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RESILIENT FINANCING: THE ECONOMIC COSTS OF NATURAL DISASTERS, A CASE STUDY OF THE 2014 SERBIA FLOODS



RESILIENT FINANCING
THE ECONOMIC COSTS OF NATURAL DISASTERS
A CASE STUDY OF THE 2014 SERBIA FLOODS

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| DRM | Disaster Risk Management |
| DRR | Disaster Risk Reduction |
| EBRD | European Bank for Reconstruction and Development |
| EPS | “Electric Power Company of Serbia” (Elektroprivreda Srbije), a holding company |
| EU | European Union |
| EUSF | European Union Solidarity Fund |
| GDP | Gross Domestic Product |
| GFDRR | Global Facility for Disaster Reduction and Recovery |
| IPA | Instrument for Pre-Accession Assistance |
| OCHA | Office for the Coordination of Humanitarian Affairs |
| OECD | Organisation for Economic Co-operation and Development |
| PDNA | Post-Disaster Needs Assessment |
| PWMC | Public Water Management Company |
| RNA | Recovery Needs Assessment |
| UNDP | United Nations Development Programme |
| UNISDR | United Nations Office for Disaster Risk Reduction |
| WB | World Bank |



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EXECUTIVE SUMMARY

Investment in the prevention of disasters can have remarkable effects on avoiding loss of life and reducing human tragedy. Beyond the effect that investment in disaster prevention has on a humanitarian scale (effects which are seldom captured in economic analyses), such investments can also provide considerable economic benefits and cost savings to host countries which would otherwise be saddled with increased expenditures post-disaster. This report is focused on the case of the floods which hit Serbia in May 2014, to devastating effect, and analyzes statistical data to compare expenditures on prevention with expenditures on response and recovery in the country as it recovered.

As a result of extraordinary rains in May 2014, Serbia was hit by the most severe flooding it had experienced in 120 years, affecting 22% of the total population in more than two-thirds of all municipalities. In the immediate aftermath of the disaster, the Government of Serbia (the “Government”) conducted a post-disaster needs assessment with support from the European Union, the United Nations and the World Bank. The Government’s assessment focused on estimating the damages and loss caused by the event, as well as the financial needs required to address the country’s recovery and reconstruction. Disaster effects were estimated at €1.7 billion, or 4.8% of Serbia’s GDP. The disaster created by the floods caused a recession in the Serbian economy, causing it to contract by 1.8% in 2014, rather than grow by 0.5% as was previously projected for 2014.

In addition to sustaining a budget shock, Serbia was caught without an adequate system in place to respond to the overwhelming social and infrastructure needs in a coordinated fashion. The Government Office for Reconstruction and Flood Relief (the “Office”), an operative rather than political entity which reports directly to the Government and the Prime Minister, was established immediately after the flooding had subsided as the national authority for relief, recovery and reconstruction. The main purpose of the Office was to ensure efficient coordination of government bodies, donors, creditors and other stakeholders in providing assistance to affected households and businesses.

The cumulative disaster effects amounting to €1.7 billion were mostly concentrated in the areas of economically productive activities (€1.190 billion, or 70% of the total losses), social services (€272 million, or 16% of the total losses), and infrastructure (€204 million, or 12% of the total losses). Less than 2.5% of the total damage and losses were insured. It was estimated that as a consequence of floods, 125,000 people fell below the poverty line, an increase of almost 7% compared to the previous year’s level, and that reconstruction efforts would need to be spread over three years in order to undo the damage that was done.

In terms of damages to specific sectors and industries,¹ energy and mining was the hardest hit sector (€494 million, or 32% of the total losses): 110,000 customers faced electricity supply interruptions and two-thirds of Serbia’s coal production was lost when open-pit mines flooded. The resulting gap in electricity supply versus demand had to be overcome by electricity imports. To compensate for the effect that the flood disaster had on the electricity supply, the price of electricity to end user consumers would have had to be increased by 50% for the following year or by 15% for the following 3 years. So, as to sustain regulated levels of electricity prices for households and other small consumers, the entire financial loss of €494m in this sector had to be borne by the Government (which fully owns the Electric Power Company of Serbia, or “EPS”). This liquidity gap was financed from EPS’ own sources as well as from sovereign borrowing.

1 References to “sectors” in this paper are taken from the Recovery Needs Assessment done in Serbia in June-July 2014



The sector of agriculture and water management bore 15% of the total disaster effects, amounting to €228 million. Substantial water management infrastructure was significantly damaged during the floods, leaving the country more vulnerable to future floods. Agricultural lands received large amounts of sediment, rendering the flooded areas unarable before cleanup. Around 33,000 farmers were affected by the disaster. All of the damage and loss in this subsector occurred at the private level and among private farmers and landholders. Moreover, the land, assets and yields were almost entirely uninsured. Immediate help was needed to minimize loss of income due to crop destruction, including assistance in form of fuel, seeds, fertilizers, and land recovery (all of which had to be provided). Following the provision of material and financial assistance by the Government and donors and following a replanting of crops undertaken by private initiative, farmers were able to retrieve their expected income in 2014 and consequently the prices of the most important crops remained at the level of previous years.

Disaster needs following the floods were estimated at €1.346 billion, of which €403 million, or 30%, suggested as used for recovery and €943m, or 70%, suggested as used for reconstruction. Over 30,000 people were evacuated from their homes. All €200 million of damages in housing were sustained by the private sector. Since the flooding Serbia has invested considerable resources into the reconstruction of transport infrastructure, public buildings, and power production and distribution facilities, as well as into the rehabilitation and strengthening of flood protection infrastructure. Government assistance has also been provided to nearly 21,000 families for the reconstruction of their damaged or destroyed homes, as well as to thousands of small and medium-sized businesses and farmers for the reconstruction of their business infrastructure. The Government's Office coordinated recovery based on sectorial National Recovery Programs passed by the Government and financed from a combination of Government, donor, and private sources. Total post-flood insurance claims accounted for only €38.8 million, or below 2.5% of the total damage and losses.

The European Commission, together with France and Slovenia, organized a Donors' Conference in July 2014 to support Bosnia and Herzegovina and Serbia in their post-flood recovery efforts. The European Union was the largest donor for post-flood assistance through various mechanisms, such as the IPA and the Solidarity Fund. The Government of Serbia used mostly ex-post financial instruments, such as budget reallocations, international aid, and debt financing. Numerous bilateral donations were pledged and a number of private foundations made significant contributions, especially in recovery of the housing and education sectors. Almost €515 million of flood relief financing was raised by October 2015 from a combination of Government funds, private resources, donations from the international community, and loans from international financial institution. However, this meant that a significant funding gap still existed from the total post-disaster needs assessment of €1.346 billion and that a gap of over €830 million in funds persisted.

Over the years, by focusing on flood hazards and spending an average of €35-40 million annually over the past decade, Serbia could barely finance the maintenance of current flood protection infrastructure that was damaged after minor, local events. As a result there were no new large scale projects in this sector in the country over the past 10 years. The deprived state of water management and flood prevention in Serbia is a direct result of insufficient financial resources for this sector and a lack of strategic financial management over the past decades.

Since the floods, the Government has taken a number of policy and investment measures to strengthen its capacity to deal with natural disasters. In November of 2014, it extended the mandate of the Office to allow it to engage in prevention activities, as well as its core role in addressing recovery. Based on this, the



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Government then adopted the National Disaster Risk Management Program (the “National DRM Program”), a comprehensive program for disaster resilience intended to be used as an umbrella framework to coordinate, channel funds, and implement activities related to reducing and managing risks of disaster in Serbia. One of the main purposes of the National DRM Program is to build a national disaster risk management system which is equipped with the necessary capacity and provided with clear responsibilities in order to reduce existing risks and avoid the creation of future risks, as well as to respond more efficiently to future disasters.

In late 2015 Serbia finalized drafting of its first Law on Disaster Risk and Crisis Management and the Law on Reconstruction. The Action Plan for implementation of the National DRM Program, currently under development, is in full accordance with the Sendai Framework’s 4 priorities for action. With these laws and the DRM Action Plan, Serbia aims to be the first country in the world with the DRM legislative framework fully aligned with the Sendai Framework for Disaster Risk Reduction.²

The floods of May 2014 exposed a number of disaster-related vulnerabilities of the Serbian population and economy. In order to strengthen the Serbian DRM system, it was recommended that the country undertake a variety of risk assessment measures, including undergoing a multi-hazard, multi-risk, and multi-sector assessment, mapping of key disaster flashpoint areas, and monitoring of disaster prevention and recovery actions. It is recommended that Serbia also promote risk-informed urban planning and land management to avoid locating homes and production activities in flood-prone areas. The Government should increase the scope of funds both for maintenance and rehabilitation of the existing system of protection but also for implementation of new works and enhancement of non-structural measures that can help improve the country’s disaster response. Moreover, the country should work on increasing financial resilience by promoting disaster risk financing strategies, including by encouraging disaster risk transfer and insurance schemes and introducing ex-ante financing mechanisms which can aid in recovery should disaster strike.

Serbia has been on the receiving end of international development aid for at least the past 15 years. Not nearly enough, however, has historically been invested in disaster prevention. As a first step towards strengthening prevention, and in addition to policy changes, Serbia will commence with the implementation of DRM projects worth at least €70 million in 2015 alone. In the wake of the floods the year 2014 may have needed to be the year of recovery and reconstruction; however the year 2015, as well as the years to follow, need to be the years of prevention. The country has learned the hard way that a single disaster can render meaningless its other considerable investments in development. Now, however, Serbia is fully committed to making sure that risk-informed investment and disaster risk reduction activities are placed at the top of its sustainable development agenda so that if natural disaster strikes again, it will be better prepared.

² The Sendai Framework for Disaster Risk Reduction is a 15-year non-binding agreement developed at the 2015 Third UN World Conference on Disaster Risk Reduction, held in Sendai, Japan in March 2015, which recognizes that the state has a primary role in reducing disaster risk but that responsibility should be shared with other stakeholders, including local government and the private sector.



1. INTRODUCTION

- The severity and costs of natural disasters have been rising over the past decades
- Investments in prevention, however, are lagging behind
- Severe disasters such as earthquakes in Turkey and Nepal have put Disaster Risk Reduction – or DRR – on the global agenda
- There are still no precise conclusions on how much a dollar invested in prevention can save in recovery

Global costs of natural disasters are on the rise, but most international aid is currently spent on responding to disasters and recovering from them rather than on reducing future risks. As post-disaster costs are increasing at a much higher pace than international aid, it is easy to determine that spending most of a country's development funds on reconstruction and relief in the wake of disasters is an unsustainable model for holistic development progress. In order to promote disaster risk reduction and emphasize the importance of preventative measures, enhanced political commitment and dialogue across policy areas is required. Kellet and Caravani (2013)³ estimate that over the past 20 years the international community has committed over \$3 trillion in development aid, of which \$106.7 billion was allocated to disasters:

- \$13.5 billion was for risk prevention activities (constituting 0.4% of total international aid);
- \$23.3 billion was spent on reconstruction and rehabilitation; and
- \$69.9 billion was spent on response.

This means that for every \$100 spent on development aid, just 40 cents has been invested in defending that aid from the impact of disasters. Certain catastrophic events, such as massive earthquakes with a very visible and sudden impact have represented peaks in overall disaster financing (to address disaster response and post-disaster reconstruction) and have put DRR on the international agenda. The devastating 1999 Marmara earthquake in Turkey took 17,480 lives and injured 43,953 people in just 40 seconds.⁴ In April 2015, an earthquake in Nepal caused over 8,790 casualties and 22,300 injuries. It was estimated that the lives of 8 million people, almost one-third of the total population of Nepal, were impacted by the earthquake.⁵

A recent study of the Humanitarian Aid and Civil Protection department of the European Commission showed that between 2002 and 2014, natural disasters in the EU caused over 80,000 deaths and cost over €100 billion in economic losses.⁶ The severity and frequency of natural disasters has risen steadily over the past decades, partly as a result of climate change, urbanization, population growth and environmental degradation. In 2013 the Central Europe region suffered once-in-a-hundred-year's floods for the second time in just 13 years. Accounting for the cross-cutting impact of these disasters, disaster risk prevention is increasingly mainstreamed across key EU policy areas including health, environment, climate change

3 Kellet, J., Caravani, A., (2013), Financing Disaster Risk Reduction – A 20 year story of international aid, The Global Facility for Disaster Reduction and Recovery (GFDRR) at the World Bank & The Overseas Development Institute (ODI)

4 <http://www.ifrc.org/PageFiles/93724/report-turkey.pdf>

5 Government of Nepal (2015), Post Disaster Needs Assessment, National Planning Commission http://icnr2015.mof.gov.np/uploaded//PDNA_Executive_Summary_new.pdf

6 Disaster Risk Management (2015), Humanitarian Aid and Civil Protection sector, European Commission



INTRODUCTION

adaptation, development, cohesion, agriculture, transport, energy, research, and innovation. At the same time, the European Commission supports and complements the disaster prevention and preparedness efforts of participating states through its EU Civil Protection Mechanism, which fosters cooperation among national civil protection authorities across Europe.

