp function):

Importance of components:

	Comp.1	Comp.2	Comp.3	Comp.4	Comp.5
Standard deviation	1.8166005	1.0958700	0.9041410	0.72189768	0.3889895
Proportion of variance	0.5500062	0.2001552	0.1362452	0.08685604	0.0252188
Cumulative proportion	0.5500062	0.7501614	0.8864065	0.97326258	0.9984814

	Comp.6
Standard deviation	0.09545532
Proportion of variance	0.00151862
Cumulative proportion	1.00000000

Judging by standard deviation and cumulative proportion, the first two or three components have the greatest explaining power. The third component has an eigenvalue about one, but 88 per cent of the overall information is obtained if it is also included.

Result of NbClust function:

***** : The Hubert index is a graphical method of determining the number of clusters.**
In the plot of Hubert index, we seek a significant knee that corresponds to a significant increase of the value of the measure, i.e. the significant peak in Hubert index second differences plot.

***** : The D index is a graphical method of determining the number of clusters.**
In the plot of D index, we seek a significant knee (the significant peak in the D index second differences plot) that corresponds to a significant increase of the value of the measure.

****

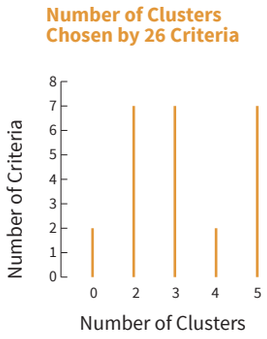
*** Among all indices:**
*** 7 proposed 2 as the best number of clusters**
*** 7 proposed 3 as the best number of clusters**
*** 2 proposed 4 as the best number of clusters**
*** 7 proposed 5 as the best number of clusters**

******* Conclusion *******

*** According to the majority rule, the best number of clusters is 2**

****

```
> table (nc$Best.n[1,])
0  2  3  4  5
2 10  7  2  5
> barplot(table (nc$Best.n[1,]),
+    xlab="Numer of Clusters", ylab="Number of Criteria",
+    main="Number of Clusters Chosen by 26 Criteria")
```



According to 26 applied criteria, the most optimal number of clusters for this group of indicators is two.

Even though this fact is not completely in accordance with a PCA and *princomp* function, further analysis will be performed with two clusters.

Result of kmeans function with predetermined number of clusters (two):

K-means clustering with 2 clusters of sizes 4, 2

Clustering vector:

V1	V2	V3	V4	V5	V6
1	2	1	1	2	1

Within cluster sum of squares by cluster:
[1] 139.8811 127.8670
(between_SS / total_SS = 49.2 %)

Distribution of variables by clusters (which coincides with their natural connection) is as follows:

- Cluster 1: *Active companies, per 1,000 population*, *Number of employees compared to population number, Net average salaries and wages* and *Municipal gross product (V1, V3, V4* and *V6);*
- Cluster 2: *Active entrepreneurs, per 1,000 population* and *Per capita revenue of the budget of the cities and municipalities (V2* and *V5).*

However, the ratio *between_SS / total_SS* do not even reach 50 per cent, thus showing that the quality of indicators grouping within this group is not the most appropriate, further implying the increase of the number of clusters to 3. This result is not surprising, considering that over 80 per cent of cumulative proportion is explained only when the third component is included; In addition, *NbClust* analysis showed that the most suitable number of clusters is three.

Result of *kmeans* function with predetermined number of clusters (three):

K-means clustering with 3 clusters of sizes 1, 1, 4

Clustering vector:

V1	V2	V3	V4	V5	V6
3	1	3	3	2	3

Within cluster sum of squares by cluster:
[1] 0.0000 0.0000 139.8811
(between_SS / total_SS = 73.5 %)

Distribution of variables by clusters (which still coincides with their natural connection) is as follows:

- Cluster 1: *Active entrepreneurs, per 1,000 population(V2);*
- Cluster 2*: Per capita revenue of the budget of the cities and municipalities (V5);*
- Cluster 3*: Active companies, per 1,000 population*, *Number of employees compared to population number, Net average salaries and wages*, and *Municipal gross product (V1, V3, V4, V6).*

The ratio *between_SS / total_SS* has in this case significantly increased, indicating that the more representative number of clusters in this group is three. In this case (if compared to the previous one), in distribution of variables by clusters, only the separate importance of components V2 and V5 is emphasized, while V1, V3, V4 and V6 are distributed in the same way.

Result of *principal* function with included *Varimax* rotation and defined number of desired factors (three):

Standardized loadings (pattern matrix) based upon correlation matrix

	PC1	PC3	PC2	h2	u2	com
V1	0.88	0.26	-0.21	0.89	0.114	1.3
V2	0.19	0.89	0.17	0.85	0.148	1.2
V3	0.89	0.33	-0.07	0.91	0.095	1.3
V4	0.78	-0.36	0.15	0.76	0.241	1.5
V5	-0.07	0.14	0.97	0.96	0.041	1.1
V6	0.96	0.18	-0.04	0.96	0.043	1.1

The correlation matrix coincides with distribution of variables by clusters – V1, V3, V4 and V6 explain the first; V2, the second, and V5, the third component. The lowest correlation coefficient, the lowest h^2, but the greatest u^2 has the variable V4 (*Net average salaries and wages*), and due to overlapping of information in V1, V3, V4 and V6, this variable can be excluded from further analysis. Moreover, in general, and observing all variables, the importance of the indicator V5 (*Per capita revenue of the budget of the cities and municipalities*) and V6 (*Municipal gross product*) is particularly emphasized. Furthermore, two remaining indicators in cluster 3 are "repressed" by information carried by V6. One of these two most significant indicators from the group Economic capital will be defined as the leading one, since this has been also proposed by the experts.

PHYSICAL CAPITAL

PCA analysis on standardized data (result of *princomp* function):

Importance of components:

	Comp.1	Comp.2	Comp.3	Comp.4	Comp.5
Standard deviation	1.7620344	1.4112683	1.1462286	1.0750405	0.78402826
Proportion of variance	0.3104765	0.1991678	0.1313840	0.1155712	0.06147003
Cumulative proportion	0.3104765	0.5096443	0.6410283	0.7565995	0.81806957

	Comp.6	Comp.7	Comp.8	Comp.9	Comp.10
Standard deviation	0.73660790	0.68521113	0.58087386	0.52007050	0.44644268
Proportion of variance	0.05425912	0.04695143	0.03374144	0.02704733	0.01993111
Cumulative proportion	0.87232869	0.91928012	0.95302156	0.98006889	1.00000000

Judging only by standard deviation, the first four components have the greatest explaining power. However, only when the fifth one is also included, the cumulative proportion exceeds 80 per cent.

Result of *NbClust* function:

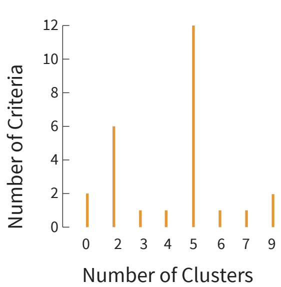
***** : The Hubert index is a graphical method of determining the number of clusters.**
In the plot of the Hubert index, we seek a significant knee that corresponds to a significant increase of the value of the measure, i.e. the significant peak in the Hubert index second differences plot.

***** : The D index is a graphical method of determining the number of clusters.**
In the plot of D index, we seek a significant knee (the significant peak in the D index second differences plot) that corresponds to a significant increase of the value of the measure.

****

*** Among all indices:**
*** 6 proposed 2 as the best number of clusters**
*** 1 proposed 3 as the best number of clusters**
*** 1 proposed 4 as the best number of clusters**
*** 12 proposed 5 as the best number of clusters**
*** 1 proposed 6 as the best number of clusters**
*** 1 proposed 7 as the best number of clusters**
*** 2 proposed 9 as the best number of clusters**

Number of Clusters Chosen by 26 Criteria



******* Conclusion *******

*** According to the majority rule, the best number of clusters is 5**
****

```
> table(nc$Best.n[1,])
0 2 3 4 5 6 7 9
2 6 1 1 12 1 1 2
> barplot(table(nc$Best.n[1,]),
+       xlab="Numer of Clusters", ylab="Number of Criteria",
+       main="Number of Clusters Chosen by 26 Criteria")
```

According to 26 used criteria, the most optimal number of clusters for this group of indicators is – five.

Result of *kmeans* function with predetermined number of clusters (five):

K-means clustering with 5 clusters of sizes 1, 2, 1, 4, 2
Clustering vector:

V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
3	4	1	2	4	4	5	4	5	2

Within cluster sum of squares by cluster:
[1] 0.00000 65.90951 0.00000 146.56789 38.64175
(between_SS / total_SS = 73.9 %)

Distribution of variables by clusters (which coincides with their natural connection) is as follows:

- Cluster 1*: Households connected to the water supply system (V3);*
- Cluster 2*: Households connected to urban wastewater collection system* and *Total value of residential area per m² (V4 and V10);*
- Cluster 3*: Distance to regional centre (***reoriented, 100-x****) (V1);*
- Cluster 4: *Housed residential area per capita, Length of modern road as percent of total roads, Number of doctors per 1,000 inhabitants* and *Number of health care institutions per 1,000 population (V2, V5, V6 and V8);*
- Cluster 5*: Number of elementary schools per 1,000 pupils of primary school age* and *Number of teachers per 1,000 pupils in primary schools (V7 and V9).*

The ratio *between_SS / total_SS* is big enough, thus indicating that the selected optimal number of clusters is appropriate.

Result of *principal* function with included *Varimax* rotation and defined number of desired factors (five):

Standardized loadings (pattern matrix) based upon correlation matrix

	PC1	PC2	PC3	PC5	PC4	h2	u2	com
V1	-0.16	0.16	0.14	-0.06	0.94	0.96	0.042	1.2
V2	0.13	0.85	-0.15	0.17	0.02	0.79	0.211	1.2
V3	-0.14	0.07	0.09	0.96	-0.06	0.96	0.041	1.1
V4	-0.31	-0.34	0.74	-0.11	0.09	0.78	0.221	1.9
V5	-0.36	0.77	0.05	-0.07	0.21	0.77	0.229	1.6
V6	0.05	0.10	0.91	0.17	0.08	0.87	0.131	1.1
V7	0.74	-0.34	-0.07	-0.37	-0.08	0.82	0.183	2.0
V8	0.76	0.14	0.25	0.01	-0.33	0.77	0.231	1.7
V9	0.83	-0.19	-0.20	-0.01	-0.03	0.77	0.234	1.2
V10	-0.65	-0.32	0.40	0.11	0.01	0.70	0.297	2.2

Judging by the approximate correlation matrix, the lowest h^2, the highest u^2 and the greatest com (parameter of *complexity*), the indicator which can be excluded in further analysis due to redundancy is V10 (*Total value of residential area per m2*). Heuristics of experts determine that V8 (*Number of health care institutions per 1,000 population*) is the indicator containing overlapping information with the others from the same group, and according to the table of burden factors, this indicator is, after V10, actually the worst one (by its performances) for assessing the significance in this group. Therefore, V8 and V10 will be disregarded in further analysis.

HUMAN CAPITAL

PCA analysis on standardized data (result of *princomp* function):

Importance of components:

	Comp.1	Comp.2	Comp.3	Comp.4	Comp.5
Standard deviation	1.7561774	1.4575919	1.0845076	0.9706957	0.83496145
Proportion of variance	0.3426843	0.2360638	0.1306841	0.1046945	0.07746229
Cumulative proportion	0.3426843	0.5787482	0.7094322	0.8141267	0.89158899

	Comp.6	Comp.7	Comp.8	Comp.9
Standard deviation	0.70834768	0.56131130	0.38915018	0.0862230129
Proportion of variance	0.05575072	0.03500782	0.01682643	0.0008260453
Cumulative proportion	0.94733971	0.98234753	0.99917395	1.0000000000

Judging by standard deviation, four factors are explanatory, considering that their eigenvalue is over one or approximately one, and according to cumulative proportion, they contain over 80 per cent of total information.

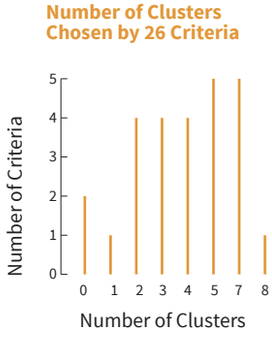
Result of *NbClust* function:

***** : The Hubert index is a graphical method of determining the number of clusters.**
In the plot of the Hubert index, we seek a significant knee that corresponds to a significant increase of the value of the measure, i.e, the significant peak in the Hubert index second differences plot.

***** : The D index is a graphical method of determining the number of clusters.**
In the plot of the D index, we seek a significant knee (the significant peak in Dindex second differences plot) that corresponds to a significant increase of the value of the measure.

****
*** Among all indices:**
*** 4 proposed 2 as the best number of clusters**
*** 4 proposed 3 as the best number of clusters**
*** 4 proposed 4 as the best number of clusters**
*** 5 proposed 5 as the best number of clusters**
*** 5 proposed 7 as the best number of clusters**
*** 1 proposed 8 as the best number of clusters**
******* Conclusion *******
*** According to the majority rule, the best number of clusters is 5**
****

> table(nc$Best.n[1,])
0 1 2 3 4 5 7 8
2 1 4 4 4 5 5 1
> barplot(table(nc$Best.n[1,]),
+ xlab="Numer of Clusters", ylab="Number of Criteria",
+ main="Number of Clusters Chosen by 26 Criteria")



Following the results of *NbClust* function, the best number of clusters for this group is five. However, out of total of 26 criteria, the same number of criteria (five) has shown that the most suitable number of clusters would be seven.