Resilience⁷ is 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. Prevention and risk reduction are often seen as long-term and invisible investments in the time-bound terms of politics. Building on the benefits of investing in disaster risk reduction, political leaders may consider an incremental approach to prioritizing disaster risk reduction to support other prevention and safety agendas. Governments retain a central role in ensuring that all investments, both public and private, are geared towards reducing, rather than increasing risk from natural disasters. They are responsible for creating national laws, regulations, and the compliance requirements that act as incentives for individuals, private, and public entities to take current and future disaster risks into account.

Nonetheless, there are no conclusive findings on how much a dollar spent on DRR can save; a cost benefit analysis for implementation of early warning systems for natural disasters, for example, has estimated that benefits of such programs are 4 to 36 times greater than the actual cost of implementing them,⁸ while the European Commission calculates that for every €1 invested in disaster prevention, €4 to €7 are saved which otherwise would have been spent on disaster response.⁹ Experts argue that such methods for a cost benefit analysis have severe limitations, as benefits through avoided losses can only be comprehended if a disaster event occurs (and even then, only within a reasonable timeframe).

As a result of unprecedented hydrologic conditions in Serbia in May 2014 large scale floods hit 42 recognized floodplains¹⁰ out of a total of 99 recognized significant floodplains. Historical maximum inflows and water levels were reached, dams breached, and protective levels exceeded, while littoral zones – from shoreline to high-water marks – were flooded, resulting in great damage to populations, infrastructure, and the economy in these areas. Due to the flooding at a large number of watercourses in mid-May 2014 a state of emergency was declared over the entire territory of the country. The flooding was the most severe recorded flooding in the past 120 years. The disaster affected 22% of the total population in more than two-thirds of all municipalities. 1.6 million persons were directly or indirectly affected in Serbia. The total monetary value of the effects of the disaster was estimated at 4.8% of Serbia's GDP. The disaster caused a recession in the Serbian economy, causing it to contract by 1.8% in 2014, rather than growing by 0.5% as was previously projected.

While there are a number of case studies in the aftermath of the floods that hit Serbia in 2014, one of the aims of this study is to show that investing in disaster prevention is economically beneficial and the preferred route to disaster mitigation when compared to spending on response or bearing the costs of recovery. This study will therefore analyze the statistical data on expenditures in prevention and compare it to statistical data on expenditures in response and recovery in Serbia. An analysis of insurance schemes will not be in focus of this report.

7 This report utilizes UNISDR Terminology on disaster risk reduction. Definitions for English language can be found at http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf

8 Watson, C., Caravani, A., et al., (2015), Finance for Reducing Disaster Risk: 10 Things to Know, ODI

9 http://ec.europa.eu/echo/files/aid/countries/factsheets/thematic/disaster_risk_management_en.pdf

10 Based on the "Preliminary Flood Risk Assessment for the Territory of Serbia"

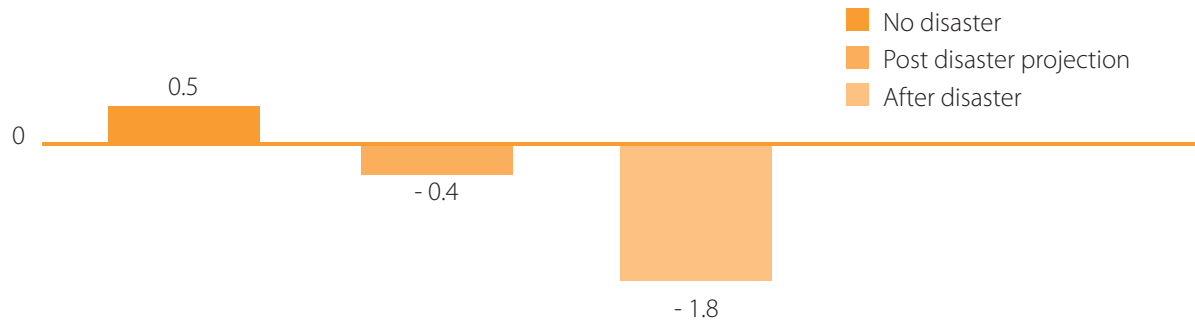


Figure 1: The Effect of Floods on Serbia's GDP in 2014

This study first provides a background description of the events prior to, during, and after the May 2014 floods in Serbia, and proceeds by providing a brief analysis of the legal and institutional setup governing the treatment of natural disasters in Serbia. This is followed by an assessment of the disaster effects and identification of most affected sectors, for which deeper analysis and recommendations are given. The following chapter analyses the impact of floods on commodity prices. The next chapter looks at the costs of response and recovery and analyses all available sources of financing the efforts of responding to disasters such as floods. The subsequent part of the study compares statistical data on annual national and local expenditures on flood prevention and provides a set of recommendations for improvement of the expenditures in these areas. Finally, the report examines the new disaster risk management efforts borne by Serbia since the 2014 floods.

2. METHODOLOGY

The study will provide case studies and conduct assessments on the economic impact of a major natural disaster, namely the floods which hit Serbia in May 2014. It utilizes a number of methodological approaches to collect and process data. The following qualitative and quantitative sources of information are used to support the analysis:

- In-depth discussions with representatives of the Government Office for Reconstruction and Flood Relief;
- Expert discussions with key informants from relevant Governmental bodies (including representatives from the Ministries of Finance, Interior, Construction, Agriculture and Environment Protection, Public Administration, and Local Self-government) and select local self-governments;
- Expert discussions with the management of relevant public enterprises and academia (including representatives from the Statistical Office, the Faculty of Agriculture, the Faculty of Natural Sciences, the Faculty of Economics, various public water management companies, the Jaroslav Cerni Water Institute, and others);
- Discussions with the management of and analysis of data provided by certain select private humanitarian foundations engaged in 2014 flood recovery efforts;
- Consultations with representatives of the National Bank of Serbia;
- Analysis and in-depth desk research of existing quantitative data, including:



- data from the national budgets and the budgets of local self-governments, as well as the annual programs of operation for relevant public companies;
- damage data from assessments of the May 2014 floods;
- other data obtained from the National Bank of Serbia;
- Review of the legal framework in Serbia regulating disaster risk reduction; and
- Comprehensive reviews and synthesis of relevant documents, including reports by various development agencies such as the International Monetary Fund (the “IMF”), the EU, etc.

3. BACKGROUND

A rising trend in the number of disasters is visible in Serbia

- **Floods in May 2014 were the worst in 120 years; they affected 22% of population in two-thirds of the municipalities**
- **The floods caused a recession in Serbia -disaster effects were estimated at 4.8% of Serbia’s GDP**
- **In addition to budgetary shock, no adequate legal and institutional system for recovery and reconstruction was in place**
- **The Office for Reconstruction and Flood Relief was set up to coordinate government bodies, donors, creditors, and other stakeholders in providing assistance to affected households and businesses**

3.1. Floods 2014

In May 2014, a low-pressure area designated ‘Yvette’ or ‘Tamara’ affected a large area of Southeastern and Central Europe, causing floods and landslides. This was a regional event, which spanned the whole of the Balkan region with severe but differentiated impacts in a number of countries, most notably in Bosnia and Herzegovina and Serbia. Extraordinarily heavy rains fell over Serbia during the third week of May of 2014, causing massive flooding. Some parts of the country received more than 250 (in some areas up to 300) liters of rain per square meter, the highest amount measured in the country in the last 120 years. This rainfall caused sudden and extreme flooding of several rivers and their tributaries, as well as landslides.¹¹ The floods are attributed to a rare combination of three compounding factors: (i) saturated land following

¹¹ The rainfalls led to a rapid and substantial increase in water levels in the main rivers in Western, Southwestern, Central and Eastern Serbia: the Sava, Tamnava, Kolubara, Jadar, Zapadna Morava, Velika Morava, Mlava, and Pek. In the Sava river, the consequences were dramatic. Flash floods triggered the rise of water levels almost immediately after the start of the rains, which then dropped quickly back following the cease of rainfall. The water level at Beli Brod on the tributary river Kolubara rose by 7 meters from May 14th-16th but was back to normal levels by May 18th-19th. Meanwhile, the level of the Sava river rose at a more gradual rate, with an increase of 3.5 meters recorded over the period from May 14th-20th. The water level on the Sava peaked after the rains had stopped and decreased much more slowly after the peak (by some 20-30 centimeters per day). Moreover, highly saturated soil followed by heavy rainfall triggered landslides particularly in unstable hilly areas. The landslides occurred in inhabited areas damaged many houses, roads, bridges, and other infrastructure works.



previous rain and a mild winter, (ii) high river levels, and (iii) heavy rainfall. Urban, industrial and rural areas were completely submerged under water, cut off without electricity or communications and with damage to roads and transport facilities. Consequently, a vast number of houses were destroyed, damaged or left underwater, leading to a significant number of displaced households.

The heavy rainfall and rising water levels had three immediate and direct effects:

- **High intensity flash floods**, resulting in the total destruction of houses, bridges and sections of roads;
- **Rising water levels**, resulting in the widespread flooding of both urban areas (particularly in Obrenovac) and rural areas; and
- **Increased flow of underground waters**, leading to widespread landslides.

The disaster affected, directly or indirectly, 1.6 million persons (or 22% of the country's population). It affected people living in 38 municipalities and cities, mostly located in Central and Western Serbia. Two cities (Šabac and Sremska Mitrovica) and 17 municipalities were severely impacted. The floods and landslides caused 51 casualties, 23 of which were by drowning. Some 32,000 people were evacuated from their homes, out of which 25,000 were from Obrenovac. Over 5,000 evacuees settled in temporary shelters in camps established by the Government and the Red Cross of Serbia.

In addition to the negative direct effects of the floods and landslides on the population, the disaster caused additional problems with living and environmental conditions. Due to the flooding, several health facilities sustained damage and had to be temporarily closed, and health care to the population had to be suspended; many schools were also damaged and/or were used as temporary shelters for evacuees, and classes were suspended, which necessitated an early closing of the school year. Flood waters and rising groundwater levels covered some industrial zones and threatened to release hazardous waste. Mine disposal sites were also flooded, and the waste material was discharged into key rivers used for drinking water. Fortunately, these threats to public health did not materialize as evidenced by chemical tests and monitoring of the water sources.¹² Agricultural lands received relatively large amounts of sediment and other materials, in some cases rendering the flooded areas unusable for farming. Removal of such sediment was required in order to restore those lands to production. In addition, two coalmines were flooded whose production is essential for the generation of electricity, and their operations had to be suspended.

3.2. Serbia's Legal and Institutional Framework at the Time of the Floods

In Serbia, from the period of 1900-1940, there were around 100 natural disasters per decade; from 1960-1970 this figure grew to 650 natural disasters per decade; from 1980-1990 this rose to 2000 disasters in a single decade; finally from 1990-2000 the number of disasters rose to 2800 in a single decade. Even if we account for an increased reporting capacity which may somewhat distort the picture of hazard frequency, a clear rising trend of emergencies and disasters is visible and the magnitude and frequency has been constantly increasing. Consequently, disaster prevention and preparedness need to be integrated into the strategic focus of the country.¹³

Overall, the 2014 floods affected over one-fifth of the total population, mostly located in Central and Western Serbia. In addition to sustaining a budget shock, Serbia was caught without an adequate system in place to respond to overwhelming social and infrastructure needs in a coordinated fashion.

¹² Government of Serbia (2014), Serbia Floods 2014 (Recovery Needs Assessment Report), p. 12

¹³ University of Belgrade, Faculty of Economics (2015), Catastrophic Risks and Sustainable Development, p. 79



BACKGROUND

The key law applicable to natural disasters in Serbia is the Law on Emergency Situations. The national protection and rescue system is developed and managed in accordance with the National Strategy for Disaster Risk Reduction and Protection and Rescue in Emergencies,¹⁴ which is charged with the responsibility of protecting the lives, health, and property of citizens, the environment, and cultural heritage of Serbia. The National Strategy defines and determines the national coordinating mechanisms and program guidelines for reducing disasters caused by natural hazards and the risks of accidents, protection, response and recovery. The Emergency Management Headquarters has also been set up as a system of operational and management bodies at the local, regional, and national level. The Law on Emergency Situations also specifies a need to conduct a Risk Assessment for the territory of the Republic of Serbia and to formulate a Protection and Rescue Plan in Emergencies.