Further analysis will be continued with five clusters.

Result of *kmeans* function with predefined number of clusters (five):

K-means clustering with 5 clusters of sizes 5, 1, 1, 1, 1
Clustering vector:

V1	V2	V3	V4	V5	V6	V7	V8	V9
2	1	1	1	1	5	3	1	4

Within cluster sum of squares by cluster:
[1] 54.65696 0.00000 0.00000 0.00000 0.00000
(between_SS / total_SS = 88.8 %)

Distribution of variables by clusters (which coincides with their natural connection) is as follows:

- Cluster 1*: Aging index* (reoriented, 1/x), *Population dependence index*, 0-14 +65> */ 15 – 64* (reoriented, 1/x), *Population dependence index*, Old age (reoriented, 1/x), *Life expectancy at birth* and *Share of illiterate population in total population aged 10 and over* (reoriented, 100-x) (V2, V3, V4, V5, V8);
- Cluster 2*: Population density (V1);*
- Cluster 3*: Incidences of tuberculosis, per* 100, 000 *population (*reoriented, 100-x) (V7);
- Cluster 4: *Population aged 15 and over by educational attainment (secondary and higher) (V9)*;
- Cluster 5*: Share of social welfare beneficiaries in total population* (reoriented, 100-x) (*V6).*

The ratio *between_SS / total_SS* is over 80 per cent, indicating that grouping has been adequately done.

Result of *principal* function with included *Varimax* rotation and defined number of desired factors (five):

Standardized loadings (pattern matrix) based upon correlation matrix

	PC1	PC2	PC3	PC4	PC5	h2	u2	com
V1	0.17	-0.03	0.11	0.92	0.01	0.90	0.1032	1.1
V2	-0.04	0.98	-0.06	-0.02	-0.10	0.97	0.0337	1.0
V3	0.84	0.40	0.01	-0.02	0.04	0.87	0.1314	1.4
V4	0.36	0.92	-0.02	-0.01	-0.07	0.99	0.0076	1.3
V5	-0.07	-0.16	0.81	0.33	-0.05	0.80	0.1952	1.4
V6	0.29	0.06	0.85	-0.10	0.11	0.82	0.1752	1.3
V7	0.14	-0.12	0.05	0.02	0.98	1.00	0.0035	1.1
V8	0.88	-0.08	0.14	0.08	0.11	0.82	0.1777	1.1
V9	0.76	0.16	0.14	0.46	0.11	0.85	0.1482	1.9

Correlation matrix emphasizes V1 and V7 variables as very significant. Additionally, V2 and V4 have high h^2, and very low u^2, so they are classified in the category of important ones. In order to more clearly present which of the indicators contains “extra” information, *k-means* cluster analysis and *principal* function will be performed for seven factors, since the same number of criteria has shown that there is an equally appropriate number of indicators regarding this group.

Result of *kmeans* function with predetermined number of clusters (seven):

K-means clustering with 7 clusters of sizes 1, 1, 1, 1, 1, 1, 3
Clustering vector:

V1	V2	V3	V4	V5	V6	V7	V8	V9
1	7	7	7	3	5	6	4	2

Within cluster sum of squares by cluster:
[1] 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000 8.310792
(between_SS / total_SS = 98.3 %)

The ratio *between_SS / total_SS* is better than in the case with five clusters, and all variables are separate, except V2, V3 and V4, which make the same cluster (*Aging index, Population dependence index, 0-14 +65> / 15-64* and *Population dependence index, old-age)*. This coincides with a natural connection among these variables.

Result of *principal* function with included *Varimax* rotation and defined number of desired factors (seven):

Standardized loadings (pattern matrix) based upon correlation matrix

	PC2	PC1	PC4	PC3	PC6	PC5	PC7	h2	u2	com
V1	-0.03	0.12	0.97	0.12	0.06	0.00	0.09	0.99	0.00732	1.1
V2	0.99	0.02	-0.02	-0.07	-0.02	-0.10	-0.05	1.00	0.00391	1.0
V3	0.29	0.88	-0.01	-0.14	0.18	0.03	0.22	0.96	0.03983	1.5
V4	0.89	0.42	-0.01	-0.08	0.07	-0.07	0.08	0.99	0.00584	1.5
V5	-0.12	0.01	0.13	0.95	0.23	0.00	0.02	0.99	0.01315	1.2
V6	0.03	0.12	0.07	0.23	0.94	0.08	0.14	0.99	0.00802	1.2
V7	-0.12	0.08	0.01	0.00	0.07	0.98	0.09	1.00	0.00097	1.1
V8	-0.01	0.42	0.12	0.02	0.17	0.12	0.87	1.00	0.00253	1.6
V9	0.12	0.77	0.35	0.25	-0.01	0.13	0.33	0.92	0.07731	2.2

If in this correlation matrix, only variables V2, V3 and V4 are observed, the least influential among them is V3 (*Population dependence index, 0-14 +65> / 15-64*) since it has the lowest h^2 and the highest u^2. The proposal of the experts confirms this result, indicating that this indicator will be omitted in further analysis. It should also be noted that variable V9 (*Population aged 15 and over by educational attainment (secondary and higher*) performs poorly in both cases.

SOCIAL AND INSTITUTIONAL CAPITAL

PCA analysis on standardized data (result of *princomp* function):

Importance of components:

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5
Standard deviation	1.4829278	1.1836265	1.0964020	0.9753871	0.9057957
Proportion of variance	0.2748843	0.1751215	0.1502622	0.1189225	0.1025582
Cumulative proportion	0.2748843	0.4500058	0.6002680	0.7191905	0.8217487

	Comp. 6	Comp. 7	Comp. 8
Standard deviation	0.79485663	0.71271588	0.53502275
Proportion of variance	0.07897463	0.06349549	0.03578117
Cumulative proportion	0.90072334	0.96421883	1.00000000

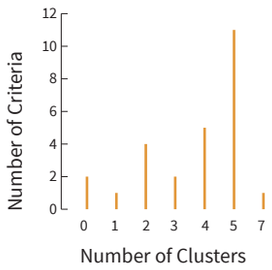
The first five components have the greatest explanatory power, containing together over 80 per cent of the information, as shown in cumulative proportion.

Result of *NbClust* function:

***** : The Hubert index is a graphical method of determining the number of clusters. In the plot of Hubert index, we seek a significant knee that corresponds to a significant increase of the value of the measure, i.e. the significant peak in Hubert index second differences plot.**

***** : The D index is a graphical method of determining the number of clusters. In the plot of D index, we seek a significant knee (the significant peak in Dindex second differences plot) that corresponds to a significant increase of the value of the measure.**

Number of Clusters Chosen by 26 Criteria




```
**********************************************************************
* Among all indices:
* 4 proposed 2 as the best number of clusters
* 2 proposed 3 as the best number of clusters
* 5 proposed 4 as the best number of clusters
* 11 proposed 5 as the best number of clusters
* 1 proposed 7 as the best number of clusters

                ***** Conclusion *****

* According to the majority rule, the best number of clusters is 5

**********************************************************************
> table(nc$Best.n[1,])
 0 1 2 3 4 5 7
 2 1 4 2 5 11 1
> barplot (table(nc$Best.n[1,]),
+      xlab="Numer of Clusters", ylab="Number of Criteria",
+      main="Number of Clusters Chosen by 26 Criteria")
```

According to the results of *NbClust* function, the best number of clusters for this group is five, since out of a total of 26 criteria, even 11 showed this outcome.

Result of *kmeans* function with predefined number of clusters (five):

```
K-means clustering with 5 clusters of sizes 3, 1, 2, 1, 1

Clustering vector:

V1  V2  V3  V4  V5  V6  V7  V8
 3   4   1   2   1   3   5   1

Within cluster sum of squares by cluster:
[1] 39.52429  0.00000 54.38478  0.00000  0.00000
 (between_SS / total_SS =  83.7 %)
```

Distribution of variables by clusters (which coincides with their natural connection) is as follows:

- Cluster 1: *Percentage of voters who voted on elections for deputies of the municipal and city assemblies (V7);*
- Cluster 2*: Coverage of children by the preparatory preschool programme (V2);*
- Cluster 3*: Telephone subscribers* and *Computer literacy (V1* and *V6);*
- Cluster 4: *Convicted adults by location where the criminal offence was committed, per 1,000 population* **(reoriented, 100-x)** (V4);
- Cluster 5*: Primary school - dropout rate* **(reoriented, 100-x),** *Number of children in conflict with the law* **(reoriented, 100-x)** and *Ability to produce and implement local development strategies (V3, V5* and *V8).*

The ratio *between_SS / total_SS* is over 80 per cent, thus indicating the quality of the variables grouping.

Result of *principal* function with included *Varimax* rotation and defined number of desired factors (five):

Standardized loadings (pattern matrix) based upon correlation matrix

	PC1	PC2	PC3	PC4	PC5	h2	u2	com
V1	0.85	0.13	0.00	0.11	-0.06	0.75	0.247	1.1
V2	0.43	0.72	0.05	-0.11	0.23	0.77	0.227	1.9
V3	-0.02	0.09	-0.01	-0.04	0.98	0.97	0.025	1.0
V4	-0.61	0.19	0.42	-0.20	0.08	0.63	0.371	2.3
V5	0.07	-0.06	0.94	0.01	-0.03	0.89	0.114	1.0
V6	0.85	-0.13	0.17	-0.12	0.08	0.79	0.213	1.2
V7	-0.41	0.79	-0.09	0.08	-0.03	0.81	0.189	1.6
V8	0.05	0.00	-0.01	0.98	-0.04	0.96	0.038	1.0

Among the variables from this group, the least favourable indicators are noted in V2 and V4. Since, according to heuristics of experts, the variable V2 (*Coverage of children by the preparatory preschool programme*) has been marked as the indicator containing the least significant information in this group, and also aiming to simplify the further procedure, this indicator will be excluded in later analysis. Additionally, it is to be noted that variable V4 (*Convicted adults by place of committing criminal offence, per 1,000 population*) has also performed poorly; thus, its relevance in further procedures will be put into question.

Conclusions on reducing the number of indicators

- Judging by the previous analysis of total of 39 indicators classified into five different groups, and according to confirmation by heuristic experts, there are seven indicators that can be excluded from calculating the composite indicator.
  These indicators are:
  1. *Agricultural area* (natural capital);
  2. *Utilised agricultural area* (natural capital);
  3. *Net average salaries and wages, RSD* (economic capital);
  4. *Number of health care institutions per 1,000 population* (physical capital);
  5. *Total value of residential area per m²* (physical capital);
  6. *Population dependence index, 0-14 + 65> / 15-64* (human capital);
  7. *Coverage of children by the preparatory preschool programme* (social and institutional capital).

- From the remaining 32 indicators, through test examples in the KROKI program, it was concluded that the following indicators also have no influence on creating the composite indicator, due to redundancy and overlapping of information:
  a. *Employees compared to population number* (economic capital);
  b. *Population aged 15 and over by educational attainment (secondary and higher)* (human capital);
  c. *Number of elementary schools per 1,000 pupils of primary school age* (physical capital).

  This is in accordance with the previous analysis. Indicator (a.) is in the cluster with *Municipal gross product*, which, since it is potentially recognized as the leading one, covers its influence; indicator (b.) was, within its group, recognized as highly unsuitable according to the performances from burden matrix (correlation coefficients with the factors h^2, u^2 and *com*); indicator (c.) is in the cluster with *Number of teachers per 1,000 pupils in primary schools*, and has smaller correlation coefficient and much higher *complexity (com)* factor (2.0 to 1.2).

- Finally, three cases were tested in the KROKI program:
  1. *Municipal gross product (Economic capital) was selected as the leading indicator;*
  2. *Per capita revenue of the budget of the cities and municipalities (Economic capital) was selected as the leading indicator;*
  3. *No leading in*dicator selected.

  Comparing the results of these three outputs, it becomes clear that ranking of municipalities only insignificantly varies, particularly at the beginning and at the end of the list.

- In the case where *Municipal gross product* is selected as the leading indicator, then *Per capita revenue of the budget of the cities and municipalities* is in the second place by order of indicators entering into the model (in the section of methodology of creating the composite indicator, the method of KROKI's selection of the following indicator for the model was explained), indicating that the importance of this indicator is not decreased by defining the leading one.

- If *Per capita revenue of the budget of the cities and municipalities* is taken as the leading indicator, or if the leading one is not defined, then *Municipal gross product* is almost at the end of the list of leading indicators, since, conditionally speaking, the leading one encompasses the whole information.

- Due to the municipalities such as Crna Trava with small number of inhabitants and therefore, the value of the indicator *Per capita revenue of the budget of the cities and municipalities* becomes very high related to other municipalities (even though the income per municipality does not deviate), the significance of the indicator *Municipal gross product* should not be neglected, since it can be used for partially influencing the mentioned imperfections in outliers.

- Attached in the Annex are rang lists and composite indicators calculated by the method of I-distance (explained in methodological part) for all three test cases, respectively. The first and the last ten municipalities are coloured in order to clearly observe the difference. In the first case (when the leading indicator is *Municipal gross product)* and in the second case (when the leading indicator is *Per capita revenue of the budget of the cities and municipalities)*, Crna Trava is in the second place, and when no leading indicator is selected, this municipality is in the first place. Therefore, the least reliable rank is obtained in case no leading indicator is defined. Additionally, this is proven by the fact that the first and the last ten municipalities differ in relation to the first two cases.

The cases with the selected leading indicator among these two previously mentioned are to be discussed. However, since the importance of both indicators is emphasized only in the case when *Municipal gross product* is set as the leading indicator, the first test example (the first rang list) has the advantage.

Table 1

RANK LIST 1			RANK LIST 2		RANK LIST 3	
RANK	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**
1	Savski venac	20.53795	Savski venac	21.26466	Crna Trava	18.58203
2	Crna Trava1	19.09468	Crna Trava	19.33298	Savski venac	18.43576
3	Stari grad	18.67885	Vračar	18.05141	Čajetina	15.97026
4	Vračar	17.90826	Stari grad	17.79199	Petrovaradin	15.72696
5	Novi Sad	17.24419	Petrovaradin	17.32883	Vračar	15.66884
6	Petrovaradin	17.21432	Čajetina	17.26869	Pirot	15.50119
7	Čajetina	17.11617	Novi Sad	17.06778	Novi Sad	15.44837
8	City of Novi Sad	16.88208	City of Novi Sad	16.74348	Vrnjačka Banja	15.29626
9	Pirot	16.79204	Pirot	16.7298	Stari grad	15.22206
10	Pančevo	16.63911	Medijana	16.62343	Leskovac	15.21889
11	Medijana	16.6209	Pančevo	16.62254	City of Novi Sad	15.12998
12	Temerin	16.46725	Pantelej	16.54219	Trgovište	15.08621
13	Vrnjačka Banja	16.40195	Vrnjačka Banja	16.54001	Pančevo	15.07953
14	Pantelej	16.37947	Leskovac	16.52425	Vranje	15.03633
15	Leskovac	16.36369	Temerin	16.50122	Temerin	15.035
16	Zvezdara	16.34019	Zvezdara	16.49184	Aleksandrovac	15.02136
17	Zemun	16.3168	Rakovica	16.44035	Pantelej	14.99017
18	Vranje	16.23021	Vranje	16.38785	Kraljevo	14.95107
19	Rakovica	16.20059	Zemun	16.38399	Tutin	14.92712
20	Užice	16.16164	Voždovac	16.32922	Ivanjica	14.89857
21	Kragujevac	16.14966	Kraljevo	16.29469	Preševo	14.89852
22	Sremski Karlovci	16.11223	Gornji Milanovac	16.27788	Bujanovac	14.8618
23	Palilula (Belgrade)	16.1122	Sremski Karlovci	16.25723	Varvarin	14.79341
24	Voždovac	16.10025	Aleksandrovac	16.25432	Bela Palanka	14.79246
25	Palilula (Niš)	16.06259	Užice	16.2532	Užice	14.78037
26	Stara Pazova	16.06032	Ivanjica	16.22241	Gornji Milanovac	14.77208
27	Kraljevo	16.05746	Palilula (Niš)	16.21194	Zemun	14.76101
28	Gornji Milanovac	16.05515	Čukarica	16.14594	Vranjska Banja	14.72976
29	Čukarica	16.04184	Kragujevac	16.12039	Rakovica	14.71239
30	Aleksandrovac	16.03755	Bačka Palanka	16.11345	Voždovac	14.70133
31	Ivanjica	16.00464	Novi Beograd	16.1127	Kragujevac	14.69693
32	Novi Beograd	16.00226	Palilula (Belgrade)	16.06535	Palilula (Niš)	14.69501
33	Bačka Palanka	15.99435	Bački Petrovac	16.05238	Zvezdara	14.6945
34	Bački Petrovac	15.97772	Kruševac	16.04959	Bački Petrovac	14.68441
35	Zrenjanin	15.9765	City of Vranje	16.03014	Ćićevac	14.68267
36	Sremska Mitrovica	15.92348	Stara Pazova	16.02008	Bačka Palanka	14.67451
37	Grocka	15.91186	Trgovište	16.01691	Rekovac	14.67041
38	Trgovište	15.89964	Varvarin	16.00179	Trstenik	14.66054
39	Varvarin	15.88469	City of Niš	15.9764	Medijana	14.66001
40	Kruševac	15.85206	Čačak	15.96672	Žagubica	14.65938
41	Čačak	15.84696	Trstenik	15.96288	Pećinci	14.62617
42	Surčin	15.84292	Zrenjanin	15.94006	Kruševac	14.5944
43	Aranđelovac	15.80626	Sremska Mitrovica	15.91873	Zrenjanin	14.57447
44	Trstenik	15.78702	Aranđelovac	15.91199	Sremska Mitrovica	14.56501
45	City of Niš	15.77585	Bela Palanka	15.89374	Stara Pazova	14.54994

RANK LIST 1			RANK LIST 2		RANK LIST 3	
RANK	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**
46	Pećinci	15.73923	Požega	15.8881	Blace	14.54543
47	Bela Palanka	15.72884	Prokuplje	15.87586	Niška Banja	14.51785
48	Zaječar	15.67832	Vranjska Banja	15.87138	Aranđelovac	14.50754
49	Požega	15.67685	Niška Banja	15.8659	Palilula (Belgrade)	14.50257
50	City of Vranje	15.6628	Ćićevac	15.85518	City of Vranje	14.49615
51	Niška Banja	15.65406	Bujanovac	15.85429	Aleksinac	14.49155
52	Ćićevac	15.65404	Tutin	15.84935	Kosjerić	14.48996
53	Vranjska Banja	15.64163	Grocka	15.84097	Sremski Karlovci	14.47746
54	Sombor	15.61023	Pećinci	15.81064	Srbobran	14.46344
55	Kosjerić	15.56708	Kosjerić	15.77882	Zaječar	14.44952
56	Odžaci	15.5617	Surčin	15.75617	Ražanj	14.43697
57	Rekovac	15.55854	Žagubica	15.7561	Čukarica	14.43541
58	Kostolac	15.55663	Blace	15.71716	Čačak	14.42371
59	Lazarevac	15.54762	Crveni krst	15.70105	Surdulica	14.41508
60	Crveni krst	15.54298	Rekovac	15.68359	Prokuplje	14.41318
61	Bujanovac	15.5342	Aleksinac	15.67428	Surčin	14.40627
62	Aleksinac	15.53413	Srbobran	15.65437	Grocka	14.40391
63	Srbobran	15.53353	Kovačica	15.63518	Knjaževac	14.40119
64	Žagubica	15.52902	Sombor	15.62503	Požega	14.40041
65	Knjaževac	15.50277	Surdulica	15.6243	Odžaci	14.36561
66	Surdulica	15.4917	Odžaci	15.62128	Sombor	14.35915
67	Kovačica	15.4811	Kostolac	15.59755	Sečanj	14.3387
68	Vrbas	15.47528	Opovo	15.58982	City of Niš	14.33609
69	Topola	15.47075	Topola	15.57153	Lajkovac	14.33342
70	Barajevo	15.46657	Barajevo	15.56585	Topola	14.32765
71	Senta	15.4615	Sjenica	15.55767	Opovo	14.32293
72	Bor	15.4432	Bajina Bašta	15.53548	Vlasotince	14.31908
73	Prokuplje	15.43624	Senta	15.52891	Bač	14.31314
74	Blace	15.43255	Vrbas	15.51258	Crveni krst	14.30505
75	Opovo	15.42795	Bač	15.50214	Kovačica	14.30171
76	Smederevo	15.34652	Zaječar	15.48829	Brus	14.29412
77	Sečanj	15.33859	Vlasotince	15.46923	Bajina Bašta	14.28786
78	Bač	15.31293	Sečanj	15.42815	Kostolac	14.27423
79	Kikinda	15.30967	Brus	15.39113	Novi Beograd	14.26098
80	Bajina Bašta	15.30207	Bor	15.3564	Barajevo	14.233
81	Vlasotince	15.29543	Kula	15.35365	Senta	14.2083
82	Inđija	15.29383	Inđija	15.352	Priboj	14.18345
83	Požarevac	15.29174	Nova Varoš	15.32597	Vrbas	14.17894
84	Lajkovac	15.25551	Sopot	15.32495	Medveđa	14.16799
85	Kula	15.25413	Raška	15.31835	Nova Varoš	14.14037
86	Subotica	15.25076	Valjevo	15.31523	Rača	14.13196
87	Sopot	15.24218	Priboj	15.29852	Knić	14.10262
88	Kanjiža	15.17167	Lajkovac	15.29664	Sjenica	14.09435
89	Rača	15.16236	Knić	15.26548	Raška	14.08483
90	Jagodina	15.12036	Rača	15.26162	Kula	14.07549
91	Apatin	15.11318	Dimitrovgrad	15.25817	Bor	14.0602
92	Valjevo	15.11284	Lazarevac	15.25662	Dimitrovgrad	14.05639

RANK LIST 1			RANK LIST 2		RANK LIST 3	
RANK	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**
93	Knić	15.10807	Kikinda	15.24477	Vladičin Han	14.01562
94	Dimitrovgrad	15.10025	Smederevo	15.22918	Plandište	14.00409
95	Raška	15.08212	Preševo	15.21056	Bosilegrad	13.99406
96	Šid	15.07139	Požarevac	15.21036	Inđija	13.99331
97	Priboj	15.06414	Subotica	15.20885	Novi Pazar	13.98408
98	Tutin	15.04537	Kanjiža	15.20355	Kikinda	13.97617
99	Novi Bečej	15.04518	Apatin	15.18646	Šid	13.95948
100	Brus	15.03993	Novi Pazar	15.16158	Despotovac	13.95382
101	Nova Varoš	15.0277	Jagodina	15.15286	Lazarevac	13.94135
102	Ražanj	14.98278	Ražanj	15.14562	Subotica	13.92507
103	Ruma	14.95991	Šid	15.12409	Smederevo	13.91379
104	Bačka Topola	14.91421	Knjaževac	15.12114	Kanjiža	13.90429
105	Despotovac	14.90352	Arilje	15.07108	Novi Bečej	13.89151
106	Arilje	14.89358	Despotovac	15.05122	Požarevac	13.87999
107	Sjenica	14.87625	Novi Bečej	15.03836	Apatin	13.86657
108	Svilajnac	14.86637	Vladičin Han	14.99605	Žitište	13.83869
109	Mladenovac	14.81361	Ruma	14.9873	Jagodina	13.80251
110	Žitište	14.81341	Bačka Topola	14.98681	Merošina	13.78839
111	Irig	14.78133	Svilajnac	14.97039	Bačka Topola	13.78195
112	Vladičin Han	14.77616	Plandište	14.95444	Sopot	13.76066
113	Čoka	14.77059	Prijepolje	14.94197	Valjevo	13.76032
114	Plandište	14.72698	Irig	14.91248	Arilje	13.75915
115	Novi Pazar	14.71852	Žitište	14.85734	Svilajnac	13.74847
116	City of Požarevac	14.70004	Svrljig	14.85274	Svrljig	13.74376
117	Svrljig	14.6996	Lučani	14.84546	Kuršumlija	13.72521
118	Lapovo	14.68537	Medveđa	14.8403	Prijepolje	13.70641
119	Batočina	14.67214	Kuršumlija	14.8346	Ruma	13.6696
120	Ćuprija	14.67168	Mali Iđoš	14.82873	Babušnica	13.64984
121	Kovin	14.65227	Ćuprija	14.82861	Bojnik	13.6492
122	Bečej	14.64112	Čoka	14.80512	Batočina	13.64194
123	Lučani	14.62231	Mladenovac	14.80144	Lučani	13.63168
124	Mali Iđoš	14.60993	Lapovo	14.78423	Mali Iđoš	13.62964
125	Medveđa	14.59367	Mionica	14.76693	Irig	13.62847
126	Golubac	14.56999	Bečej	14.75272	Čoka	13.61469
127	Ada	14.55194	Bosilegrad	14.74377	Golubac	13.59012
128	Nova Crnja	14.54704	Golubac	14.73941	Mionica	13.5854
129	Prijepolje	14.54301	Batočina	14.73388	Bečej	13.56263
130	Bosilegrad	14.48809	Ada	14.67181	Ćuprija	13.55154
131	Mionica	14.4813	City of Požarevac	14.66389	Kovin	13.54963
132	Ub	14.48035	Ub	14.64807	Ub	13.53203
133	Merošina	14.46803	Kovin	14.63446	Mladenovac	13.52974
134	Sokobanja	14.43766	Alibunar	14.62975	Majdanpek	13.5111
135	Novi Kneževac	14.43511	Sokobanja	14.6048	Ada	13.49659
136	Malo Crniće	14.42979	Nova Crnja	14.59479	Malo Crniće	13.49491
137	Alibunar	14.40149	Merošina	14.58889	Nova Crnja	13.47236
138	Obrenovac	14.39098	Malo Crniće	14.51468	Alibunar	13.44123
139	Vršac	14.36161	Babušnica	14.51378	Novi Kneževac	13.43611