Among the shortcomings of the country's emergency response system was a lack of adequate legal framework and procedures governing the period before (encompassing prevention and preparedness) and after the disaster (focused on post-disaster recovery):

- **The Law on Emergency Situations** (2009, 2011) regulates the response and management of emergency situations in detail, but doesn't contain provisions for the process of reconstruction and recovery after natural disasters;
- **The National Strategy for Protection and Rescue in Emergency Situations** (2011) defines the country's strategic emergency management objectives in line with the then-prevailing Hyogo Framework for Action,¹⁵ which Serbia as a signatory took the obligation to apply. It stipulates that the country's Strategy would be developed and then implemented through an Action Plan, which would be adopted within six months of the adoption of the National Strategy. The Action Plan was supposed to define the detailed implementation of the strategic objectives, responsible institutions, performance indicators, timeframe and necessary funding. However, no Action Plan for this Strategy has been adopted to date;
- **The Law on Financial Resources for Recovery and Protection from Disasters in the Republic of Serbia** (1992) regulates reconstruction on a larger scale, but had not been revised since its adoption in 1992 and is therefore not appropriate in responding to present-day needs;¹⁶
- **The Guide on Unique Methodology for Assessing Damage from Natural Disasters** (1987), though not law is an important document in the DRR process. Although it was adopted in 1987, and therefore in some parts outdated, it was very successfully applied in determining the categorization of damages to buildings after floods in May 2014.
- **Various Topical Laws** additionally govern the fields related to natural disaster response in the areas of water, health care, and meteorological activities, for instance.¹⁷

Additionally, in the aftermath of the 2014 floods the country faced an important gap in resources, especially acute in the areas of inadequate staffing, and insufficient equipment used in prevention and operation-

14 Government of Serbia (2011), National Strategy for Protection and Rescue in Emergency Situations, Official Gazette RS, No. 86/2011

15 The Hyogo Framework for Action (HFA) is a 10-year focused on making the world safer from natural hazards by describing the roles and responsibilities of different sectors and actors to reduce disaster losses. It was endorsed by the UN General Assembly following the 2005 World Disaster Reduction Conference and implementation of it is monitored by the United Nations Office for Disaster Risk Reduction (UNISDR).

16 After the breakup of former Yugoslavia in the early 1990s, numerous statutory, political and societal changes have shaped the country. The law needs substantial changes to accommodate the new political, institutional and economic situation in the Republic of Serbia in order for the law to be functionally applied.

17 For example: The Law on Local Self-Government, the Law on Planning and Construction, the Water Act, the Act on Transport of Dangerous Goods, the Health Care Law, the Law on Fire Protection, the Law on Meteorological and Hydrological Activities, the Law on the Republic Seismological Bureau, the Law on the Protection Against Ionizing Radiation and Nuclear Safety, the Law on Forests, the Law on Environmental Protection, and the Law on Explosive Substances, Flammable Liquids and Gases.



al services,¹⁸ and low levels of budgetary funding. The country’s permanent budgetary reserve is used for funding the expenses of the government in addressing emergencies,¹⁹ and in recent years such permanent budgetary reserve (which can be used for supplementary and non-budgeted items) has been budgeted at only RSD 2 million (equivalent to €15,000-20,000).

In Chapter 10 of this study we will look at how the Serbian legal and institutional system in the area of disaster risk management has been evolving in the aftermath of, and in direct response to, the 2014 disaster.

3.3. Government Office for Reconstruction and Flood Relief

Pursuant to the Law on Post-Flood Rehabilitation in the Republic of Serbia²⁰ and the Decrees “On Establishing the Government Office for Reconstruction and Flood Relief,”²¹ the Office was established to conduct expert and administrative work related to aid, reconstruction, and rehabilitation following the floods. It is set up as an operative and not political national authority, tasked with relief, recovery, and reconstruction and was established immediately after the flooding subsided. The first tasks included the drafting and passage of completely new legislation and building capacity within the government for the establishment of a new entity responsible for managing the recovery and reconstruction. The Office became fully operational less than 2.5 months after the disaster.

The main purpose of the Office was to ensure efficient coordination of government bodies, donors, creditors and other stakeholders in providing the assistance to affected households and businesses, following the process depicted in Figure 2.²²



Figure 2: Post-Flood Recovery Process in Serbia

18 <http://www.seesac.org/res/files/failovi/389.pdf>, p.21-23

19 Emergencies such as earthquakes, floods, droughts, fires, landslides, snow drifts, hail, animal and plant diseases, environmental accidents and other natural disasters, i.e. other emergencies that may affect human life and health or cause a large damage

20 Official Gazette of the Republic of Serbia, No. 75/14 and 64/15

21 Official Gazette of the Republic of Serbia, No. 55/14, 110/14 and 136/14

22 The Law defined that, in addition to analysis of the condition as is, coordination of the reconstruction process, and jurisdiction over prevention activities, the Office would also gain jurisdiction over verifying all of the activities in the process of reconstruction that were undertaken by local self-governments, public enterprises, and other entities founded by the Republic of Serbia. Therefore, in addition to regular oversight and internal audit functionality, a team for verification, formed by the director of the Office, was in charge of performing reviews of all relevant documentation and authorities by other stakeholders involved in the reconstruction process.



ASSESSMENT OF THE EFFECTS

The work of the Office was set up based on two key principles:

- **Responsiveness** – the ability to understand and respond swiftly to the needs of those affected by floods.
- **Accountability** – to act in a responsible manner, ensuring full transparency of the process.

Having in mind the scope of damage and the need to deploy the funds in a transparent and efficient way, the Law defined sources of available funds as national and local budgets, as well as donations. The Law established that rehabilitation from floods would be carried out in accordance with the National Recovery Programs, and thus provided a unified approach in the aftermath of the disaster. On the basis of the Post-Disaster Needs Assessment, the programs of recovery were developed in a way to ensure predictability of the amounts to be received by the affected populations as well as to balance the overwhelming social needs with infrastructure needs, thereby ensuring proportional allocation of limited resources across sectors. By October 2015, the Government of Serbia adopted seventeen separate National Recovery Programs based on sector.²³

4. ASSESSMENT OF THE EFFECTS OF THE MAY 2014 FLOODS

- **The Government conducted a post-disaster needs assessment with the support of the European Union, the United Nations, and the World Bank**
- **The total disaster effects were estimated at €1.7 billion**
- **Disaster effects were concentrated mostly in productive activities (70% of the total), social services (16%), and infrastructure (12%)**
- **Less than 2.5% of the total damages and losses were insured**
- **As a consequence of the floods, 125,000 people fell below the poverty line, an increase of almost 7% compared to the previous year's level**
- **Reconstruction efforts would need to be spread over three years**

In the immediate aftermath of the disaster, the Government conducted a Recovery Needs Assessment, considered a “light” version of the post-disaster needs assessment,²⁴ with financial and technical support of the European Union, the United Nations, and the World Bank. This assessment focused on estimating the damages and losses caused by the event, as well as the financial costs required to address recovery and reconstruction. More than 14 sectors of social and economic activity and cross-cutting issues were analyzed during the assessment. The assessment was initiated on June 9, 2014 and completed by July 10, 2014, lasting a total of 5 weeks.

The methodology for the assessment was based on the Damage and Loss Assessment (“DaLA”)²⁵ methodology, and involved collecting available secondary information from different Government and private sources, verified and supplemented by field visits. This enabled an estimation of value as to the extent of physical assets destroyed, as well as that of indirect economic losses caused by the floods and landslides. 24 of the most

23 National Recovery Programs available at <http://www.obnova.gov.rs/cirilica/zakoni-i-uredbe>

24 The full report can be found at http://www.sepa.gov.rs/download/SerbiaRNAreport_2014.pdf

25 Damage and Loss Assessment (DaLA) Methodology, as developed by the World Bank, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTDISMGMT/0,,contentMDK:20196047~menuPK:1415429~pagePK:210058~piPK:210062~theSitePK:341015,00.html>



affected municipalities were included in the assessment. To calculate the total damage in Serbia caused by the floods, experts extrapolated data to include a number of additional, less affected municipalities.

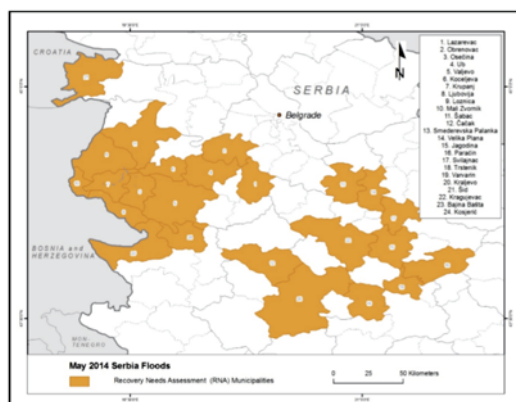


Figure 3: Map of Local Self-Governments Most Affected by the May 2014 Floods

The assessment revealed that the total effects of the disaster in the 24 affected municipalities amounted to €1.525 billion, of which €885 million (57% of the total losses) represent the value of destroyed physical assets, and €640 million (43% of the total losses) referred to losses due to an inability to produce or a break in production due to the devastation (see Fig. 4 below). When considering the additional affected municipalities, the total value of disaster effects would rise to €1.7 billion.

| | | Disaster Effects (in € million) | | |
|-----------------------|----------------------|---------------------------------|--------------|----------------|
| | | Damage | Loss | Total* |
| Social | | 234.6 | 7.1 | 241.7 |
| | Housing | 227.3 | 3.7 | 231 |
| | Education | 3.4 | 0.1 | 3.5 |
| | Health | 3 | 2.7 | 5.7 |
| | Culture | 1 | 0.6 | 1.6 |
| Productive | | 516.1 | 547.6 | 1,063.6 |
| | Agriculture | 107.9 | 120.1 | 228 |
| | Manufacturing | 56.1 | 64.9 | 121 |
| | Trade | 169.6 | 55.2 | 224.8 |
| | Tourism | 0.6 | 1.6 | 2.2 |
| | Mining and energy | 181.9 | 305.8 | 487.7 |
| Infrastructure | | 117.3 | 74.8 | 192.1 |
| | Transport | 96 | 70.4 | 166.4 |
| | Communications | 8.9 | 1.1 | 10 |
| | Water and sanitation | 12.4 | 3.2 | 15.6 |
| Cross cutting | | 17.2 | 10.7 | 27.9 |
| | Environment | 10.6 | 10.1 | 20.7 |
| | Governance | 6.7 | 0.6 | 7.3 |
| Total | | 885.2 | 640.1 | 1,525.3 |

* due to rounding up of figures some totals do not exactly add up

Figure 4: Summary of Post-Disaster Needs Assessment Carried out in the 24 Most Affected Municipalities



ASSESSMENT OF THE EFFECTS

It was found that total disaster effects were concentrated mostly in productive activities (€1.07 billion and 70% of the total losses), social services (€242 million and 16% of the total losses), and infrastructure (€192 million and 12% of the total losses); thus, the disaster's impact was highest in terms of loss in production and access to social services than in regard to destruction of infrastructure. In regard to individual sectors of economic and social activity, the most affected sector was the one of mining and energy (€494 million and 32% of the total losses), followed by housing (€231 million and 15% of total losses), agriculture (€228 million and 15% of total losses), trade (€225 million and 15% of total losses) and transport (€167 million and 11% of total losses).

Even though insurance is not a focus of this study, it is worth pointing out that, according to data from the National Bank of Serbia, total post-flood insurance claims amounted to only €38.8 million (below 2.5% of total damages and losses). Out of all the claims, up until December 31, 2014 only €16.9 million was paid out by insurance companies.

Ownership of all of the property affected by the disaster is almost equally divided between the public and private sectors. However, the Needs Assessment found that the private sector sustained higher values of destroyed assets than the public sector, but that production losses were higher in the public sector, primarily due to the damages and losses sustained by the mining and energy sector, a sector entirely owned by the Government.

The concentration of disaster effects on the productive activities of the energy and agriculture industries and the damages to housing have impaired economic growth in the country and have had a corresponding subsequent impact on livelihoods, income, and employment, plus have created a significant decline in living conditions of the population. Furthermore, the high destruction that occurred in the mining sector mandated the use of alternative sources of energy and electricity. As a direct consequence of floods, and caused by the interruption of production activities at production activities facilities, a temporary loss of jobs for about 51,800 individuals occurred. It is estimated that after the floods, 125,000 people fell below the poverty line, an increase of almost 7% compared to the previous year's level. The Country's Human Development Index²⁶ fell, pushing back Serbia to 2012 levels.²⁷ The Needs Assessment report provided an indication that reconstruction after the disaster could not be carried out in a single calendar year, because the country did not have the capacity to do so. It is very likely that reconstruction will need to be spread over the course of three years, exacerbating the losses that that industries and communities in the country still maintain.

Fortunately, damages to the country's educational facilities were not extensive, and because the disaster occurred at the end of the school year the education sector was not high. In the health sector, partial destruction of a number of clinics occurred, together with damages to medical equipment and supplies, but no increase in morbidity rates occurred due to flood-related disease.²⁸

26 The Human Development Index (HDI) is a composite statistic of life expectancy, education, and income per capital indicators which are used to rank countries into tiers of human development, and is overseen by UNDP.