RANK LIST 1			RANK LIST 2		RANK LIST 3	
RANK	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**	**UNIT**	**I-DISTANCE**
140	Kuršumlija	14.35017	Bojnik	14.47327	Lapovo	13.42865
141	Bojnik	14.32563	Novi Kneževac	14.41142	Doljevac	13.35818
142	Žabalj	14.32029	Žabalj	14.39249	Krupanj	13.33187
143	Babušnica	14.27781	Obrenovac	14.36506	City of Požarevac	13.3065
144	Velika Plana	14.25085	Gadžin Han	14.32709	Lebane	13.27488
145	Krupanj	14.21786	Krupanj	14.32052	Žitorađa	13.2725
146	Gadžin Han	14.17437	Vršac	14.28512	Velika Plana	13.22599
147	Smederevska Palanka	14.14657	Velika Plana	14.27011	Žabalj	13.20232
148	Preševo	14.13193	Ljig	14.26212	Sokobanja	13.19478
149	Petrovac na Mlavi	14.10868	Smederevska Palanka	14.21865	Gadžin Han	13.17661
150	Beočin	14.09366	Majdanpek	14.18388	Petrovac na Mlavi	13.14032
151	Doljevac	14.07041	Lebane	14.16424	Ljig	13.07519
152	Majdanpek	14.06915	Petrovac na Mlavi	14.14329	Obrenovac	13.05286
153	Lebane	14.03389	Žitorađa	14.13271	Osečina	13.01858
154	Ljig	14.01406	Doljevac	14.11233	Smederevska Palanka	12.99304
155	Žitorađa	14.00303	Kladovo	14.10784	Titel	12.9641
156	Šabac	13.90277	Beočin	14.09436	Vršac	12.93604
157	Kladovo	13.77669	Osečina	13.98913	Kladovo	12.89159
158	Titel	13.72029	Ljubovija	13.8169	Beočin	12.86088
159	Osečina	13.68559	Šabac	13.79275	Ljubovija	12.8174
160	Ljubovija	13.6528	Titel	13.73378	Kučevo	12.81555
161	Loznica	13.47943	Kučevo	13.57795	Boljevac	12.66122
162	Boljevac	13.47892	Loznica	13.56121	Šabac	12.56183
163	Kučevo	13.46525	Boljevac	13.51562	Žabari	12.45128
164	Bogatić	13.35663	Žabari	13.50488	Bogatić	12.39695
165	Veliko Gradište	13.32828	Veliko Gradište	13.36326	Loznica	12.31444
166	Žabari	13.32503	Bogatić	13.28828	Veliko Gradište	12.28416
167	Paraćin	13.08681	Vladimirci	13.11793	Vladimirci	12.20356
168	Vladimirci	13.02642	Paraćin	13.10775	Paraćin	12.13616
169	Negotin	12.88189	Mali Zvornik	12.74207	Negotin	11.95998
170	Mali Zvornik	12.74407	Negotin	12.72648	Mali Zvornik	11.82683
171	Koceljeva	12.3361	Koceljeva	12.47473	Koceljeva	11.60802
172	Bela Crkva	11.13119	Bela Crkva	11.05616	Bela Crkva	10.13275

Number of inhabitants by municipality

The table below represents the number of inhabitants by municipality (estimate, 2013), in the order of the first rank list. It is clear that the municipality of Crna Trava has the smallest number of inhabitants; therefore, for the indicator *Per capita revenue of the budget of the cities and municipalities,* this municipality is positioned at the top of the list. Considering that this municipality stands out as an outlier, presented in Annex 2 is the *KROKI* software processing without it, observing the principle of case 1 (technical criterion, the leading indicator *Municipal gross product*).

RANK	MUNICIPALITY	NO. OF INHABITANTS	RANK	MUNICIPALITY	NUMBER OF INHABITANTS	RANK	MUNICIPALITY	NUMBER OF INHABITANTS
1	Savski venac	38 226	59	Lazarevac	58 352	117	Svrljig	13 755
2	Crna Trava	**1 539**	60	Crveni krst	31 988	118	Lapovo	7 650
3	Stari grad	47 646	61	Bujanovac	38 132	119	Batočina	11 525
4	Vračar	56 854	62	Aleksinac	50 543	120	Ćuprija	29 947
5	Novi Sad	312 247	63	Srbobran	16 073	121	Kovin	33 130
6	Petrovaradin	33 916	64	Žagubica	12 292	122	Bečej	36 663
7	Čajetina	14 522	65	Knjaževac	30 490	123	Lučani	20 344
8	City of Novi Sad	346 163	66	Surdulica	19 873	124	Mali Iđoš	11 844
9	Pirot	56 903	67	Kovačica	24 864	125	Medveđa	7 235
10	Pančevo	122 492	68	Vrbas	41 378	126	Golubac	8 091
11	Medijana	85 607	69	Topola	21 778	127	Ada	16 715
12	Temerin	28 244	70	Barajevo	27 084	128	Nova Crnja	9 978
13	Vrnjačka Banja	27 141	71	Senta	22 933	129	Prijepolje	36 464
14	Pantelej	53 394	72	Bor	47 911	130	Bosilegrad	7 866
15	Leskovac	141 719	73	Prokuplje	43 511	131	Mionica	14 001
16	Zvezdara	155 206	74	Blace	11 370	132	Ub	28 612
17	Zemun	169 632	75	Opovo	10 247	133	Merošina	13 721
18	Vranje	73 512	76	Smederevo	107 048	134	Sokobanja	15 524
19	Rakovica	109 034	77	Sečanj	12 843	135	Novi Kneževac	11 011
20	Užice	76 886	78	Bač	14 097	136	Malo Crniće	11 054
21	Kragujevac	179 030	79	Kikinda	58 099	137	Alibunar	19 678
22	Sremski Karlovci	8 645	80	Bajina Bašta	25 491	138	Obrenovac	72 682
23	Palilula (Belgrade)	176 113	81	Vlasotince	29 256	139	Vršac	51 330
24	Voždovac	160 916	82	Inđija	47 046	140	Kuršumlija	18 694
25	Palilula (Niš)	73 584	83	Požarevac	61 147	141	Bojnik	10 851
26	Stara Pazova	65 513	84	Lajkovac	15 281	142	Žabalj	25 873
27	Kraljevo	123 724	85	Kula	42 110	143	Babušnica	11 734
28	Gornji Milanovac	43 533	86	Subotica	140 223	144	Velika Plana	40 052
29	Čukarica	180 725	87	Sopot	20 257	145	Krupanj	16 760
30	Aleksandrovac	25 903	88	Kanjiža	24 833	146	Gadžin Han	7 990
31	Ivanjica	31 347	89	Rača	11 188	147	Smederevska Palanka	49 185
32	Novi Beograd	214 512	90	Jagodina	71 583	148	Preševo	27 254
33	Bačka Palanka	54 631	91	Apatin	28 315	149	Petrovac na Mlavi	30 378
34	Bački Petrovac	13 222	92	Valjevo	89 112	150	Beočin	15 551
35	Zrenjanin	121 683	93	Knić	13 877	151	Doljevac	18 319
36	Sremska Mitrovica	78 776	94	Dimitrovgrad	9 854	152	Majdanpek	18 127
37	Grocka	84 833	95	Raška	24 198	153	Lebane	21 290
38	Trgovište	**4 906**	96	Šid	33 540	154	Ljig	12 298
39	Varvarin	17 582	97	Priboj	26 386	155	Žitorađa	15 999

RANK	MUNICIPALITY	NO. OF INHABITANTS	RANK	MUNICIPALITY	NUMBER OF INHABITANTS	RANK	MUNICIPALITY	NUMBER OF INHABITANTS
40	Kruševac	126 900	98	Tutin	31 201	156	Šabac	114 548
41	Čačak	114 141	99	Novi Bečej	23 512	157	Kladovo	20 136
42	Surčin	44 649	100	Brus	15 916	158	Titel	15 571
43	Aranđelovac	45 493	101	Nova Varoš	16 035	159	Osečina	12 162
44	Trstenik	41 939	102	Ražanj	8 767	160	Ljubovija	14 015
45	City of Niš	259 125	103	Ruma	53 332	161	Loznica	78 136
46	Pećinci	19 679	104	Bačka Topola	32 689	162	Boljevac	12 468
47	Bela Palanka	11 725	105	Despotovac	22 473	163	Kučevo	14 852
48	Zaječar	58 183	106	Arilje	18 642	164	Bogatić	28 209
49	Požega	29 050	107	Sjenica	26 259	165	Veliko Gradište	17 165
50	City of Vranje	82 845	108	Svilajnac	22 940	166	Žabari	10 906
51	Niška Banja	14 552	109	Mladenovac	52 831	167	Paraćin	53 327
52	Ćićevac	9 252	110	Žitište	16 295	168	Vladimirci	17 038
53	Vranjska Banja	9 333	111	Irig	10 626	169	Negotin	35 735
54	Sombor	84 187	112	Vladičin Han	20 281	170	Mali Zvornik	12 169
55	Kosjerić	11 740	113	Čoka	11 081	171	Koceljeva	12 723
56	Odžaci	29 355	114	Plandište	10 991	172	Bela Crkva	17 034
57	Rekovac	10 525	115	Novi Pazar	102 122			
58	Kostolac	13 566	116	City of Požarevac	74 713			

This section provides the ranking of municipalities by using the method of I-distance implemented in KRO-KI software, but excluding the municipality of Crna Trava, which proved to be an outlier value.

Clearly, the fully identical order as in rank list 1 (which also resulted from defining the indicator *Municipal gross product,* however, including 172 municipalities in total) could not have been expected, since now the benchmark point, the "factious less-developed municipality", was also changed to a certain extent. However, the top and the bottom of the list almost do not differ at all, and the variance is rather small (I-distance for the municipality with rising/falling rank is rather close, up to one decimal point, to the I-distance of the municipality taking its place).

The only considerable change from the top of the list is the municipality of Trgovište, which dropped from the 38th to 12th place. However, if looking at the number of inhabitants by municipalities, after Crna Trava, this municipality has the smallest number; therefore, when the less inhabited municipality is outcast, the importance of the next one becomes more expressive, as its indicator *Per capita revenue of the budget of the cities and municipalities* also gains in weight.

RANK LIST (WITHOUT CRNA TRAVA)*

RANK	UNIT	I-DISTANCE	RANK	UNIT	I-DISTANCE	RANK	UNIT	I-DISTANCE
1	Savski venac	20.55318	58	Surčin	15.47665	115	Irig	14.7524
2	Stari grad	18.76376	59	Odžaci	15.47065	116	Gadžin Han	14.71681
3	Vračar	17.90746	60	Aleksinac	15.46082	117	Vladičin Han	14.65282
4	Čajetina	17.29283	61	Srbobran	15.43341	118	Novi Pazar	14.6457
5	Novi Sad	17.08644	62	City of Vranje	15.43276	119	Lučani	14.64557
6	Petrovaradin	17.04858	63	Blace	15.41234	120	Babušnica	14.63512
7	City of Novi Sad	16.73769	64	Surdulica	15.39301	121	Mladenovac	14.61405
8	Pirot	16.68915	65	Sečanj	15.39118	122	Ćuprija	14.59337
9	Pančevo	16.51143	66	Kovačica	15.38045	123	City of Požarevac	14.57658
10	Medijana	16.4597	67	Tutin	15.37813	124	Svrljig	14.56441
11	Trgovište	16.35628	68	Kostolac	15.37123	125	Lapovo	14.54243
12	Vrnjačka Banja	16.35532	69	Topola	15.36983	126	Mionica	14.52841
13	Sremski Karlovci	16.26443	70	Senta	15.36219	127	Bečej	14.51852
14	Temerin	16.22939	71	Crveni krst	15.3612	128	Sokobanja	14.49756
15	Leskovac	16.18994	72	Prokuplje	15.34732	129	Kovin	14.47977
16	Zvezdara	16.15967	73	Barajevo	15.34072	130	Alibunar	14.47664
17	Zemun	16.12825	74	Bač	15.30327	131	Malo Crniće	14.47592
18	Pantelej	16.10606	75	Vrbas	15.29931	132	Batočina	14.47571
19	Užice	16.07581	76	Bosilegrad	15.29325	133	Nova Crnja	14.46845
20	Rakovica	16.07324	77	Opovo	15.29062	134	Ub	14.45417
21	Gornji Milanovac	16.04346	78	Lazarevac	15.28191	135	Ada	14.43569
22	Vranje	15.99167	79	Bor	15.27199	136	Prijepolje	14.43141
23	Aleksandrovac	15.98874	80	Bajina Bašta	15.27046	137	Mali Iđoš	14.42029
24	Ivanjica	15.98003	81	Vlasotince	15.24681	138	Merošina	14.40957
25	Kragujevac	15.96589	82	Lajkovac	15.23411	139	Novi Kneževac	14.35084
26	Kraljevo	15.95059	83	Preševo	15.22488	140	Kuršumlija	14.34073
27	Voždovac	15.94495	84	Požarevac	15.14767	141	Bojnik	14.2662
28	Bačka Palanka	15.87793	85	Inđija	15.14256	142	Vršac	14.26536
29	Bački Petrovac	15.87792	86	Kikinda	15.13486	143	Obrenovac	14.1856
30	Novi Beograd	15.86082	87	Brus	15.12642	144	Petrovac na Mlavi	14.13793
31	Palilula (Belgrade)	15.85004	88	Kula	15.11069	145	Žabalj	14.11568
32	Stara Pazova	15.84395	89	Subotica	15.10404	146	Krupanj	14.09182
33	Zrenjanin	15.84076	90	Smederevo	15.10095	147	Velika Plana	14.06028
34	Čukarica	15.81949	91	Medveđa	15.08302	148	Smederevska Palanka	14.05451
35	Varvarin	15.81377	92	Kanjiža	15.08265	149	Ljig	14.05027
36	Palilula (Niš)	15.80053	93	Knić	15.07593	150	Majdanpek	13.99421
37	Čačak	15.74421	94	Valjevo	15.06589	151	Žitorađa	13.91949
38	Sremska Mitrovica	15.73227	95	Rača	15.04115	152	Beočin	13.89767
39	Bela Palanka	15.72638	96	Nova Varoš	15.04063	153	Doljevac	13.89504
40	Trstenik	15.70968	97	Dimitrovgrad	15.02446	154	Lebane	13.87834
41	Kruševac	15.69418	98	Jagodina	15.00699	155	Kladovo	13.86218
42	Aranđelovac	15.69121	99	Ražanj	14.98995	156	Ljubovija	13.75429
43	Požega	15.6725	100	Apatin	14.97595	157	Šabac	13.69586
44	Zaječar	15.61285	101	Priboj	14.96181	158	Kučevo	13.69165
45	Kosjerić	15.60003	102	Raška	14.95877	159	Osečina	13.66009
46	Pećinci	15.59365	103	Šid	14.9214	160	Boljevac	13.59936
47	Grocka	15.59154	104	Golubac	14.90687	161	Titel	13.52763