27 Government of the Republic of Serbia (2014), National Program for Disaster Risk Management Regulation 05 No. 217-16233/2014-1

28 World Health Organization, Flooding and Communicable Diseases Fact Sheet, http://www.who.int/hac/techguidance/ems/flood_cds/en/



5. MOST AFFECTED SECTORS

- **Energy and Mining (32% of total disaster effects): 110,000 customers faced supply interruptions**
- **Two-thirds of Serbia's of coal production was lost when open-pit mines were flooded and Serbia was forced to import energy to avoid power outages**
- **Agriculture (15% of total disaster effects): around 33,000 farmers were affected by the disaster**
- **Over two-thirds of rural households identify agriculture as a source of income**
- **Water management infrastructure was significantly damaged, leaving the country more vulnerable to future floods**
- **Housing (15% of total disaster effects): over 30,000 people were evacuated from their homes; all €200m of damages were sustained by the private sector**
- **Housing remains vulnerable to disasters, including recurring small scale localized events without much public attention or subsequent support**
- **The total construction costs of 254 new houses would equal the cost of insurance coverage against floods for 529 years**

The Needs Assessment report is, to this date, the most reliable source of damage assessment for the May 2014 floods and the source of all flood-related data in this report (unless stated otherwise). As was previously discussed, the total damage and losses caused by the disaster were estimated at around €1.5 billion in the 24 hardest hit municipalities and at €1.7 billion for the whole country overall. The distribution of damage and losses was quite unequal across different industries and sectors. The disaster's effects were heavily concentrated in the main industry sectors (such as energy, mining, and agriculture), and in the social sectors (especially housing), while infrastructure sectors (aside from water management infrastructure) damages were relatively small.

5.1. Energy and Mining

The energy sector was the hardest hit sector by the heavy rain and subsequent devastating floods. Up to 110,000 customers were facing supply interruptions in 28 municipalities affected by floods. Water overflowing from the Kolubara River and its tributaries flooded open-pit coal mines. Large portions of the distribution network were also affected and, to a lesser extent, so was the transmission network.

Immediately after the floods started, the Government put in place an emergency working group led by the Ministry of Mining and Energy which successfully coordinated and monitored the security of energy supply and coordinated all activities related to preserving the integrity of the energy sector. Specific measures included protection of key facilities, emergency repair in the power transmission and distribution systems, assistance to municipalities in securing energy supplies, and a plan for the immediate recovery of the system. As a result of these efforts, consumers in other regions in the country were not affected by power shortages and by the end of May 2014, power supply was restored to all consumers in the zones affected by the floods.



MOST AFFECTED SECTORS

Overall damages in the power sector were estimated at over €183 million and losses at another €308 million. Over 90% of damages were in the coal and power generation segments, followed by the power distribution, as shown in the following table.

| Energy sector | € million | |
|----------------------------------|-------------------|------------------|
| | Estimated Damages | Estimated Losses |
| Coal Mining and Power Generation | 167.44 | 294.11 |
| Power Transmission | 3.54 | 0 |
| Power Distribution | 10.04 | 14.3 |
| Natural Gas and District Heating | 2.44 | - |
| | 183.46 | 308.41 |
| Total | 491.87 | |

Figure 5: Post-Disaster Needs Assessment Findings for the Energy Sector

Almost two-thirds of Serbian electricity is produced from coal. Overall damages in the coal mining and power generation sectors were estimated at €167 million. Damages include the estimated cost of mine dewatering, mine reconstruction, repair, and replacement of damaged mining equipment. Outpouring of water from the Kolubara river and the failure of a water control dam located upstream of the mine caused a large volume of water to surge and flooded open-pit mines Tamnava West and Veliki Crljeni. Fields D and B in the Kolubara mining basin were also partially flooded. Overall, these open-pit mines account for about two thirds of the coal produced in the country. After dewatering and rehabilitation, the production process in Fields D and B was fully recovered in less than a month. However, production in Tamnava West open-pit mine was only restarted seven months after the floods.

The floods had a relatively minor impact on the electricity transmission network. However, distribution suffered from landslides and erosion following the floods, causing loss of power supply for more than 110,000 customers (mainly households). Prompt restoration works were carried out and electricity supply in dry and stable areas was quickly recovered. By the end of May 2014, power supply was restored to all consumers in flood-affected areas. Due to heavy rains, the gas sector network also suffered some minor damage, but there was no interruption of service.

The total value of losses amounts to €308.4 million, all in the public sector of the economy. The majority were incurred by the coal, power generation, and power distribution sectors. Losses were estimated on the basis of:

- business disruption (reduced capacity to supply coal and electricity); and
- reduced metering/billing.

Losses in coal mining of almost €300 million resulted from reductions in coal output in the Kolubara mining basin. No coal production was possible until late December 2014. The vast majority of losses occurred due to lost power generation in the country's thermal power plants from a lack of coal supplies. Other minor losses in the coal mining sector include lower revenue from coal sold to the retail market.

Some other losses in the power generation segment (approx. €6 million) occurred due to reduced output from Hydropower plants, as water spillage due to large daily inflows occurred in order to ensure protection of the dams in Djerdap.



Picture 1: Flooded Open-Pit Coal Mines in Kolubara River Basin

Losses in operation of distribution companies were incurred from the first day of the disaster. Around 110,000 customers were disconnected from the distribution grids after initial flooding. The distribution companies sustained losses due to supply interruptions and unmetered electricity sold to consumers. The floods also led to a significant increase in operational expenses during the recovery period.

Energy Sector Recommendations

State-owned enterprises play a key role in the energy sector in Serbia. The prevailing activity of Elektroprivreda Srbije (EPS), the key player, is electricity supply, including power generation, electricity distribution, and distribution system management. Other activities include production, processing and transport of coal, and generation of steam and hot water in combined processes. Besides the 2014 floods, the EPS faces other serious issues such as a low price on the regulated market (for households and small customers), a high level of uncollected revenues, and significant technical losses. In addition, the company is currently undergoing a major corporate restructuring by consolidating a number of subsidiaries and transforming the company from a public enterprise into a modern government-owned company. All of these challenges will at the moment reduce EPS's capacity to shift its focus to better prevention and preparedness against future catastrophic events, which can be one of the most threatening risks to stable electricity supply in the country.

Despite all of those challenges, EPS remains the largest government-owned company, and one of the few that is financially independent from the state. A clear indicator of the company's financial strength is the fact that its annual revenues of €2 billion are equivalent to 25% of the total central government's budget. In order to reduce the impact of natural disasters on its operations, the EPS has to further explore all instruments at its disposal for disaster risk reduction:

- resilient recovery and proper maintenance of its existing prevention infrastructure;
- assessment of the exposure of its critical infrastructure and the vulnerabilities of its system to prevailing hazards;
- risk-informed building of additional infrastructure to physically protect its facilities further;
- better insurance coverage of assets (both plants and machinery); and
- usage of disaster risk financing instruments (such as contingent loan or reserves) that can be mobilized quickly to respond to disasters in a timely manner to prevent further damages from occurring and to provide financial buffers and contingency options in the case of catastrophic events.



MOST AFFECTED SECTORS

5.2. Housing

The heavy rainfall and rising water levels had three distinctly different effects in different areas: flash floods of high intensity resulted in total destruction of houses, bridges, and sections of roads (as observed in Krupanj and areas near Sabac); rising water levels resulted in widespread flooding of urban areas (in particular in Obrenovac) and rural areas (around Sabac); finally, the rise in ground water levels resulted in widespread landslides leading to the destruction of houses, roads, and agricultural land (observed around Krupanj and Bajina Basta). Luckily, chemical analyses of water sources showed that no contamination of drinking water occurred.²⁹

The UN Office for the Coordination of Humanitarian Affairs (“OCHA”) reported that as a result of the flooding, over 30,000 people were evacuated from their homes and 34 persons were recorded dead (of which 13 died by drowning).³⁰ While the vast majority of evacuees found shelter with relatives, some 5,000 persons were accommodated in temporary shelters established by the Red Cross of Serbia. Damages³¹ in the housing sector were estimated at €200.73 million, while losses³² amounted to €1.61 million more. The table below shows estimated values of disaster effects for the housing sector.

| Housing Sector | € million | |
|---------------------------|-------------------|------------------|
| | Estimated Damages | Estimated Losses |
| Damages to Housing Units | 145.81 | - |
| Household Goods | 54.92 | - |
| Temporary Shelter Costs | - | 0.43 |
| Demolition/Debris Removal | - | 0.6 |
| Temporary Housing Costs | - | 0.43 |
| Rental Income Losses | - | 0.14 |
| | 200.73 | 1.6 |
| Total | | 202.33 |

Figure 6: Post-Disaster Needs Assessment Findings for the Housing Sector

The damaged housing stock consists of individual family houses in rural areas and family houses and multi-unit apartment blocks in urban areas. A great number of existing houses were affected by floods and subsequent landslides. It is worth pointing out that all €200 million of damages were sustained by the private sector.

29 Government of Serbia, Serbia Floods 2014 (Recovery Needs Assessment Report), p. 12

30 https://www.humanitarianresponse.info/system/files/documents/files/Final%20UNDAC%20Report%20-%20Serbia%20Floods_May2014.pdf

31 For the estimation of damages and losses during the needs assessment, bills of quantities for typical houses and typical damages were analyzed. Values of unit prices for construction works were confirmed in consultations with several construction companies presently working in the construction of both houses made of traditional materials and pre-fabricated houses.

32 The following losses were analyzed: costs of temporary shelters for evacuees; expenditures related to the demolition of totally destroyed houses, with 419 houses at a rate of €200 per house; temporary housing expenses incurred during housing reconstruction; rental income losses, with 175 houses (accounting for approximately 10% of all damaged houses incurring such a rental income) at a rate of €125 over 6 months.



Housing Sector Recommendations

Housing is considered one of the three basic human needs in addition to food and clothing. The importance of housing cannot be understated, as it is a key factor determining a person's health, wellbeing, and prospects in life. The United Nations International Strategy for Disaster Reduction ("UNISDR") Global Assessment Report on Disaster Risk Reduction³³ highlights the vulnerability of one's housing and built environment not just to major disaster events, but also to recurring and small scale localized events which do not receive much public attention or subsequent support. Although floods are natural phenomena, human activities and human interventions into the processes of nature, such as alterations in the drainage patterns from urbanization, agricultural practices, and deforestation, have considerably changed the environment and living situation in whole river basins. At the same time, exposure to risk and vulnerability in flood-prone areas has been growing constantly.

Irrespective of the nature of hazards, disaster losses associated with the housing sector are due to underlying risk factors that need to be mitigated by applying the following concepts in development:

- Identifying of risk zones on the basis of multi-hazard risk maps;
- Adopting risk-informed development and land use planning;
- Enforcing of land use legislation and building codes;
- Relying on catastrophe risk insurance coverage;
- Removing and relocating buildings in zones of immediate disaster risk;
- Employing resilient reconstruction in applying build-back-better criteria;
- Using quality building materials; and
- Adequately maintaining structures.

During the reconstruction phase, 254 new houses were built and donated to some of the most affected families. The total construction cost of these houses amounted to €6.55 million. The Government Office for Reconstruction and Flood Relief has initiated an insurance-promotion campaign in collaboration with the World Bank and Europa Reinsurance. The activity identified that insuring all 254 newly built houses against flood and earthquake would cost €12,379 per annum. This means that, for the cost of building new houses to compensate for those destroyed by floods, those same houses can be insured against both flood and earthquake risk for 529 years. The case of insurance helps us clearly see how financially beneficial investing in prevention can be.

5.3. Agriculture, Livestock and Water Resources

The agriculture sector encompasses subsectors of crop production, livestock, fisheries, forestry, as well as management of water resources (flood control and irrigation). Agriculture makes significant contributions to Serbian gross domestic product (comprising 10% of GDP in 2011) and exports (23% for agriculture, food, and beverages combined in 2011). Approximately half of Serbia's 7.4 million inhabitants reside in rural areas and over two thirds of rural households identify agricultural activity as a source of income. Agriculture is considered to be the biggest employer in rural areas and the main contributor to the rural population's food security. Most livestock farming is also small scale: 49% of all cattle, 56% of pigs, and 74% of sheep are kept in holdings of less than 10 animals.

It is estimated that around 33,000 farmers were affected by the disaster. Many small and medium-sized farms suffered (the average agricultural area per holding is 5.4 hectares). Some livestock died in the flood,

33 UNISDR (2015), The Global Assessment Report on Disaster Risk Reduction (GAR)



MOST AFFECTED SECTORS

but the numbers are relatively small, as there was enough time in many cases for owners to move animals to safer grounds. Damage was also reported in commercial fisheries, consisting of damage to equipment and fish stock that disappeared. As can be seen from the table below, with the exception of damaged public infrastructure, the majority of damage and losses in the agricultural industry also occurred in the private sector.

| Agricultural Sector | Disaster Effects | | Ownership | |
|----------------------|------------------|--------------|--------------|--------------|
| | Damages | Losses | Public | Private |
| € million | | | | |
| Agriculture, Crops | 80.86 | 117.33 | 0 | 197.96 |
| Livestock | 2.02 | 2.61 | 0 | 4.63 |
| Fishery | 0.54 | 0.16 | 0 | 0.7 |
| Forestry | 0.58 | 0 | 0.47 | 0.11 |
| Floods control Works | 24.11 | 0 | 24.11 | 0 |
| | 107.87 | 120.1 | 24.58 | 203.4 |
| Total | 227.97 | | | |

Figure 7: Post-Disaster Needs Assessment Findings for the Agricultural Sector

Serbian farmers are familiar with floods that affect agricultural production in the river valleys, but the floods of May 2014 were of an entirely different scale. Flash flooding caused land erosion and debris deposition, damage to buildings, destruction of crops, machinery and livestock death. Where fields flooded slowly and remained flooded for longer, there was generally enough time to move machinery and livestock, but significant losses occurred to standing crops. The timing of the floods coincided with high value harvest for early season greenhouse crops such as tomatoes.

Production losses occurred especially in the agricultural crops subsector. Municipalities reported the number of hectares lost for different crops, including animal fodder, pastureland, fruit and vegetable production, industrial crops, and cereals. Fruits and vegetables are an important factor in both catering for the domestic market, as well as for export. In the livestock subsector, reported losses occurred in milk, beef, and honey production. Some trout and carp production was lost and there was one report of lost timber production from a privately owned forest. An estimated 11,943 hectares of land was rendered useless for production for a season and approximately 4,815 hectares required removal of debris. Some farm machinery and equipment were damaged by submersion; many greenhouses were destroyed. Damage also occurred to a number of fruit tree seedlings and tree nurseries. Damage to bridges and rural roads reduced market access in some places and reduced access to land to harvest fodder for conservation. Irrigation systems were also damaged, especially electric pumps.

Flood protection infrastructure was also significantly damaged during the May 2014 floods, leaving the country more vulnerable to future floods. The floods damaged large portions of flood protection infrastructure (mostly embankments) that failed either because they were overtopped or following underground erosion of their foundations. The high velocity of flood waves and large volume of sediments transported (sometimes, large rocks had been rolled over by the floods) produced severe erosion of the riverbanks and riverbeds and even destroyed riverbank protection.



Picture 2: Destroyed and Damaged Water Management Infrastructure

As a consequence, a total of 45.6 km of riverbanks and beds were damaged. In some cases, the riverbed grew from 50 to over 300 meters, damaging adjoining municipal infrastructure (roads, water supply systems, cables). Drainage infrastructure was also affected. Luckily, no damage was reported either to public infrastructure for irrigation supply or to field irrigation equipment held as private property of farmers. The value of estimated damage by type of structure is shown in the chart below.

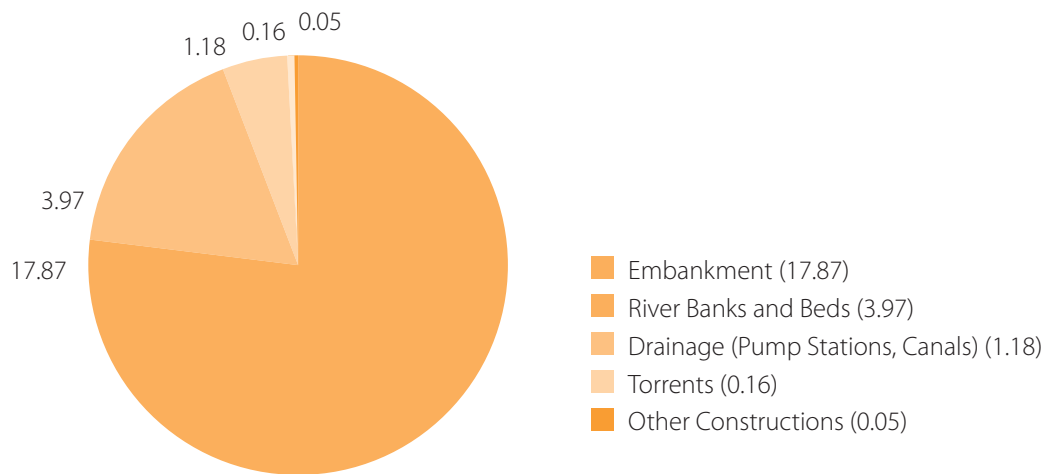


Figure 8: Value of Damages to Water Management Infrastructure, in € million

The post-disaster assessment indicates that the cost of repairs to existing flood protection and drainage infrastructure would be around €24 million. Significant attention needs to be paid to these flood protection facilities in order to reduce risks of further flooding. Unprecedented damage due to the flooding was recorded mostly in the non-protected areas, whereas the already constructed flood defense systems underwent a difficult endurance test but overall sustained less damage.³⁴

³⁴ This was seen especially along the rivers Sava, Kolubara, Južna and Zapadna Morava, and also along a large number of torrential watercourses.



MOST AFFECTED SECTORS

Agricultural Sector Recommendations

In general, there are three specific segments of investment in preparedness and prevention that can help minimize potential disaster effects:

- **Early warning systems** that can increase the chance of saving lives and property (including farm animals and machinery). These systems require relatively modest investment and, if well-allocated, they can provide real-time data sharing internationally, which can be of benefit to multiple (especially neighboring) countries;
- **Critical infrastructure** that reduces the chance of property and life losses in case of disaster. While all infrastructure must be well designed, constructed, and maintained, designating a subset as “critical” allows the government to pay special attention to it. Critical infrastructure doesn’t necessarily signify that it is the most important asset before and after the disaster, but rather that it is the one that can prevent significant damage and losses in case a disaster occurs; and
- **Environmental buffers** offer protection from hazards, but only within physical limitations. For example, forests offer some protection from extreme floods, and better protection against landslides. Protecting the environment is always cheaper than restoring it, but a decision on what to protect is hard because development involves changes to the environment that are often unforeseeable.

In order to improve the system of protection against adverse water effects, it would be advisable to adopt the following approach:

- Increase the structural system of maintenance to the required level;
- Prevent unplanned use of floodplains;
- Provide so-called passive measures, including protective holes through the structural system with the required level of protection;
- Use the natural retentive capacity of river basins, which ensure conditions for a controlled flooding of the littoral zone during flood flows;
- Form successive accumulation and retention areas to control flood waves; and
- Implement erosion and torrent control works and measures.

The Kolubara River Basin Study is currently under development by the Jaroslav Černi Institute for the Development of Water Resources, a leading research organization in Serbia’s water sector. Preliminary estimates indicate that investments in flood protection infrastructure of approximately €110 million may be sufficient to protect this basin from future flood events.³⁵ Municipalities in the Kolubara basin sustained a significant amount of damage amounting to over €900 million during the 2014 floods.

35 As stated by representatives of the Institute during interview in July 2015.



6. IMPACT ON COMMODITIES

- **Crops:** Agricultural lands received large amounts of sediment, rendering the flooded areas unusable for farming before substantial post-flood cleanup could occur
- All damages and losses in this subsector occurred in the private segment – land, assets, and yields were almost entirely uninsured
- Immediate help was needed to minimize loss of income due to crops destruction – assistance in fuel, seeds, fertilizers, and land recovery was provided
- Following provision of material and financial assistance by the Government and replanting assistance by private initiative, farmers were able to retrieve their expected income in 2014 – prices of the most important crops remained at the level of previous year.
- **Electrical Energy:** the electricity supply-demand gap had to be narrowed in the aftermath of the flood by electricity imports
- To compensate for disaster effects, EPS would have had to, on average, increase the price of electrical energy to end user consumers by 50% for 1 year or by 15% for the next 3 years
- So as to sustain regulated electricity prices for households and other small consumers, the entire financial loss to this sector of €492m had to be borne by the Government (which fully owns EPS), with the liquidity gap financed from the EPS' own sources and sovereign borrowing

The following chapter analyzes the impact of the 2014 floods on two segments of commodities in Serbia: agricultural crops and electrical energy.

6.1. Agricultural Crops

The floods deposited debris on agricultural land consisting mainly of tree branches and, in some places, stones and gravel. Plant debris did not cause serious problems, but other materials and sludge rendered land useless and necessitated large-scale clearing. The biggest portion of estimated losses was related to the loss of land, crops, machinery and assets. It is important to mention that 32,495 farmers, of which the overwhelming majority (26,286) were small land owners (owning up to 2 hectares), found themselves in a critical situation because of the loss of crops and assets, coupled with the land having to be reclaimed. In almost all cases land, assets and yields were uninsured. Removal of sediment and other materials was required in order to restore production. An estimated 11,943 hectares of land was rendered useless for production for a season and an estimated area of 4,815 hectares required removal of debris. Direct damage was estimated at approximately €81 million.

Production losses were most visible in the agricultural crops subsector, where losses were assessed at over €117 million. Higher production costs also occurred due to replanting crops that were lost. It is worth pointing out that all damage and losses in this subsector occurred in the private segment of the Serbian econ-



IMPACT ON COMMODITIES

omy. Municipalities reported the number of hectares lost for different crops, including animal fodder, pastureland, fruit and vegetable production, industrial crops, and cereals. Information for the 4 most important crops is shown in the next figure.

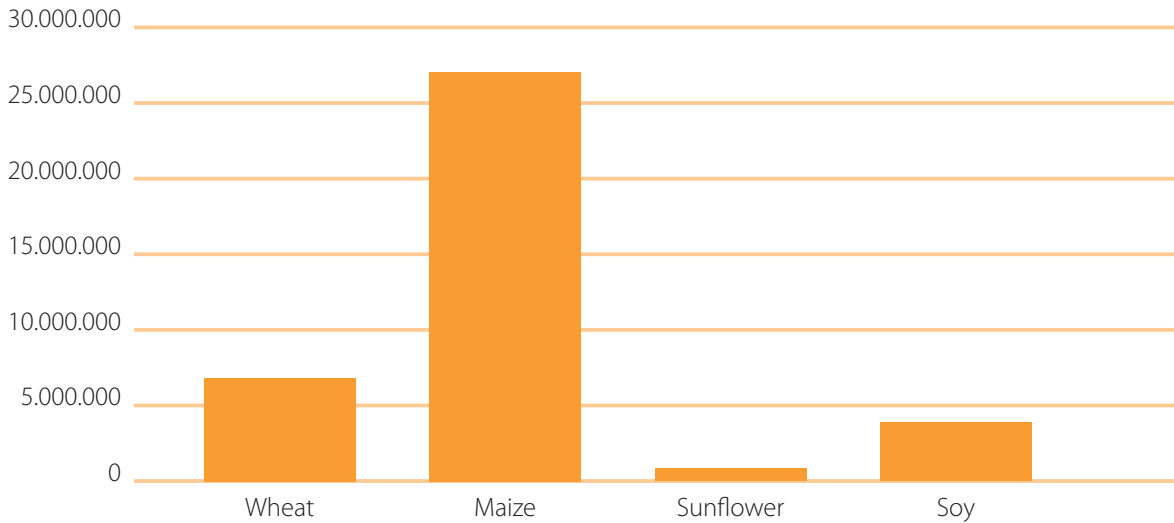


Figure 9: Losses (in €) in Main Crops As a Consequence of Floods

As a consequence, it was clear that immediate help was needed to minimize loss of income due to crop destruction. In collaboration with the Ministry of Agriculture, the Government Office for Reconstruction and Flood Relief first organized an allocation of seeds for the re-sowing of around 16,000 hectares of land owned by almost 10,000 small farms (for 2,000 hectares of soy and 14,000 hectares of maize). The farms were also given assistance in fuel in the approximate value of €400,000 (420 tons of fuel). Almost 10,000 registered farms received monetary assistance to purchase fertilizer in the total amount of over €500,000. Additionally, the Government passed a National Recovery Program for cleaning up and land recovery on 3,000 hectares of land, with land owners receiving €200 per hectare in direct financial aid for land rehabilitation purposes. Government aid to farmers was further coupled with EU-funded assistance: an agricultural relief program of €8 million was implemented by the Food and Agricultural Organization of the United Nations (“FAO”) in cooperation with the Office. Aid packages for over 17,000 agricultural households in 29 affected municipalities were given in the form of saplings, animals, animal feed, equipment, and other goods. A second phase of the project with additional €1.5 million of EU funds followed suit, also through FAO.

The most significant amount of funding for agricultural assistance came from the World Bank’s Floods Emergency Recovery Project.³⁶ Out of a total of €227.5 million allocated through the project, the Ministry of Agriculture and Environmental Protection is implementing a component of assisting the agricultural sector (Component 2, worth over €53 million). The project aim is to provide support for funding the incentives paid to farmers within the program and for allocation of incentives in agriculture in the flood-affected areas. Over €32 million of funds have been withdrawn and deployed, while the remaining funds in the amount of almost €21 million, are planned to be withdrawn in the following period.

Following provision of material and financial assistance by the Government, and replanting by private ini-

36 IBRD Loan No. 8449-YF; Official Gazette of the Republic of Serbia - Treaties No. 17/2014 dated 9 December 2014



tiative, farmers were able to retrieve their expected income in 2014 from replanted crops. The success of initiatives to assist farmers taken by the Government and the international donors is best shown by the fact that prices of the most wide-spread and important commodities remained at the level of previous years. The following table shows prices of the four most planted crops on Serbian farms.