RANK LIST (WITHOUT CRNA TRAVA)*

RANK	UNIT	I-DISTANCE	RANK	UNIT	I-DISTANCE	RANK	UNIT	I-DISTANCE
48	Bujanovac	15.59064	105	Despotovac	14.89211	162	Veliko Gradište	13.37124
49	Vranjska Banja	15.58366	106	Svilajnac	14.88445	163	Žabari	13.36437
50	Ćićevac	15.58224	107	Sjenica	14.88058	164	Loznica	13.32665
51	City of Niš	15.57493	108	Arilje	14.85912	165	Bogatić	13.16206
52	Sopot	15.57381	109	Novi Bečej	14.85763	166	Paraćin	13.03969
53	Niška Banja	15.5354	110	Žitište	14.83771	167	Negotin	12.99465
54	Rekovac	15.53069	111	Bačka Topola	14.80475	168	Vladimirci	12.93377
55	Knjaževac	15.49724	112	Ruma	14.79473	169	Mali Zvornik	12.46385
56	Žagubica	15.49501	113	Čoka	14.75951	170	Koceljeva	12.30579
57	Sombor	15.49218	114	Plandište	14.75901	171	Bela Crkva	11.1216

Note: * Crna Trava is removed as an obvious outlier.

Serbia: Final Municipality ranking by the Capitals for Resilience Index

BASED ON THE 'MIN-MAX' NORMALIZATION OF THE CAPITALS FOR RESILIENCE INDEX

Here, linear transformation of the original values of composite indicator of ranked municipalities obtained by I-distance method was performed.

The interval $[X_{\min}, X_{\max}]$ is mapped to a new interval 0 to 100, where $X_{\min}$ and $X_{\max}$ are minimum and maximum values of variable X (in this case I-distance of municipalities), where each value X_i from the original set of values, is reflected in the value obtained by the formula:

$$X_{i\_new} = \frac{X_i - X_{\min}}{X_{\max} - X_{\min}} * 100$$

The final calculated Index is shown in the table below.

RANK LIST (WITHOUT CRNA TRAVA) – MUNICIPALITIES RESILIENCE INDEX

RANK	UNIT	NORMALIZED I-DISTANCE	RANK	UNIT	NORMALIZED I-DISTANCE	RANK	UNIT	NORMALIZED I-DISTANCE
1	Savski venac	100.00	58	Surčin	46.18	115	Irig	38.50
2	Stari grad	81.03	59	Odžaci	46.11	116	Gadžin Han	38.12
3	Vraèar	71.95	60	Aleksinac	46.01	117	Vladičin Han	37.44
4	Èajetina	65.43	61	Srbobran	45.72	118	Novi Pazar	37.36
5	Novi Sad	63.24	62	City of Vranje	45.71	119	Lučani	37.36
6	Petrovaradin	62.84	63	Blace	45.49	120	Babušnica	37.25
7	City of Novi Sad	59.55	64	Surdulica	45.29	121	Mladenovac	37.03
8	Pirot	59.03	65	Sečanj	45.27	122	Ćuprija	36.81
9	Panèevo	57.15	66	Kovačica	45.16	123	City of Požarevac	36.63
10	Medijana	56.60	67	Tutin	45.13	124	Svrljig	36.50
11	Trgovište	55.50	68	Kostolac	45.06	125	Lapovo	36.27
12	Vrnjačka Banja	55.49	69	Topola	45.04	126	Mionica	36.12
13	Sremski Karlovci	54.53	70	Senta	44.96	127	Bečej	36.02
14	Temerin	54.16	71	Crveni krst	44.95	128	Sokobanja	35.79
15	Leskovac	53.74	72	Prokuplje	44.80	129	Kovin	35.61
16	Zvezdara	53.42	73	Barajevo	44.73	130	Alibunar	35.57

RANK LIST (WITHOUT CRNA TRAVA) – MUNICIPALITIES RESILIENCE INDEX

RANK	UNIT	NORMALIZED I-DISTANCE	RANK	UNIT	NORMALIZED I-DISTANCE	RANK	UNIT	NORMALIZED I-DISTANCE
17	Zemun	53.08	74	Bač	44.34	131	Malo Crniæe	35.56
18	Pantelej	52.85	75	Vrbas	44.29	132	Batočina	35.56
19	Užice	52.53	76	Bosilegrad	44.23	133	Nova Crnja	35.49
20	Rakovica	52.50	77	Opovo	44.20	134	Ub	35.33
21	Gornji Milanovac	52.18	78	Lazarevac	44.11	135	Ada	35.14
22	Vranje	51.64	79	Bor	44.01	136	Prijepolje	35.09
23	Aleksandrovac	51.60	80	Bajina Bašta	43.99	137	Mali Iđoš	34.97
24	Ivanjica	51.51	81	Vlasotince	43.74	138	Merošina	34.86
25	Kragujevac	51.36	82	Lajkovac	43.60	139	Novi Kneževac	34.24
26	Kraljevo	51.20	83	Preševo	43.51	140	Kuršumlija	34.13
27	Voždovac	51.14	84	Požarevac	42.69	141	Bojnik	33.34
28	Bačka Palanka	50.43	85	Inđija	42.63	142	Vršac	33.33
29	Bački Petrovac	50.43	86	Kikinda	42.55	143	Obrenovac	32.49
30	Novi Beograd	50.25	87	Brus	42.46	144	Petrovac na Mlavi	31.98
31	Palilula (Belgrade)	50.13	88	Kula	42.30	145	Žabalj	31.75
32	Stara Pazova	50.07	89	Subotica	42.22	146	Krupanj	31.49
33	Zrenjanin	50.04	90	Smederevo	42.19	147	Velika Plana	31.16
34	Čukarica	49.81	91	Medveđa	42.00	148	Smederevska Palanka	31.10
35	Varvarin	49.75	92	Kanjiža	42.00	149	Ljig	31.05
36	Palilula (Niš)	49.61	93	Knić	41.93	150	Majdanpek	30.46
37	Čačak	49.01	94	Valjevo	41.82	151	Žitorađa	29.67
38	Sremska Mitrovica	48.89	95	Rača	41.56	152	Beočin	29.43
39	Bela Palanka	48.82	96	Nova Varoš	41.55	153	Doljevac	29.41
40	Trstenik	48.65	97	Dimitrovgrad	41.38	154	Lebane	29.23
41	Kruševac	48.48	98	Jagodina	41.20	155	Kladovo	29.06
42	Aranđelovac	48.45	99	Ražanj	41.01	156	Ljubovija	27.91
43	Požega	48.25	100	Apatin	40.87	157	Šabac	27.29
44	Zaječar	47.62	101	Priboj	40.72	158	Kučevo	27.25
45	Kosjerić	47.48	102	Raška	40.68	159	Osečina	26.91
46	Pećinci	47.42	103	Šid	40.29	160	Boljevac	26.27
47	Grocka	47.39	104	Golubac	40.13	161	Titel	25.51
48	Bujanovac	47.38	105	Despotovac	39.98	162	Veliko Gradište	23.85
49	Vranjska Banja	47.31	106	Svilajnac	39.90	163	Žabari	23.78
50	Ćićevac	47.29	107	Sjenica	39.86	164	Loznica	23.38
51	City of Niš	47.22	108	Arilje	39.63	165	Bogatić	21.63
52	Sopot	47.21	109	Novi Bečej	39.61	166	Paraćin	20.34
53	Niška Banja	46.80	110	Žitište	39.40	167	Negotin	19.86
54	Rekovac	46.75	111	Bačka Topola	39.05	168	Vladimirci	19.21
55	Knjaževac	46.39	112	Ruma	38.95	169	Mali Zvornik	14.23
56	Žagubica	46.37	113	Čoka	38.57	170	Koceljeva	12.56
57	Sombor	46.34	114	Plandište	38.57	171		

ANNEX 3
SNAPSHOT OF THE LEGAL FRAMEWORK RELEVANT FOR DISASTER RISK REDUCTION IN SERBIA

The National Sustainable Development Strategy of Serbia 2009–2017 (2008) promotes the integration of the principle of sustainability into all other sectors. In the chapter "Natural disasters – floods, landslides, fires, earthquakes", there are three strategic objectives recognized for future sustainable development in this field: (i) to institutionalize the civil defence system; (ii) to increase the level of flood protection; and (iii) to promote insurance against damage caused by natural disasters. The Strategy also recommends implementation of a programme of risk assessment for the territory of Serbia, which should include a risk map, developing the data base of landslides and evaluation of risk mitigation measures (Official Gazette of the Republic of Serbia, 2008)

The Strategy for the Protection from Fire 2012-2017 (adopted in 2012). The system of fire protection and its in¬stitutional and normative framework are presented in the Strategy. It strongly emphasizes that informing citizens in a timely manner is of utmost importance for prevention. These activities are, as defined by the Strategy, closely related to improving capacities and increasing the number of firemen at the local level, including their adequate training and equipment, in accordance with international standards in the field (Official Gazette of the Republic of Serbia, 2012a).

The Strategy of Agriculture and Rural Development of the Republic of Serbia 2014-2024 (2014) sets the foundations of the new agricultural policy, oriented towards modern public policy management and the European model of supporting agriculture, which also takes into account climate changes and related risks (Official Gazette of the Republic of Serbia, 2014b).

The Forestry Development Strategy (2006) prioritizes, among others, stopping the reduction of forested areas. The Strategy emphasizes the role of the forest sector in sustainable development of the Republic of Serbia, and in floods prevention (Official Gazette of the Republic of Serbia, 2006).

The draft **Energy Sector Development Strategy of the Republic of Serbia 2015-2025.** The Strategy defines the conditions for enhancing energy efficiency in the entire chain of energy-related activities and energy consumption, stimulating the use of renewable energy sources as well as promoting environment protection.

The Law on Post-Flood Rehabilitation in the Republic of Serbia (2014) was developed in order to accelerate the reconstruction of areas, which were affected by the floods and landslides in May 2014. It also regulated the establishment and operation of the Office for Assistance to and Recovery of Flooded Areas, as well as public procurement rules and procedures (Official Gazette of the Republic of Serbia, 2014c). As *lex specialis,* the law was in force until the end of the 2015.

This law on Post-Flood Rehabilitation is succeeded by the **Law on Reconstruction and State Aid following Natural and Other Hazards,** as of 1 January 2016. The Law regulates the process of reconstruction and allocation of state aid to citizens and legal persons who have suffered material damage due to natural and other hazards. Its guiding principles are in line with the key policy recommendations, such as the principle of citizen equality in exercising the right to receive state aid, of gender equality, special protection of vulnerable groups, aid to illiterate persons (Official Gazette of the Republic of Serbia,2015a).

The Water Law (2010). A number of articles in this Law regulate risks and potential threats from water, which are consistent with the Law on Emergency Management. It defines measures to be taken in order to protect watercourses as well as criteria for determining flood-prone and erosion areas. It recognizes first- and second-level watercourses, identifying responsibilities for its protection (public water management enterprises for first-level watercourses and local government units for "level 2" watercourses), as defined by two relevant documents to be developed at each governance level: general and operational flood protection plans (Official Gazette of the Republic of Serbia, 2010b).

The Law is currently under revision. Proposed changes are significant for the protection from water and erosion, setting out the responsibility of the Government of Serbia for determining of erosion zones, based on the criteria established by the ministry in charge. The Law of 2010, which is still in force, assigns this role to the local governments, which often exceeds their capacities.

The Law on Meteorological and Hydrological Activities (2010). The Law regulates hydrological and meteorological activities, including those related to hydrological disasters. It defines the roles and responsibilities of institutions in charge, above all, the Republic Hydro Meteorological Service (RHMS) in monitoring as well as in establishing and developing an early warning system in the country. This Law provides the legal framework for weather forecasting, early warning, and the use of weather- and climate-related information for risk assessments, integrating strategic principles of the World Meteorological Organization (WMO) (Official Gazette of the Republic of Serbia, 2010a).

The Law on Fire Protection (2009, amended 2015). The Law prescribes the legal obligations of all the participants in fire protection and prevention from endangerment. It promotes, *inter alia*, principles of transparency, responsibility, prevention and awareness rising. In its Articles 21 and 22, it identifies the roles and responsibilities of local government in prevention of fire protection and development of the Fire Protection Plan, listing main segments that the Plan should contain (Official Gazette of the Republic of Serbia, 2009d).

The Law on Local Self-Government (2007, amended 2014). The Law defines that one of the major responsibilities of local government is to assure the safety of all citizens. More directly, the Law relates to disaster risk reduction (DRR) and emergency management only in one of its articles, stating that the municipality is "…*obliged to organize, through its units, and in accordance with the Constitution and legislation, protection from hazards and other threats as well as fire protection, providing mechanisms for its reduction and mitigation of its consequences*"; it also defines the responsibility of local government in identifying eroded areas (Article 20) (Official Gazette of the Republic of Serbia, 2007).

Law on Environmental Protection (2004, 2009, 2011). The Law covers the areas related to prevention and protection against disasters, such as: sustainable management (use and protection) of natural resources and goods; protection of air, water, soil, land, forests, protected areas and national parks; systems for ecological permitting and approvals; access to information and public participation in decision-making processes; economic instruments for environmental protection; and responsibility for environmental pollution (Official Gazette of the Republic of Serbia, 2004).

Law on Planning and Construction (2009, 2011, 2012, 2014). The Law prescribes conditions and modalities of spatial planning and development, the development and use of buildable land and the construction of facilities, carrying out supervision over the application of this Law and supervisory inspections; It determines the preparation of: planning documents, documents for implementation of regional plans and urban–technical documents (Official Gazette of the Republic of Serbia, 2009a).

The Law on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (2009) (Official Gazette of the Republic of Serbia, 2009c) confirms the Aarhus Convention in Serbia, and it covers issues of access to information related to environmental matters, access to justice, and the rights and mechanisms of participation of the public in the area of prevention of natural disasters.

REFERENCES

Adam, F. and B. Roncevic. 2003. 'Social Capital: Recent Debates and Research Trends'. *Social Science Information*, 42(2): 155-183.

Aldrich, D. 2010. 'Fixing Recovery: Social Capital in Post-Crisis Resilience'. *Journal of Homeland Security*, 6 (June): 1-10.

Aldrich, D. and M. Meyer. 2015. 'Social Capital and Community Resilience'. *American Behavioral Scientist*, 59(2): 254-269.

Alkire S. 2010. 'Human Development: Definitions, Critiques and Related Concepts'. *Human Development Research Paper*, 2010/01. New York, UNDP.

Arnold, M. 2008. *The Role of Risk Transfer and Insurance in Disaster Risk Reduction and Climate Change Adoption*, Stockholm, Commission on Climate Change and Development. ipcc-wg2.gov/njlite_download.php?id=6017, accessed on 24 December 2015.

Bahadur, A., E. Lovell, Willkinson and T. Tanner. 2015. 'Resilience in the SDGs: Developing an indicator for Target 1.5 that is fit for purpose'. *ODI Briefing*. London, ODI.

Babić-Mladenović, M. 2014. 'Sistem zaštite od poplava u Srbiji – stanje i pravci razvoja', *POLIS*, No. 8. SKGO&PALGO. www.palgo.org/files/polis8.pdf, accessed on 21 December 2015.

Barraket, J., R. Keast, C. Newton, K. Walters and E. James. 2013. *Spontaneous Volunteering During Natural Disasters*, *Working Paper* No. ACPNS 61, Brisbane, The Australian Centre for Philanthropy and Nonprofit Studies, Queensland University of Technology.

Bogosavljević, S. 1981. 'Analiza glavnih komponenata-teorijske osnove i praktična primena'. *Metodološke studije*. Beograd, Savezni zavod za statistiku.

_____. 1989a. 'Multivariaciona stratifikacija kao klasifikacioni problem'. *Statistička revija*, 39(1-2): 28-37.

_____. 1989b. *Towards a construction of new agricultural regions*. The Hag, Central Bureau for Statistics

Bijelić, M. and M. Lazarević. 2015. *Resilient Financing: The Economic Costs of Natural Disasters A Case Study of 2014 Serbia Floods.* Belgrade, UNDP.

Bourdieu, P. 1986. 'The Forms of Capital'. *In* J. Richardson (ed.), *Handbook of Theory and Research for the Sociology of Education*. New York, Greenwood. pp. 241-258.

CINS. 2014. 'Ispovesti uhapšenih zbog komentara na fejsbuku'.15 October 2014. https://www.cins.rs/srpski/research_stories/article/ispovesti-uhapsenih-zbog-komentara-na-fejsbuku, accessed on 12 February 2016.

Coleman, J. 1988. 'Social Capital in the Creation of Human Capital'. *American Journal of Sociology*, 94: S95-S120.

Crnčević, T. 2013. 'Planiranje i zaštita prirode, prirodnih vrednosti i predela u kontekstu klimatskih promena u Republici Srbiji – Prilog razvoju metodološkog okvira'. *Posebna izdanja*, No. 72, Beograd, IAUS.

Cutter, S., J. Tiefenbacher and W.D. Solecki. 1992. 'En-gendered fears: femininity and technological risk perception'. *Industrial Crisis Quarterly*, 6: 5-22.

Donnelly, P. and J. Harvey, J. 2013. 'Volunteering and Sport'. *In* B. Houlihan and M. Green (eds.) *Routledge Handbook of Sports Development*, London, Routledge, pp. 55-71.

Dobrota, M., M. Bulajić, L. Bornmann and V. Jeremić. 2015. 'A New Approach to QS University Ranking Using Composite I-distance Indicator: Uncertainty and Sensitivity Analyses'. *Journal of the Association for Information Science and Technology*.

Emdat. 2016. *Country Profile*. Louvain, CRED. www.emdat.be/country_profile/index.html, accessed on 21 March 2016.

European Commission. 2016. *Action Plan on the Sendai Framework for Disaster Risk Reduction 2015-2030: A disaster risk-informed approach for all EU policies*. Brussels, European Commission. http://ec.europa.eu/echo/sites/echo-site/files/1_en_document_travail_service_part1_v2.pdf, accessed on 15 June 2016.

Fond B92. 2014a. 'Ko su naši volonteri?' Miloš (19) i Miroslav (19)'. www.youtube.com/watch?v=DWzTfonuuZk, accessed on 14 February 2016.

_____. 2014b. 'Šta je solidarnost? Milica (26)'. www.youtube.com/watch?v=djLen5jFlTk, accessed on 14 February 2016.

_____. 2014c. 'Zašto pomažem?' Dalibor (41)'. www.youtube.com/watch?v=AYud213DUNw, accessed on 14 February 2016.

_____. 2014c. 'Zašto volontiram?' Sofija (24)'. www.youtube.com/watch?v=JvHaO5f8hXg, accessed on 14 February 2016.

Foley, M. and B. Edwards. 1999. 'Is It Time to Disinvest in Social Capital?' *Journal of Public Policy*, 19(2): 141-173.

Fothergill, A. 1996. 'Gender, risk and disaster'. *International Journal of Mass Emergencies and Disasters,* 14(1): 33-56.

Fukuyama, F. 1995. *Trust: The Social Virtues and the Creation of Prosperity*. New York, Free Press.

Gogić, D. 2010. 'Dve žrtve zemljotresa u Kraljevu'. *RTS*, 23 November 2010. www.rts.rs/page/stories/sr/story/125/Dru%C5%A1tvo/789356/Dve+%C5%BErtve+zemljotresa+u+Kraljevu.html, accessed on 18 February 2016.

Gress, J. (2004), 'Showing the Seeds of Social Capital'. *Journal of the American Planning Association*, 70(2): 176-183.

Grootaert, C. and T. van Bastelaer. 2001. *Understanding and Measuring Social Capital: A Synthesis of Findings and Recommendations from the Social Capital Initiative*. Social Capital Initiative Working Paper No. 24. Washington, D.C., The World Bank.

Helliwell, J.F., Layard, R. and Sachs, J. (eds). 2015. *World Happiness Report 2015*. New York, Sustainable Development Solutions Network.

Herreros, F. 2004. *The Problem of Forming Social Capital: Why Trust?* New York, Palgrave Macmillan.

IPCC (Intergovernmental Panel on Climate Change). 2012. *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change.* Cambridge, Cambridge University Press. www.ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf, accessed on 20 January 2016.

IFRC. 2014. *A Framework for Community Safety and Resilience: In the face of disaster risk*. Geneva, IFRC. www.ifrc.org/Global/Case%20studies/Disasters/cs-framework-community-en.pdf, accessed on 15 January 2016.

ISDR (International Strategy for Disaster Reduction) and World Bank. 2007. *South Eastern Europe Disaster Risk Management Initiative* (SEEDRMI) *Final Report*, Noida. Prepared by RMSI. www.preventionweb.net/files/2695_SEEDRMI.pdf, accessed on 23 December 2015.

Ivanović, B. 1977. *Teorija Klasifikacija*. Beograd, Institut za Ekonomiku Industrije.

Jeremić, V. and M. Jovanović-Milenković. 2014. 'Evaluation of Asian university rankings: position and perspective of leading Indian higher education institutions'. *Current Science*, 106(12), 1647- 1653.

Johnston, G. and J. Percy-Smith. 2003. 'In Search of Social Capital'. *Policy & Politics*, 31 (3): 321-334.

Klugman J., F. Rodriguez and C. Hyung-Jin. 2011. 'The HDI 2010: New Controversies, Old Critiques'. *Human Development Research Paper*, No. 2011/01. New York, UNDP.

Kovač, M. 2015. Positive Futures for Serbian Sports. Doctoral Thesis, University of Central Lancashire.

Mathbor, G. 2007. 'Enhancement of Community Preparedness for Natural Disasters'. *International Social Work*, 50(3): 357-369.

Mayunga, J. 2007. *Understanding and Applying the Concept of Community Disaster Resilience: A Capital-based Approach*. A draft working paper prepared for the summer academy for social vulnerability and resilience building, 22-28 July 2007, Munich, Germany.

Milanović, A., M. Urošev and D. Milijašević. 2010. 'Poplave u Srbiji u periodu 1999-2009: hidrološka analiza i mere zaštite od poplava'. *Glasnik Srpskog geografskog dru*štva, 90(1): 93-121.

Miladinović, S. 2012. 'Two Faces of Social Capital in Structural Trends: Bonding and Bridging'. *In* P. Cvetičanin and A. Birešev (eds.) *Social and Cultural Capital in Western Balkans Societies*. Niš, Centre for Empirical Cultural Studies of South-East Europe, the Institute for Philosophy and Social Theory of the University of Belgrade, pp. 59-73.

Misztal, B. A. 1996. *Trust in Modern Societies: The Search for the Bases of Social Order*. Cambridge, Polity Press.

Murphy, B. 2007. 'Locating social capital in resilient community-level emergency management'. *Natural Hazards*, 41(2): 297-315.

Official Gazette of the Republic of Serbia. 2004. *Law on Environmental Protection*, No., 135/04, 36/09, 36/09, 72/09 and 43/11.

_____. 2006. *Forestry Development Strategy*, No. 59/06.

_____. 2007. *Law on Local Self-Government,* No. 129/07, 83/14.

_____. 2008. *National Sustainable Development Strategy Republic of Serbia*, No.57/08.

_____. 2009a. *Law on Emergency Situations*, No. 111/09, 92/11 and 93/12.

_____. 2009b. *Law on Planning and Construction*, No. 72/09, 81/09, 64/10, 24/11, 121/12 and 132/14.

_____. 2009c. *The Law on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*, No. 38/09.

_____. 2010a. *Law on Meteorological and Hydrological Activities,* No. 88/10.

_____. 2010b. *Water Law*, No. 30/10.

_____. 2011. *Strategy for DRR, Protection and Rescue in Emergency Situation*, No. 86/11.

_____. 2012a. *The Strategy for the Protection from Fire for the period from 2012-2017*, No. 21/12.

_____. 2012b. *Methodology for risk assessment and plan for rescue and protection in emergency situations*, No. 96/12.

_____ 2014a. *The Law on Local Self-government*, No. 129/07 and 83/14.

_____. 2014b. *The Strategy of Agriculture and Rural Development of the Republic of Serbia (2014-2024)*, No. 85/14.

_____. 2014c. *Law on Post-Flood Rehabilitation in the Republic of Serbia*, No. 75/14.

_____. 2014d. *Law on Insurance*, No. 139/14.

_____2015a. *Law on Reconstruction and State Aid Following Natural and other Hazards*, No. 112/15.

_____. 2015b. *Odluka o obrazovanju Republičkog štaba za vanredne situacije*, No. 59/15.

Onyx, J. and P. Bullen. 2000. 'Measuring Social Capital in Five Communities'. *The Journal of Applied Behavioral Science*, 36(1): 23-42.