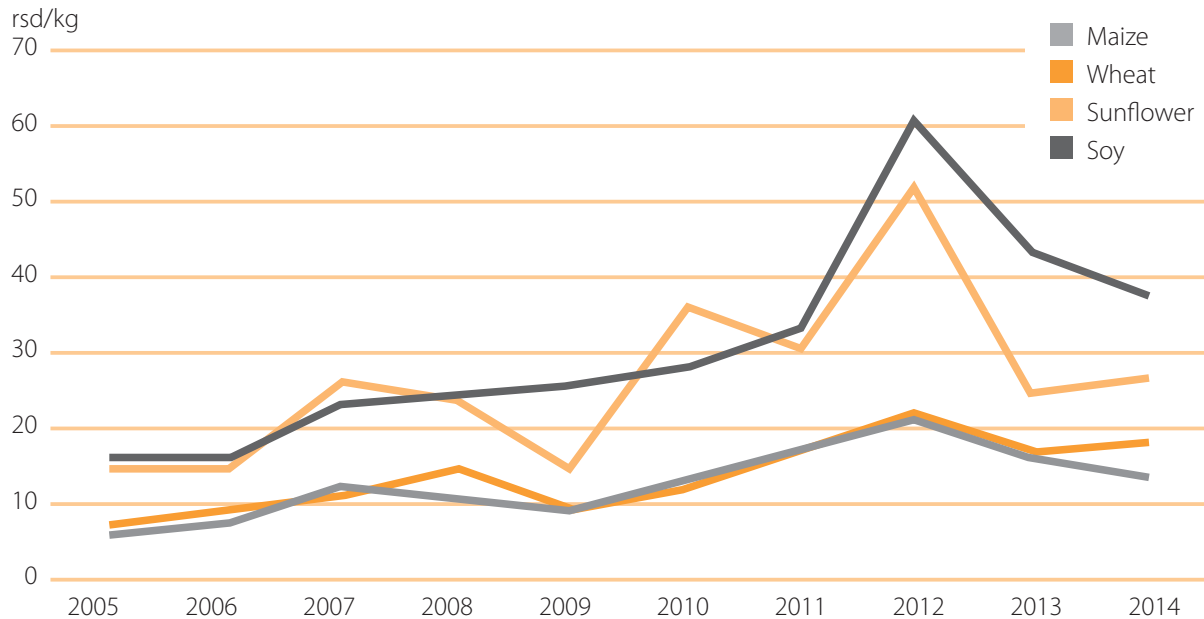


Figure 10: Average prices of most important crops in Serbia

Source: Statistical Office of the Republic of Serbia

6.2. Electricity

Serbia is characterized by a high percentage of coal use (over 50%) in the total primary energy supply; lignite-fired thermal power plants account for over 70% of the electricity generation. Under normal weather conditions domestic power generation covers the entire market demand. Both consumption and total generation have remained fairly flat over the last few years prior to the 2014 floods.³⁷

The energy sector was the hardest hit (with losses and damages of €492 million) and the power supply gap was expected to reach 15% of demand over the following winter season. The flooded mines at Tamnava-West Field and Veliki Crljeni provide about two thirds of the country's coal production and are the primary sources of fuel supply to the Nikola Tesla Thermal Power Plants (part of EPS). These power plants account for 40% of the total installed capacity in the country and are the backbone of the country's power system. Power demand in Serbia is highly seasonal (with higher consumption in winter months when electricity demand for heating purposes is high) and is characterized by a large share of consumption coming from the residential sector (about 55%) due to residents' inefficient use of electricity for heating purposes. Prices for residential consumers are regulated and are well below cost recovery levels, even before the floods.

³⁷ In 2013, Serbia produced approximately 37,540 gigawatt hours of electricity and consumed around 34,000 gigawatt hours. After taking combined transmission and distribution losses (16.2 % in 2013) into account, the country had a deficit of just under 2,000 gigawatt hours which was met with net energy imports at a cost of €1.8 million. Source: Government of Serbia, Serbia Floods 2014 (Recovery Needs Assessment Report)



IMPACT ON COMMODITIES

Due to the lack of coal supplies, the electricity supply-demand gap between June 2014 and April 2015 was estimated to be about 3,700 gigawatt hours, or around 15% of demand, which had to be overcome by electricity imports. There was also significant damage to coal mining equipment, as well as to the distribution network, as was detailed in the previous chapter.

Although a large number of licensed suppliers operate in the open market and cater to large (primarily industrial) consumers of electrical energy, individuals and low-consumption customers are typically being supplied by the government-owned EPS. In 2013, EPS subsidiaries accounted altogether for 99% of domestic electricity generation and 97% of sales to final consumers.

Regulated electricity prices for households and other small consumers are approved by the Energy Agency. The current tariff structure is divided into 11 different rates according to a combination of consumption type and voltage. They range from 3.9 €cents/kWh to 7 €cents/kWh. While tariffs were increased by 11% for households in August 2013, it is estimated that they are still not cost reflective. Below market prices pose significant challenges to both EPS and to the energy sector at large.

The annual revenues of EPS are approximately €1.8 billion per annum. EPS's income is split between two segments – the regulated market brings in around €1 billion, while €800 million comes from the open market. We have to assume that increases of prices in the open market segment are not possible, as higher supply prices would undoubtedly lead to decreases in revenue due to loss of customers. In this segment, the company is already pursuing profit maximization strategies. Therefore, we must take into account that the entire amount of the €492 million attributable to damages and losses would be covered by modifying the below market price of electricity on the regulated market. This means that, in order to compensate for losses and damages the income of EPS would have to have risen by €492 million in order to compensate for the damages and losses that it sustained from the 2014 floods.

If we were to assume competitive behavior by EPS, profit maximization in the open market is already taking place. Therefore, all price realignments would have had to occur on the €1 billion regulated market. Hence, in order to address the effects of floods, EPS would have had to, on average, increase the price of electrical energy to end user consumers. To achieve that:

- a) The price of electrical energy for end users should have increased by 50% in 2015, so as to fully compensate for flood-related damage and loss within 1 year of operation; or
- b) More realistically, the price should have increased by 15% for a period of 3 years, thus spreading out the remedy of floods to a 3-year period.

Since neither such action occurred, and to keep the regulated and below market level prices for end user consumers, the entire financial loss had to be borne by the Government (which fully owns EPS). The largest portion of the required financial resources for recovery and reconstruction was provided from EPS's own financial sources and from the World Bank's Floods Emergency Recovery Project, approved by the Government. Out of the total loan amount of €227.5 million, the €157 million component dedicated to energy sector support was provided as a loan to EPS, which will service the corresponding debt payments on this loan over the following years. The project helped to partially close a financing gap and ensured continued provision of electricity services, particularly during the first winter following the floods. The project also helped restore the distribution system and provided financing for dewatering of the Tamnava West open-pit mine, which ensured a continuation of operations and uninterrupted supply of coal to thermal power plants for continued production of electrical energy.



7. RESPONSE AND RECOVERY

- Post-disaster needs were estimated at €1.346 billion, of which €403 m (30%) was for recovery and €943 m (70%) was for reconstruction
- Resource needs were estimated at €829 m in 2014, €437 m in 2015, and €81 m in 2016 – this time distribution reflects the necessity of urgent restoration to pre-disaster conditions at the earliest possible time
- €514 m was raised until October 2015 – the funding gap for reconstruction efforts amounts to over €830 m
- The Office for Reconstruction and Flood Relief coordinated recovery based on sectorial National Recovery Programs passed by the Government and financed from a combination of Government, donor, and private sources

During the needs assessment exercise carried out by the Government and international community, including the EU, UN, and WB, the financial requirements for recovery and reconstruction were estimated for all sectors of social and economic activities, under both public and private domains. Post-disaster needs were valued at €1.346 billion, of which €403 million (30% of the total) refers to recovery activities,³⁸ and €943 million (70%) refers to reconstruction needs.³⁹ The time distribution of resource needs is shown in the next chart. Needs were estimated at €829 million in 2014, €437 million in 2015, and €81 million in 2016. Such time distribution reflects the necessity of urgent restoration to pre-disaster conditions at the earliest possible time.

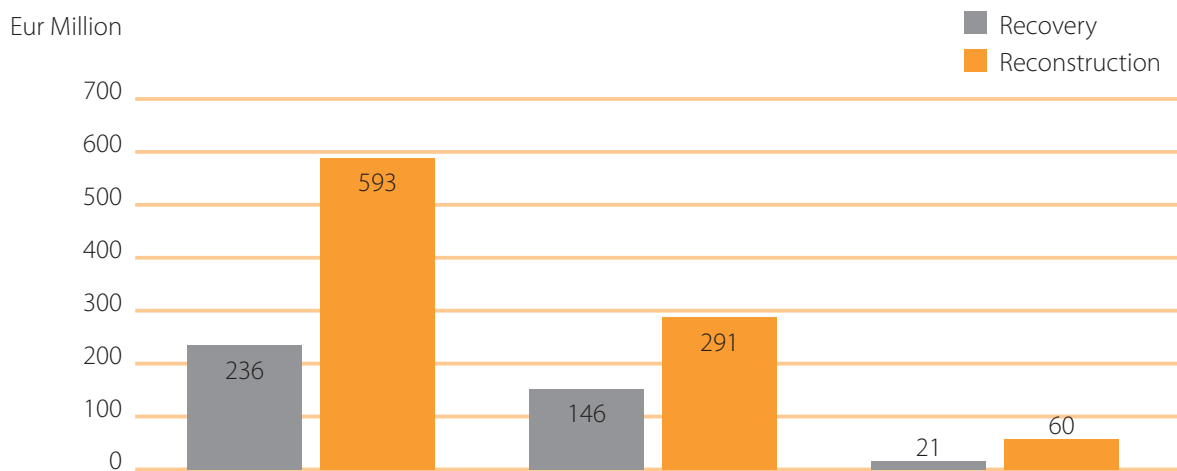


Figure 11: Time Schedule of Recovery and Reconstruction Requirements

38 Recovery needs refer to financing required to assist affected people to recover the pre-disaster level of household income, to restore the supply and access to basic services of health, education, water and sanitation, etc.; and to ensure recovery of production in sectors of agriculture, industry, commerce, tourism, etc.

39 Reconstruction requirements are financial resources needed to repair and rebuild destroyed or damaged assets and infrastructure under disaster-resilient standards and conditions.



RESPONSE AND RECOVERY

The following table shows total needs for reconstruction and recovery analysis per sector, as well as financing secured for the effort. It shows that, even with the tremendous response from the donor community, an overwhelming need for further funding is present. The funding gap for reconstruction efforts amounts to over €830 million as of October 2015.

| Sector | Recovery | Reconstruction | Total Needs | Secured Funding 2014 - October 2015 | Funding Gap |
|---|--------------|----------------|---------------|-------------------------------------|-------------|
| Mining and Energy | 212 | 202 | 414 | 220 | 194 |
| Housing | 59 | 205 | 263 | 59 | 204 |
| Manufacturing, Trade, Tourism | 30 | 198 | 228 | | 228 |
| Agriculture (including Water Management Infrastructure) | 41 | 111 | 152 | 124 | 28 |
| Transport | | 128 | 128 | 65 | 63 |
| Employment | 46 | | 46 | 5 | 46 |
| Education, Health, Culture (Public Buildings) | 5 | 10 | 15 | 9 | 6 |
| Water and Sanitation (Local Infrastructure) | 4 | 24 | 28 | 10 | 18 |
| Communications | | 13 | 13 | 0.15 | 12.85 |
| Cross-Cutting Themes (Gender, Governance, Environment) | 7 | 53 | 60 | | 60 |
| Other (Rescue, Cleanup, Early Warning Systems) | | | | 22 | (22) |
| Total (€ Million) | 403.2 | 943.4 | 1346.6 | 514.5 | 832 |

Figure 12: Post-Disaster Needs and Funding Gaps Per Sector

Source: The Government Office for Reconstruction and Flood Relief and Serbia Floods 2014 (Recovery Needs Assessment Report)

The Office for Reconstruction and Flood Relief was established to conduct all work related to coordination of aid and financing, reconstruction and rehabilitation following the floods. Two and a half months after being founded, the Office became completely operational and started coordinating and implementing sectorial National Recovery Programs passed by the Government which were financed from a combination of Government, donor, and private sources. Different sources of financing are explored in more detail in the next chapter.



Figure 13: Sectors Reconstructed Post-Floods through National Recovery Programs



The first activity that the Office undertook in cooperation with responsible institutions was helping farmers with seeds, derivatives, mineral fertilizers, and other farming aids which enabled replanting on 16,000 hectares of arable land. After this, a process of financial help began for people whose houses were destroyed or damaged in flooded zones. With a view to restoring infrastructure (power facilities for electricity generation, transmission and distribution, mining production and supply facilities, gas infrastructure facilities, telecommunication facilities, roads and rail infrastructure, water management facilities, and public facilities), and also providing assistance to the population, the Office coordinated and implemented a total of 17 National Recovery Programs.