Peleah, M. 2015. *Mission Report: Serbia: Resilience of Towns and Settlements*. Belgrade, UNDP.

Popović T., V. Djurdjević, M. Živković, B. Jović and M. Jovanović. 2009. *Promena klime u Srbiji i očekivani uticaji*. Belgrade: SEPA. www.sepa.gov.rs/download/2_T_Popovic_V_DJurdjevic_i%20dr_Prom_klime_i_uticaji.pdf, accessed on 25 December 2015.

Public Investment Management Office of the Republic of Serbia. 2016. *Home/Office*. Belgrade. http://www.obnova.gov.rs/english/responsibilities.

Putnam, R. 1993. *'The Prosperous Community: Social Capital and Public Life'. The American Prospect,* 13: 35-42.

Putnam, R., R. Leonardi and R. Nanetti. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, Princeton University Press.

Putnam, R. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York, Simon & Schuster.

Putnam, R. and L. Feldstein. 2003. *Better Together: Restoring the American Community*. New York, Simon & Schuster.

Regional South East European/Caucasus Wildland Fire Network. 2007. *Country Report of the Republic of Serbia*. Skopje, RFMC. www.rfmc.mk/pdf/Serbia/Country-Fire-Report%20-Serbia.pdf, accessed on 23 December 2015.

Regionalna Televizija Kraljevo i Ibarske novosti. 2015. 'Prilog RTKV: Sertifikat civilna zastita', May 28 2015. www.youtube.com/watch?v=E-0Kl3S1RD8, accessed on 6 June 2016.

Renzulli, L.A., H. Aldrich and J. Moody. 2000. 'Family matters: gender, networks, and entrepreneurial outcomes'. *Social Forces*, 79: 523–546.

Republic of Serbia. 2014. *Serbia Floods 2014*. Belgrade. http://ec.europa.eu/enlargement/pdf/press_corner/floods/20140715-serbia-rna-report.pdf, accessed on 24 December 2015.

Republic of Serbia. Office for Reconstruction and Flood Relief. 2015a. *Draft Law on Natural and other Hazards, Risk Reduction and Emergency Management*. Belgrade, Government Office for Reconstruction and Flood Relief.

Republic of Serbia. Office for Reconstruction and Flood Relief. 2015b. *Reconstruction in Numbers*. Belgrade, Government Office for Reconstruction and Flood Relief. www.obnova.gov.rs/uploads/useruploads/Documents/Kancelarija-za-pomoc-poplavljenih-podrucja-infograf-13-11-2015-eng.pdf, accessed on 23 December 2015.

Republic of Serbia. Ministry of Agriculture and Environmental Protection. 2015. *Serbia's First National Adaptation Plan*. www.klimatskepromene.rs/uploads/useruploads/Documents/28-12-2015_NAP-UNDP-2015-srpski.pdf, accessed on 8 May 2016.

Republic of Serbia. Ministry of Interior. 2015. *National Report on HFA*. Belgrade, Ministry of Interior of the Republic of Serbia. www.mup.gov.rs, accessed on 23 December 2015.

Republic of Serbia. Ministry of Interior. n.d-a. *Organizaciona* šema sektora za vanredne situacije. http://prezentacije.mup.gov.rs/svs/HTML/organizacija.html, accessed on 14 November 2015.

Republic of Serbia. Ministry of Interior. Sector for Emergency Management of Republic of Serbia (SEM). n.d-b. *Natural Disaster Risk Map*. http://prezentacije.mup.gov.rs/sektorzazastituispasavanje/HTML/karta%20rizika%20od%20elementarnih%20nepogoda.html.

Republic of Serbia National Assembly. 2011. *National Strategy for DRR Protection and Rescue in Emergency Situations*, 17 November 2011, Belgrade.

Republic of Serbia. Statistical Office. 2010. *Municipalities of Serbia*. http://webrzs.stat.gov.rs/WebSite/repository/documents/00/00/11/94/OGS-engleski_2010.pdf, accessed on 2 December 2015.

Republički seizmološki zavod. 2015. *Home*. http://www.seismo.gov.rs, accessed on 27 December 2015.

Ristić, R. 2014. 'Redefinisanje politike prevencije bujičnih poplava u Srbiji'. *POLIS,* No. 8, Belgrade, SKGO & PALGO. www.palgo.org/files/polis8.pdf, accessed on 21 December 2015.

Rohe, W. 2004. 'Building Social Capital through Community Development'. *Journal of the American Planning Association*, 70(2): 158-164.

Scheward, T. 2014. *Outdoors Escapades in Serbia*. Lonely Planet. www.lonelyplanet.com/serbia/travel-tips-and-articles/outdoors-escapades-in-serbia, accessed on 25 December 2015.

Schipper, F. L. and L. Langston. 2015. *A Comparative Overview of Resilience Measurement Frameworks: Analysing Indicators and Approaches*, Working Paper 422. London, ODI.

Shortall, S. 2008. 'Are Rural Development Programmes Socially Inclusive? Social Inclusion, Civic Engagement, Participation, and Social Capital: Exploring the Differences'. *Journal of Rural Studies*, 24(4): 450-457.

Stefanović, M., Z. Gavrilović, S. Petković and Z. Kocić. 2009. *The Role of Local Self-Government in Flood Risk Management in Serbia: Training Manual.* Belgrade, USAID PPES.

Stewart, F. 2013. *Capabilities and Human Development: Beyond the Individual – the critical role of social institutions and social competencies.* Occasional Paper No. 013/03. New York, UNDP HDR Office.

Stockholm Resilience Centre. 2015. *Applying Resilience Thinking: Seven principles for building resilience in social-ecological systems*. Stockholm, Stockholm Resilience Centre.

Tanjug. 2014. 'Pojava dezinformacija o prikupljanju pomoci u Novom Sadu', *Blic*, 19 May 2014. www.blic.rs/vesti/drustvo/pojava-dezinformacija-o-prikupljanju-pomoci-u-novom-sadu/mwjs56f, accessed on 12 February 2016.

Twigg, J. 2009. *Characteristics of a Disaster-Resilient Community*. Teddington, DFID Disaster Risk Reduction NGO Interagency Group.

The Regional South East European/Caucasus Wildland Fire Network. 2007. *Country Report of Republic of Serbia.* www.rfmc.mk/ pdf/Serbia/Country-Fire-Report%20-Serbia.pdf.

UN (United Nations). 2014. *Coordinated Response to Flood Recovery*. Belgrade. http://rs.one.un.org/content/dam/unct/serbia/docs/Publications/Coordinated_Response_to_Floods_Recovery_October2014.pdf, accessed on February 9, 2016.

_____ 2016. 'UN Statistical Commission Agrees on Global Indicator Framework'. *Sustainable Development Goals UN Blog*. New York, UN. www.un.org/sustainabledevelopment/blog/2016/03/un-statistical-commission-endorses-global-indicator-framework/, accessed on 10 May 2016.

UNDAC/OCHA. 2014. *End of Mission Report: Mission to Serbia - Floods 18-23 May 2014.* www.humanitarianresponse.info/system/files/documents/files/Final%20UNDAC%20Report%20-%20Serbia%20Floods_May2014.pdf, accessed on 15 December 2015.

UNDP (United Nations Development Programme). 1990. *Human Development Report 1990*. New York, UNDP.

_____. 2011. *Towards Sustaining Human Resilience: Sustaining MDG Progress in an Age of Economic Uncertainty*. New York, UNDP.

_____. 2013. C*ommunity-Based Resilience Analysis (CoBRA) Framework.* www.undp. org/content/undp/en/home/librarypage/environment-energy/ sustainable_land_management/CoBRA/cobra-conceptual-framework.html, accessed 17 December 2015.

_____. 2014a. *Human Development Report 2014: Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience*. New York, UNDP. http://hdr.undp.org/sites/default/files/hdr14-report-en-1.pdf, accessed 20 December 2015.

_____. 2014b. 'Serbia'. New York, UNDP. http://hdr.undp.org/en/countries/profiles/SRB, accessed on 15 May 2016.

_____. 2015a. *Rezime poglavlja promene klime pogodjenost i adaptacija Drugog Izvestaja R. Srbije prema okvirnoj Konvenciji UN o promeni klime*. Belgrade, UNDP. www.klimatskepromene.rs/uploads/useruploads/Documents/SNC_VA_rezime.pdf, accessed 13 March 2016.

_____. 2015b. *Second National Communication to the UN FCCC for Serbia for the period 2001-2030*. Belgrade, UNDP. www.klimatskepromene.rs/uploads/useruploads/Documents/SNC_VA_rezime.pdf, accessed on 13 March 2016.

_____. 2015c. *Climate Change and Disaster Risk Reduction Snapshot: Serbia*. Istanbul, UNDP. www.eurasia.undp.org/content/dam/rbec/docs/UNDP-snapshots-Serbia(**we**b).pdf, accessed 12 April 2016.

_____. 2016a. *Gender in Disaster Risk Reduction*. Background paper for thematic Conference 22-23 March 2016. Belgrade, UNDP.

_____. 2016b. *Human Development Report 2016: Risk Proofing the Western Balkans: Empowering People to Prevent Disasters*. Sarajevo, UNDP.

_____. n.d. *Data: Serbia*. http://hdr.undp.org/en/countries/profiles/SRB, accessed on 15 May 2016

UNEP (United Nations Environment Programme). 2012. *Climate change in the West Balkans*. Vienna, UNEP. www.unep.at/documents_unep/ENVSEC/Climate_Change/Climate-change-west-balkans.pdf, accessed on 25 December 2015.

UNFCCC (United Nations Framework Convention on Climate Change). 2015. 'Summary of the Paris Agreement'. http://bigpicture.unfccc.int/#content-the-paris-agreement, accessed on 8 May 2016.

UNISDR (United Nations Office for Disaster Risk Reduction). 2005. *Hyogo Framework for Action (HFA): Building the Resilience of Nations and Communities to Disasters*. Geneva, UNISDR. www.unisdr.org/we/coordinate/hfa, accessed on 10 January 2016.

_____. 2006. *Global Survey of Early Warning Systems*. Geneva, UNISDR. www.unisdr.org/2006/ppew/info-resources/ewc3/Global-Survey-of-Early-Warning-Systems.pdf, accessed on 25 December 2015.

_____. 2009. *2009 UNISDR Terminology on Disaster Risk Reduction*, Geneva, UNISDR. www.unisdr.org/we/inform/terminology, accessed on 15 April 2016.

_____. 2014a. *Disaster Resilience Scorecard for Cities*. Working Document. Geneva, UNISDR.

_____. 2014b. *Progress and Challenges in Disaster Risk Reduction*. Geneva, UNISDR. http://www.unisdr.org/files/40967_40967progressandchallengesindisaste.pdf, accessed on 26 December 2015.

_____. 2015. *Sendai Framework for Disaster Risk Reduction 2015-2030.* Geneva, UNISDR. www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf, accessed on 20 January 2016.

_____. 2016. *United Nations Plan of Action on Disaster Risk Reduction for Resilience: Towards a risk-informed and integrated approach to sustainable development*. Geneva, UNISDR.

Vasiljević, B. 2014. 'Doprinos volontera u zbrinjavanju ugroženih od poplava – nemerljiv', *Politika*, 22 June 2014.

Woolcock, M. and D. Narayan. 2000. 'Social Capital: Implications for Development Theory, Research and Policy'. *The World Bank Research Observer*, 15(2): 225 -249.
World Bank .2010. *Damage, Loss and Needs Assessment: Guidance Note*. Washington, D.C., World Bank.

_____. 2014. *World Development Report*: *Risk and Opportunity Managing Risk for Development*. Washington, D.C., World Bank. http://siteresources.worldbank.org/EXTNWDR2013/Resources/8258024-1352909193861/8936935-1356011448215/8986901-1380046989056/WDR-2014_Complete_Report.pdf, accessed on 20 January 2016.

_____. 2015a. *GDP per Capita (current US$)*. Washington, D.C., World Bank. http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=RS, accessed on 17 April 2016.

_____. 2015b. *Southeast Europe and Caucasus - Catastrophe Risk Insurance Facility Project: procurement plan.* Washington, D.C., World Bank. www.worldbank.org/projects/P123896/seec-crif-sccf-gef?lang=en, accessed on 15 December 2015.

YouTube. 2014. 'Poplave- volonteri na Makišu'. www.youtube.com/watch?v=V62JOF-Tdn4, accessed on 12 February 2016.

_____. 2014. 'Poplave u Paraćinu – 22. maj, volonteri'. www.youtube.com/watch?v=06h7RcREwos, on 12 February 2016.

Zlokolica Mandić, M. 1998. 'Structural-Tectonic Elements as a Factor in Cave Development' in P. Djurović (ed.) *Speleological Atlas of Serbia.* Belgrade, SANU. www.sanu.ac.rs/atlas/rad03.htm, accessed on 25 December 2015.

ENDNOTES

1. The countries and territories of the Western Balkans are Croatia (now an EU member), Serbia, Kosovo*, Bosnia and Herzegovina, Montenegro, the former Yugoslav Republic of Macedonia and Albania.
2. In the concept of flooding, the population at risk is a key indicator – UNDP (2016b: 43).
3. Around 60 per cent of the land in Serbia is ar able, and specifically in Vojvodina, it is over 80 per cent. Forests cover about one third of the territory of Serbia (Official Gazette of the Republic of Serbia, 2010).
4. The Republic of Serbia occupies a territory of 88,407 km$^{2.}$ The flatlands are mainly in Vojvodina (the Pannonian Plain and its rim: Mačva, the Sava Valley, the Morava Valley, Stig and the Negotin Marches in Eastern Serbia). Mountains dominate central and southern areas; some are over 2,000 meters high. Serbia is part of an orogenic system that is composed of the Alpine, Carpathian, and Dinaride orogenic belts. Zlokolica Mandić (1998).
5. Major floods in Serbia in the last decade include the drainage basins of Tamiš and Tisa (2000), Jadar (2001), Danube, Sava, Tisa, Tamiš and Drina (2006) and Zapadna Morava (2009). Flash floods in that period, took place in the drainage basins of Velika Morava (1999), Velika Morava and Mlava (2002), Južna Morava (2005, 2007), Đetinja, Rzav and Zapadna Morava (2009). Milanović, Urošev, and Milijasević (2010: 93-121).
6. The following cities and municipalities were seriously impacted: the cities of Šabac and Sremska Mitrovica and the municipalities of Obrenovac, Ub, Mali Zvornik, Krupanj, Ljubovija, Vladimirci, Koceljeva, Šid, Svilajnac, Paraćin, Lajkovac, Ljig, Osečina, Mionica, Smederevska Palanka, Trstenik, Bajina Bašta (Republic of Serbia, 2014).
7. 56,000 km2 of the territory of the Republic was affected by erosion; other experts in the literature estimated that 75 per cent of Serbian territory was affected by erosion (Official Gazette of the Republic of Serbia, 2008; Ristić, 2014).
8. Studies indicate that there is a higher risk of forest fires in years of drought, but also they are highly dependent on factors related to human behaviour. The Regional South East European/Caucasus Wildland Fire Network (2007), *Country Report of Republic of Serbia*. www.rfmc.mk/pdf/Serbia/Country-Fire-Report%20-Serbia.pdf.
9. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". For more information, see https://unfccc.int/resource/docs/convkp/conveng.pdf
10. The municipalities are Šid, Novi Sad, Nova Crnja, Negotin, Kladovo, Obrenovac, Smederevska Palanka, Kragujevac, Novi Pazar, Kraljevo, Loznica, Mali Zvornik, and Vranje.
11. The term 'capabilities' refers to one's opportunities to exercise freedom in different domains, the most important one being the freedom to choose one wants to do or be in life. The concept of human development is derived from the human capabilities approach developed by Amartya Sen, which replaced the basic needs paradigm in the evaluation of development (UNDP, 1990:28).
12. See, for example, Adam and Rončević (2003: 155-183); Bourdieu, P. (1986:241-258); Coleman (1988:S120); Foley and Edwards (1999: 141-173); Gress (2004: 176-183); Johnston and Percy-Smith (2003: 321-334); Miladinović (2012: 59-73); Putnam (1993:35-42); Putnam (2000); Putnam and Feldstein (2003).
13. See, for example, Gress (2004: 176-183); Rohe (2004: 158-164; Woolcock and Narayan (2000: 225-249).
14. The Sendai Framework was adopted by United Nations Member States on 18 March 2015 at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Miyagi Prefecture, Japan. http://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf
15. At the Millennium Summit in September 2000, the largest gathering of world leaders in history adopted the United Nations Millennium Declaration, committing their nations to global partnership to reduce extreme poverty and setting out a series of time-bound targets by 2015, that have become known as the Millennium Development Goals (MDGs). The MDGs are the world's time-bound and quantified targets for addressing extreme poverty in its many dimensions-income poverty, hunger, disease, lack of adequate shelter, and exclusion-while promoting gender equality, education, and environmental sustainability. They are also basic human rights – the rights of each person on the planet to health, education, shelter, and security. For more information, see United Nations Millennium Project. Available at http://www.unmillenniumproject.org/goals/index.htm. See also UNDP (2011).
16. The indicators were adopted at the 47th Session of the United Nations Statistical Commission.
17. The HFA aims to "substantially reduce disaster losses by 2015 by building the resilience of nations and communities to disasters by reducing the loss of lives and social, economic, and environmental assets when hazards strike"**.** This is broken down into five priorities for action:
    1. Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation.
    2. Identify, assess and monitor disaster risks and enhance early warning.
    3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
    4. Reduce the underlying risk factors.
    5. Strengthen disaster preparedness for effective response at all levels (UNISDR, 2005).
18. Regulation on the Methodology for the Development of Risk Assessment and Protection and Rescue Plans in Emergency Situations (Official Gazette of the Republic of Serbia, 2012b), *Methodology for risk assessment and plan for rescue and protection in emergency situations*. No. 96/12.
19. Early warning is "the provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response (UNISDR, 2006).
20. RHMSS is the reference institution with full responsibility for the development and presentation of weather and water forecasts, alerting and announcing emergency warnings (Meteoalarm) and threatening meteorological and hydrological phenomena. All the data relevant for the forecast are publicly available at: www.hidmet.gov.rs, where the links to reports from all the hydrological stations from Serbia may be found, organized by the catchments.
21. Flood defence in watersheds continues to be organized and implemented by local public water management companies (Serbia Waters Public Water Management Companies, Vojvodina Waters Public Water Management Companies and Beograd Waters), with the engagement of the Republic Hydro-meteorological Service and companies entrusted with maintenance of protective installations for protection from flooding and direct execution of tasks related to flood defence (Stefanović et al., 2009).
22. "The Public Investment Management Office is a new body of the Government of the Republic of Serbia tasked with managing the projects of reconstruction and aid allocation following natural and other hazards, but primarily the projects of reconstruction of thousands of preschool, school, health care and social protection establishments." It is responsible for reporting to the Prime Minister of the Government of Serbia. Available at: www.obnova.gov.rs/english/office.
23. Interview with Marko Blagojević, Director of the Office for Reconstruction and Flood Relief, Government of Serbia, 3 December 2015, Belgrade.
24. Currently, Serbia is involved in the World Bank South East Europe and Caucasus Catastrophe Risk Insurance Facility Project for Europe and Central Asia (SEECCRIF), whose objective is to develop new weather risk insurance and reinsurance products, automate insurance underwriting, pricing and claims settlement processes for such products, and increase public awareness of weather risk in participating countries. It established Europa Reinsurance Facility Ltd. (Europa Re), a catastrophe and weather-risk re-insurance facility, providing technical assistance for preparatory work (World Bank, 2015b).
25. The draft law is available at www.obnova.gov.rs/english/laws-and-decrees
26. By the time of the submission of the draft report, it was not yet adopted.

* References to Kosovo shall be understood to be in the context of Security Council resolution 1244 (1999).

27. The health dimension is assessed according to life expectancy at birth, while the education dimension is measured by mean years of schooling for adults aged 25 and above, and expected years of schooling for children of school entry age. The standard of living dimension is measured against gross national income (GNI) per capita in purchasing power parity (PPP) terms. The HDI uses the logarithm of income to reflect the diminishing importance of income with increasing GNI (UNDP, 2016b: 79).
28. Some of the approaches include: UNDP's Community-Based Resilience Analysis (CoBRA) Framework (UNDP, 2013). www.undp.org/content/undp/en/home/librarypage/environment-energy/sustainable_land_management/CoBRA/cobra-conceptual-framework.html; USAID's Measurement for Community Resilience. USAID (2013). Available at: https://agrilinks.org/sites/default/files/resource/files/FTF%20Learning_Agenda_Community_Resilience_Oct%202013.pdf; and Mayunga's Capital-Based Approach to Community Disaster Resilience (2007).
29. USAID's framework also includes political capital.
30. For more information on particular approaches, see table 5.
31. The entrepreneur has the status of a private entity and is liable for all business obligations to the full extent of own property/assets.
32. For more information, see: https://goo.gl/LWUlat (in Serbian).
33. For more information, see Gogić (2010).
34. See also Tanjug (2014); CINS (2014).
35. See: *Public Investment Management Office*, www.obnova.gov.rs/english
36. The NGO Fenomena from the town of Kraljevo is engaged in empowering women to take part in the civil protection system that is currently being developed in the municipality. The Aarhus Centre network in Serbia is increasingly dealing with issues of risk prevention and response. For more information, see http://aarhusns.rs/arhus-centar-novi-sad
37. For additional information, see Regionalna Televizija Kraljevo i Ibarske novosti (2015).
38. See 'Poplave- volonteri na Makišu', available at: www.youtube.com/watch?v=V62JOF-Tdn4; 'Poplave u Paraćinu – 22. maj, volonteri', available at: www.youtube.com/watch?v=06h7RcREwos. (in Serbian).
39. See 'Zašto volontiram? Sofija (24)', www.youtube.com/watch?v=-JvHaO5f8hXg; 'Ko su naši volonteri?' Miloš (19) I Miroslav (19)', www.youtube.com/watch?v=DWzTfonuuZk; 'Zašto pomažem?' Dalibor (41)', www.youtube.com/watch?v=AYud213DUNw; 'Šta je solidarnost? Milica (26)' www.youtube.com/watch?v=djLen5jFlTk
40. Guided by the principle of the protection of human rights, the draft DRR law tasks "*all authorities and other entities involved in the implementation of measures and risk management activities of natural and other disasters ... to consistently take into account the protection of human rights, gender equality and specifically on the protection of the poor, the elderly, children, people with disabilities, refugees and displaced persons and other vulnerable population groups*." (Government Office for Reconstruction and Flood Relief, 2015a). The principles of participation, the right to timely and complete public information on the risks of natural and other disasters, and the principle of building a culture of safety and security further aim to empower vulnerable groups.
41. The Development of Civil Protection System initiative was supported by the Government of Japan.
42. The sample includes 12 municipalities, excluding Vranje. In this city, the questionnaire for focus groups was tested and on this basis, the survey on trust was included later.
43. Natural capital indices as per CRI: agricultural area, number of settlements, utilized agricultural area, land area covered by forest, average size of plots and total number of plots.
44. Economic capital indices as per CRI: active companies, per 1,000 population; active entrepreneurs, per 1,000 population; employees comparing to population number; net average salaries and wages; per capita revenue of the budget of the cities and municipalities; and municipal gross product.
45. The entrepreneur has the status of a private entity and is liable for all business obligations to the full extent of his/her own property/assets.
46. The physical capital indices as per CRI are: distance to the regional centre; housed residential area per capita; households connected to the water supply system; households connected to urban wastewater collecting system; length of new roads as a % of total roads; number of doctors per 1,000 inhabitants; number of elementary schools per 1,000 pupils of primary school age; number of health care institutions per 1,000 population; number of teachers per 1,000 pupils in primary school; and total value of residential area per $m^{2.}$
47. Human capital indices as per CRI: Population density, per 1 $km^{2:}$ aging index; population dependence index, 0-14 + 65> / 15-64; population dependence index, old-age, 65> / 15-64; life expectancy at birth, years of age; share of social welfare beneficiaries in total population, per cent; Incidences of tuberculosis, per 100,000 population; share of illiterate population in total population aged 10 and over; population aged 15 and over by educational attainment (secondary and higher).
48. Social capital indices as per CRI: Telephone subscribers; coverage of children by the preparatory pre-school programme; primary school dropout rate; convicted adults by place of committing criminal offence, per 1,000 population; number of children in conflict with the law, per cent; computer literacy, per cent; percentage of voters that voted on elections for deputies of the municipal and city assemblies; ability to produce and implement local development strategies.
49. http://www.r-project.org/
50. Ivanović (1977) Bogosavljević (1982), Jeremic, V. and M. Jovanović-Milenkovic. (2014)., Dobrota (2015).
51. This is implemented in order to avoid the effect of the measurement unit of certain indicator.
52. This procedure has been described in detail in a number of papers from the initial work in 1973 by Ivanović up to recent papers and doctoral theses.
53. This is described by Ivanović (1977).
54. The aim of this is to ensure that the repeated experiment may provide comparable results.
55. Bogosavljević (1982).
56. Bogosavljević (1982 and 1984).
57. For square distance, the measure d and multiple coefficients of correlation are squared.

CIP - Каталогизација у публикацији -
Народна библиотека Србије, Београд

316.42:141.7(497.11)"2016"
005.334:504.4(497.11)"20"
352.07:316.42(497.11)"20"

ANĐELKOVIĆ, Branka, 1965-
Human Development Report : Serbia 2016 : social Capital: The Invisible Face of Resilience / [Branka Anđelković, Maja Kovač].
- Belgrade : UNDP Serbia, 2016 (Belgrade : DMD). - 164 str. : graf. prikazi, tabele ; 29 cm

Tiraž 200. - Str. 8: Foreword / Irena Vojackova Sollorano. - Anexes 1-3: str. 113-148. - Bibliografija: str. 153-158. - Endnotes: str. 161-162.

ISBN 978-86-7728-238-7
1. Kovač, Maja, 1975- [аутор]
a) Хумани развој - Истраживање - Србија - 2016 b) Природне катастрофе - Управљање ризиком - Србија - 21в c) Локалне заједнице - Друштвени процеси - Србија - 21в
COBISS.SR-ID 227380748