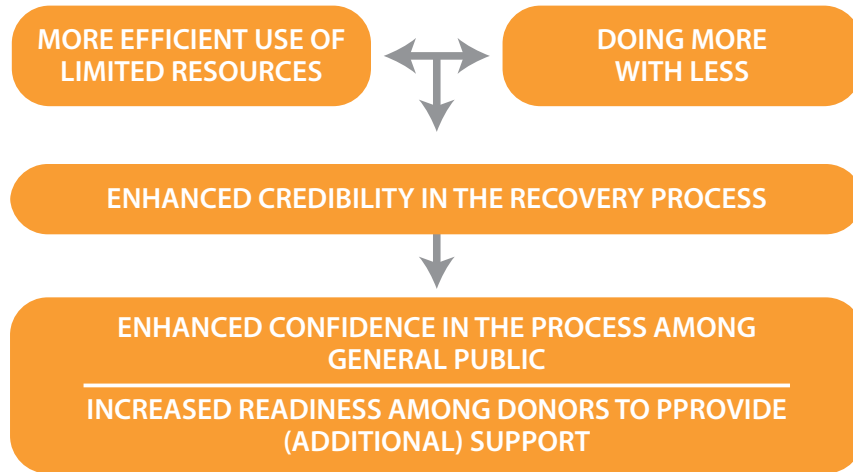


Figure 14: Benefits of a Well- Coordinated Recovery Process

During the months after the floods, predominantly through the use of donors' assistance (with the largest donor being the EU), as well as through the use of loans, Serbia invested considerable resources into the reconstruction of transport infrastructure, public buildings, and power production and distribution facilities, as well as into the reconstruction and strengthening of flood protection infrastructure, as is shown in the following figure. Government aid has also been provided to nearly 21,000 families for the reconstruction of their damaged or destroyed homes, as well as to thousands of small and medium-sized businesses and farmers.

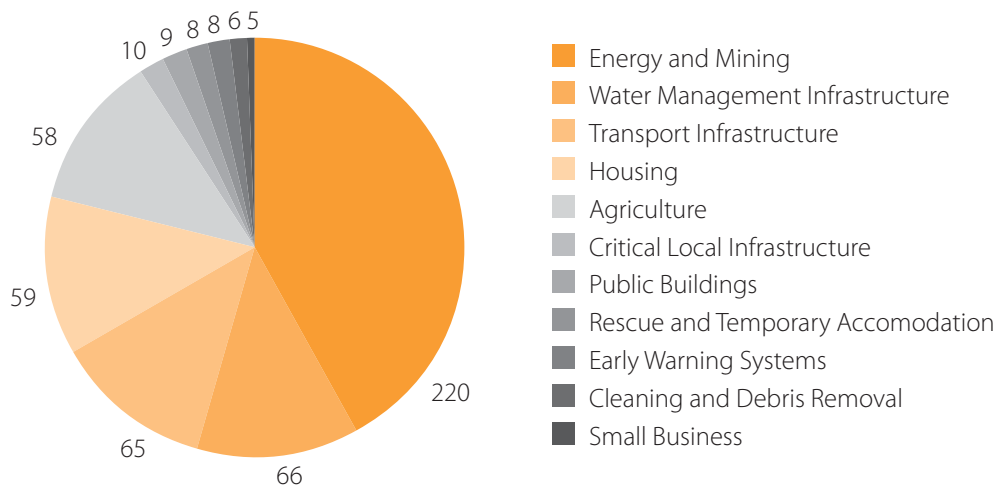


Figure 15: Spending on post-flood recovery and reconstruction per sector (€ million)



7.1. Housing

Implementation of the National Recovery Program for the beneficiaries with damaged or destroyed family housing units begun almost as soon as the Office became operational. Beneficiaries in this program received financial assistance in amounts ranging from €200 - €1,200 (depending on the category of damage to the dwellings) in order to recover destroyed or damaged furniture, appliances, and household items. Through October 2015, 20,569 households received financial assistance in a total amount of almost €41 million.

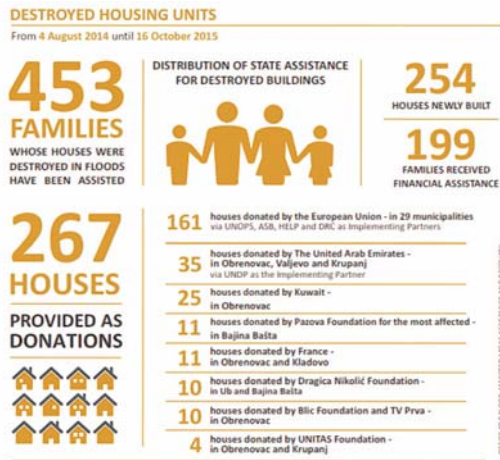


Figure 16: Assistance to Beneficiaries of Destroyed Dwellings

In addition to the direct government assistance, more than 15,000 households received support from donations in the form of funds, labor, or materials to reconstruct their houses from donations.⁴⁰ Additional financial aid of €210 per household was secured through the Red Cross of Serbia for over 15,000 households that had already received government assistance. This program was also implemented in cooperation with the Office. A further EU donation secured housing reconstructions for 1,000 socially vulnerable households; among these are all the houses damaged in the Braće Jugović settlement in Obrenovac and all of the damaged houses in Krupanj.

Accommodation was provided for 455 families who were left homeless due to the floods and landslides, while 200 families received funds instead of housing reconstruction (where housing reconstruction was impossible). The total cost of new housing units is estimated at approximately €6.5 million. A total of 254 houses were completely constructed and handed over to beneficiaries whose residences had been destroyed.⁴¹ In the second phase of recovery implementation, construction of 13 more houses got under way.⁴²

40 Donors the EU, Austria, the USA and Switzerland, through the following organizations: Red Cross of Serbia, Caritas Internationalis, Mercy Corps, ADRA, EHO, etc.

41 Funds for construction of all 267 houses were provided with direct donor funding: 161 houses were provided from the donation of the EU spread across all 29 flood-affected municipalities, 35 houses were provided from the donation of the United Arab Emirates in the municipalities of Valjevo, Obrenovac, and Krupanj, 25 houses were provided from the donation of Kuwait in Obrenovac, 11 houses were provided from the donation of the Pazova Fund for the most affected victims in Krupanj, 10 houses were provided from the donation of Blic and TV Prva in Obrenovac, 10 houses were provided from the donation of the Dragica Nikolić Foundation in Ub and Bajina Bašta, 11 houses were provided from the donation of France in Obrenovac and Kladovo, and 4 houses were provided from the UNITAS Foundation in Obrenovac and Krupanj

42 The second phase included beneficiaries who received the decisions on being able to receive state aid allocations following the completion of an appeal procedure, in cases where it was necessary to previously resolve ownership and legal issues, and also in cases where new damage was sustained (for example, due to subsequent landslide effects stemming from the floods).



The United Nations Post Floods Early Recovery Program was implemented in cooperation with UNDP and the Ministry of Public Administration and Local Self-Government. Here, funds were provided to clean up the sites where damage had occurred and to demolish unsafe structures.⁴³

The United Nations Post Floods Early Recovery Program was implemented in cooperation with UNDP and the Ministry of Public Administration and Local Self-Government. Here, funds were provided to clean up the sites where damage had occurred and to demolish unsafe structures.



Figure 17: Assistance to Beneficiaries of Damaged Housing Units

Based on the National Recovery Program for beneficiaries with damaged and destroyed family housing units, the level of financial assistance has also been determined for tenants living in buildings that were damaged or destroyed during the floods. Assistance was based on the damage category of the housing unit that they occupied, ranging from €200 to €1,200 per tenant household.

7.2. Agriculture

An extensive overview on assistance to agricultural producers was given in the previous section where we discussed the impact of floods on commodities. Besides distributing seeds, fuel and funds for fertilizers, the Government provided funds for cleaning up and rehabilitating damaged arable land so as to enable a re-sowing of most important crops on 16,000 hectares on land. The EU, through the FAO implemented additional support programs worth a total of €9.5 million.



Figure 18: Assistance to Agricultural Producers

In addition to helping crop producers, the Government assisted cattle breeders. Although relatively low numbers of livestock have been lost, at the average household level the economic impact of losing a few animals on a small farm is significant, especially for isolated and elderly people. To reinstate cattle-breeding and help farmers whose animals died as a consequence of floods, the Office carried out a National Recov-

⁴³ In the course of the program implementation, structures were demolished and 74 sites cleaned up in the municipalities of Bajina Bašta, Gornji Milanovac, Krupanj, Lajkovac, Ljubovija, Malo Crniće, Osečina, Paraćin, Požega, Smederevska Palanka, Svijalnac, Šid, Topola, Ub and Valjevo.



ery program. Budgetary funds of over €410,000 were used to fully replace the value of almost 5,000 farm animals in flood-affected areas.

7.3. Energy

The Office implemented a number of national recovery programs in the energy sector (for power distribution, transmission and generation, and coal procurement for mining production and supply), which sustained considerable damage. Reconstruction of electric power facilities was funded from:

- Resources of the companies within the EPS system;
- Resources of the public enterprise Elektromreža Srbije (“EMS”);
- Funds from the donation of the Chinese company China Machinery Engineering Corporation for water pumping equipment in the amount of US\$196.6 thousand;
- A World Bank loan, where of the total of €277.5 million, the amount of €157.11 million was allocated for EPS, namely:
 - a. Funding of electric energy purchases €119.8 million,
 - b. Support to the urgent restoration of the distribution network €14.29 million, and
 - c. Dewatering the open-pit mine Tamnava – West Field €23 million.

7.4. Public Facilities - Education and Health Sector

The National Recovery Program for public facilities in the education sector was adopted in September 2014. The Program referred to 13 pre-school institutions, 19 primary schools and 13 secondary schools, attended by more than 50,000 students aged 3 to 18 throughout municipalities affected by floods. Due to a timely response by the responsible institutions and great interest of international donors and private foundations, rehabilitation of the facilities within the education sector started immediately following the abolition of the state of emergency.⁴⁴ This allowed facilities to prepare for the beginning of the school year in September 2014 with minimal interruption.

In the National Recovery Program for the health sector, priority in rehabilitation was given to the Community Health Centre in Obrenovac and the surgery center in Divci in the town of Valjevo, given that damage to these facilities was of such extent that it prevented their further use. A donation from Norway helped complete rehabilitation of five health care institutions, and work is underway to repair five more facilities.⁴⁵

7.5. Reconstruction of Telecommunication Facilities

On the basis of the National Recovery Program for telecommunication infrastructure in flooded areas, the majority state-owned company Telekom Srbija repaired and reconstructed telecommunication facilities,

⁴⁴ Reconstruction of the facilities within the education sector was funded from the donations of the European Union, Government of the Kingdom of Norway, Government of Japan, the Ana and Vlade Divac Foundation, the Novak Đoković Foundation, the B92 Fund, the organization HELP, and also a number of other organizations and individuals who provided their financial and material assistance to complete the works and refurbish the facilities.

⁴⁵ Reconstruction work was completed in Svilajnac, Paraćin, Zatrežje and Obrenovac, while it is still underway in the Methadone Centre in Obrenovac, Šid, Krupanj, Loznica, and Jagodina. The World Health Organization, with financial assistance from the Kingdom of Norway, donated medical equipment worth approximately €125,000 for health care centers in Obrenovac, Svilajnac, Paraćin, Smederevska Palanka, Šabac, and Valjevo. Furthermore, 20 mobile ECG devices, 12 dental chairs, and six color Doppler ultrasound machines have been provided from the World Bank loan. The equipment has been allocated to 13 hardest hit municipalities which sustained extensive damage in May floods (Obrenovac, Ub, Svijaljac, Smederevska Palanka, Krupanj, Koceljeva, Valjevo, Kosjerić, Loznica, Lazarevac, Šid, Šabac, and Jagodina).



including networks and systems, with its own resources. A part of the communications equipment damaged in Obrenovac was repaired with a donation from France in the amount of €150,000.

7.6. Assistance to Business Entities and Entrepreneurs

The Government of Serbia adopted the National Recovery Program for business activities in flooded areas, financed from the national budget for the needs of reconstruction and so to incentivize business activities in flooded municipalities. The program includes provision of grants to entrepreneurs, and micro and small and medium-sized enterprises (“SMEs”) with fewer than 50 employees. The amount of the grants is determined on the basis of the number of employees in the company as of May 2014, with grant disbursements ranging from €2,000 to €5,000. As of October 2015, 1983 businesses received assistance totaling almost €4.7 million.

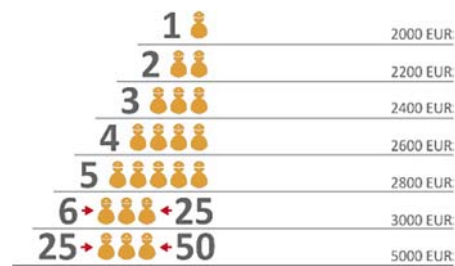


Figure 19: Assistance to Entrepreneurs and SMEs

7.7. Water Management

During its first year of operation, the Office monitored execution of rehabilitation work at infrastructure flood control facilities at more than 100 sites in the Republic of Serbia. A program of emergency rehabilitation works was prepared, on the basis of which the Government adopted the National Recovery Program for Reconstruction of Damaged Water Structures, which included emergency interventions and emergency rehabilitation work on damaged water structures related to the Public Water Management Company (“PWMC”) Srbijavode.⁴⁶

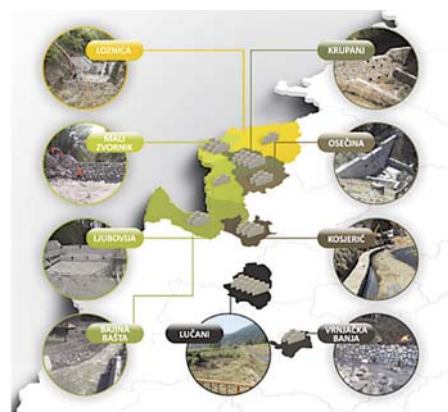


Figure 20: Dams Constructed through UNDP's Post Floods Early Recovery Program

⁴⁶ The program includes emergency rehabilitation works, as well as emergency research and study support to prepare technical documentation for the repair and reconstruction works executed in 2014, the emergency works for environmental protection in 2015, as well as planning and design documents for new protective structures whose construction will be carried out from 2016-2020.



Bilateral donations from a number of countries were dedicated to the reconstruction of infrastructure flood protection facilities.⁴⁷ In addition to grant financing, €14.7 million of the World Bank's Floods Emergency Recovery Project was dedicated to flood protection capital projects.⁴⁸ To the extent possible, rehabilitation and reconstruction will follow the principle of "building back better" after a natural disaster. The deadline for implementation is December 2017. To date, a total of €4 million has been drawn from the total amount of funding for this purpose. Within the United Nations Post Floods Early Recovery Program⁴⁹ funds were provided for construction of 18 torrential dams in the approximate amount of €475,000.

8. SOURCES OF FINANCING FOR RECONSTRUCTION AND RECOVERY

- **Almost €515 million of flood relief financing was raised through October 2015 from a combination of Government funds, private resources, donations from the international community, and loans from the international financial institution.**
- **Total post-flood insurance claims were only €38.8 million (below 2.5% of total damages and losses)**
- **The Government used mostly ex-post instruments to address costs: budget reallocations, international aid, and debt financing**
- **In October 2014 a loan of €227.5m was signed with the World Bank for the Floods Emergency Recovery Project**
- **The European Commission, together with France and Slovenia, organized a Donors' Conference in July 2014 to support Bosnia and Herzegovina and Serbia in their post-flood recovery efforts**
- **The European Union is the largest donor for post-floods assistance through the IPA and Solidarity Fund mechanisms, and numerous bilateral donations were pledged**
- **A number of private foundations made significant contributions, especially in recovery of housing and education sectors**

This chapter will explore different sources of funding used to finance the process of flood assistance, reconstruction and recovery. It was expected that financing of post-disaster needs would come from a combination of Government funds, private sector resources (including personal and enterprise savings, family

47 Donors include Albania, Algeria, Bulgaria, Indonesia, Japan, Canada, and Morocco. Negotiations to administer 4 more donations in the total amount of €3.32 million (from Great Britain, Turkey, Italy, and Hungary), also for the purpose of reconstructing the infrastructure in flood control areas, has entered the final stage as of October 2015.

48 These funds will be used to finance rehabilitation and reconstruction of priority flood protection and drainage control infrastructure through the provision of goods, civil works, and consultants' services in the flood affected areas and areas vulnerable to flooding.

49 Works were completed and the project was submitted for 13 torrent check dams in the territories of the municipalities of Krupanj, Mali Zvornik, Osečina, Loznica, Ljubovija, Bajina Bašta, Kosjerić, and Vrnjačka Banja.



remittances from abroad, and limited insurance proceeds), soft-term credit from local banking institutions, as well as cash grants and donations from the international community, and fresh and rescheduled loans from international financial institutions. The total amount of funding raised for implemented recovery and reconstruction activities from the period of May 2014 – October 2015 is €514,400,000 and is summarized in the following figure.

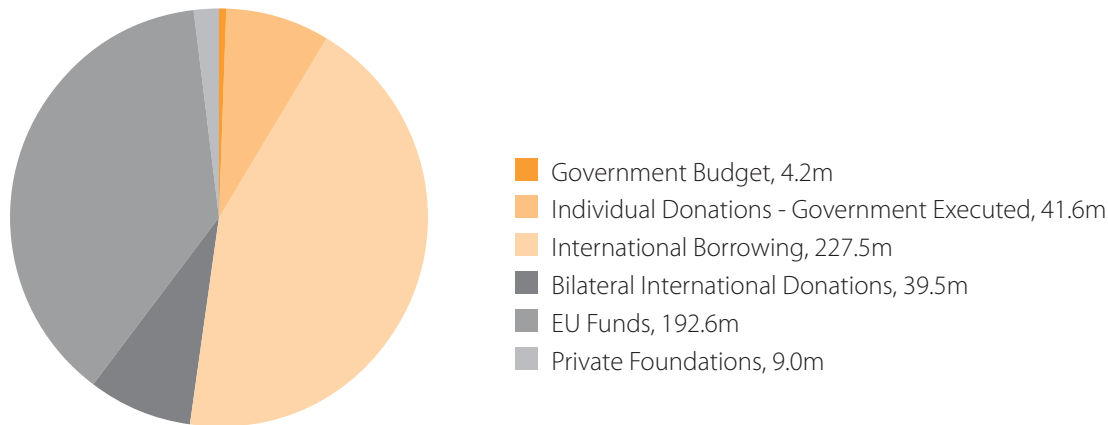


Figure 21: Sources of Secured Financing for Post-Floods Recovery and Reconstruction (in EUR Million)

While analysis of insurance is not the focus of this study, we should mention that the National Bank of Serbia reports that, through December 31, 2014, only €16.9 million was paid out by insurance companies and that the total post-flood insurance claims amounted to only €38.8 million (below 2.5% of total damages and losses and less than 2.9% of the recovery needs). These figures demonstrate a remarkable underutilization of insurance, which is a basic product for shifting at least a portion of the burden of recovery and reconstruction following natural disasters from the government to the private (insurance) sector.

8.1. Government Funds

Even though a practice of setting aside some contingency budgetary reserves exist, the Ministry of Finance of Serbia was in 2014 mostly using ex-post instruments such as budget reallocation, international aid and debt financing. Budget reallocation is a post-disaster instrument used by all countries in cases where natural disaster causes significant damage that has to be covered by the government. The Serbian legal framework provides some flexibility in terms of quick budget reallocation. All institutions can transfer up to 10% of any budget appropriation to any other institution.⁵⁰ However, if reallocation of funds needs to be done on a greater scale, supplementary budget and regular parliamentary approval cannot be avoided. In 2014 it took more than 5 months after the floods to approve a supplementary budget that envisioned additional funds for post-disaster recovery and reconstruction. The Government managed to cover the liquidity gap using international and domestic grants.

A contingency budgetary reserve for natural disasters is budgeted every year under the Ministry of Finance (recorded as a “Permanent Budgetary Reserve”). However, it is relatively small and is insufficient to cover even the emergency cost of any major disaster. Historically, the original budget would envision only RSD 2 million (equivalent to €15,000-20,000) which has been inadequate for either prevention or for any urgent post-di-

⁵⁰ The limit used to be only 5% until 2015. This change only requires an approval by the Ministry of Finance and can be implemented in a few days.



SOURCES OF FINANCING

saster relief or reconstruction. In October 2014, 5 months after the floods, the Serbian Parliament adopted a supplementary budget for 2014 and the Permanent Budgetary Reserve was increased from RSD 2 million to RSD 2.3 billion (close to €20 million), with the aim to financially support local governments and public enterprises in the reconstruction phase. As a result of missing legal provisioning that guarantees the minimum level of contingency reserve, the Permanent Budgetary Reserve in the Serbian budget has more of a symbolic than a substantial function, as none of the allocated RSD 2.3 billion is required to sit in the reserve account at any given time. Another type of contingency reserve is budget line “Compensation for Damage Caused by Natural Disasters” (account 484). There are different government institutions that can have this budget line, such as the Ministry of Agriculture, the Ministry of Labor and the Government Office for Reconstruction and Flood Relief, but historically almost all funds for this account were centralized under the Ministry of Finance. The nature and use of this reserve is quite similar to the Permanent Budgetary Reserve. Before the May 2014 floods, it was at the level of RSD 80 million (close to €670,000), but after the floods the 2014 supplementary budget and 2015 budget was more than doubled to RSD 200 million (almost €1.7 million), which is still highly insufficient given the projected disaster effects costs. In 2014 all of the social assistance that was provided to the flood-affected households in Serbia by the Office was budgeted as Compensation for Damage Caused by the Natural Disasters. It is important to note that the source of those specific funds were individual donations paid into a special flood-relief account by domestic and foreign donors after the natural disaster, rather than contingent budget funds coming from the central government’s own budgetary reserves itself.⁵¹

Local self-governments most often don’t set any contingency reserve for natural disasters in their local budgets, and there is no legal provision that forces them to do so. With a high degree of flexibility and a relatively simple procedure to change their budget during the year (a typical municipality has 3 to 4 supplementary budgets during any given year), most of them rely on post-disaster fund reallocation. Repeated practice of providing financial support from central government’s contingent funds further discourages municipalities from having a contingency reserve that would be adequate for both prevention and quick reaction in the case of a natural disaster.

The Government Office for Reconstruction and Flood Relief has a relatively modest budget fund and was primarily used to channel grant funds that were collected on a dedicated government account and some government funds (for instance in 2014 part of the Permanent Budgetary Reserve was channeled through the Office to the PWMCs). Allocation of all funds that were controlled by the Office was based on National Recovery Programs for every specific sector, as approved by the Government. The role of the Office in the current financing mechanism reflects its specific, time limited mandate. Under current regulation, the Office was established for one year and its mandate was extended to last until the end of 2015. Under the current plan, the Office will be transformed into a permanent body that will coordinate the implementation of the National Disaster Risk Management Program.

⁵¹ Use of contingency budgetary reserve in Serbia, both the Permanent Budgetary Reserve and Compensation for Damage Caused by the Natural Disasters, is quite restrictive. Even though contingency budget reserve is an ex-ante financing instrument, it is not used for any type of prevention activity, including infrastructure improvement, protection of key institutions or insurance of the government owned property. Its only purpose is to provide first layer of financial support for post-disaster relief and reconstruction of relatively small scale. Contingency reserve funds are distributed to the local municipalities based on the assessment of damage, or to public enterprises based on their financial needs linked to the post-disaster relief or reconstruction. Decision for distribution of funds is made only by the Government Committee for Natural Disasters or Government Office for Reconstruction and Flood Relief. This financial shield is adequate only in the years with local damages cause by the small-scale, frequent hazards (minor floods, droughts, wild-fires, or earthquakes), but even in those cases municipalities are often not fully compensated for the cost of damage. Final assessment of transfer to the local level depends on the available funds and size of the damage.



8.2. International Emergency Borrowing

In October 2014 Serbia and the World Bank signed a loan agreement in the amount of €227.5 million (US\$300 million equivalent) for the Floods Emergency Recovery Project with the key areas including recovery in power and agriculture sectors, repairing damaged flood control infrastructure, and helping the country better respond to natural disasters in the future. Specifically, the loan helped to close the financing gap for energy purchases and ensured stable power supply during the heating season. It also helped to finance critical power sector infrastructure and finance investments in energy efficiency. In the agriculture sector, the project allowed budget support for direct subsidies to farmers in affected areas. This provided the farmers with income security needed to invest in their farms. The project is also meant to help improve resilience to disasters by financing repairs to critical flood prevention infrastructure.⁵²

8.3. Donations

The European Commission, together with France and Slovenia, organized a Donors' Conference on July 16, 2014 to support Bosnia and Herzegovina and Serbia in their post-flood recovery efforts. The goal of the conference was to provide further support to the countries in the aftermath of devastating floods. The conference was attended by international donor countries, international financial institutions, and relevant civil society organizations. Besides a necessity for fast economic recovery of both countries, donors also stressed the importance of a stronger cooperation over floods and natural disasters in the region. Many countries recognized the immediate needs of affected people and provided donations relatively quickly after the floods, helping with the reconstruction of houses and public buildings and the rapid restoration of water and energy systems. A significant part of the assistance was implemented through the EU, UN, and WB institutions by using the existing structures already in place.

The Office played a central role in coordinating all international aid in Serbia. Both components of the aid (immediate assistance and post-flood recovery) were very significant for the country. The assistance included rescue teams, expertise, and first necessity products, provided by European countries, including Russia. Beside substantive individual donations, significant bilateral and multilateral funds have been mobilized to finance the recovery phase.

⁵² The project components are as follows:

Component 1: Energy Sector Support (€157.11 million)

The objective of this component is help restore power system capability to reliably meet domestic demand through power purchases, improved reliability of the distribution system and energy conservation measures, and help the restoration of strategic energy assets.

1A: Support for electricity purchases (€119.82 million)

1B: Urgent restoration of the distribution network and load management (€14.29 million)

1C: Dewatering of the Tamnava-West Field Mine (€23 million)

Component 2: Agricultural Sector Support (€53.08 million)

This portion will support the ongoing Farm Incentives Program in order to protect the livelihood of farmers affected by the floods and offset their income losses. This component would cover the program for payments made to farmers in the 49 affected municipalities.

Component 3: Flood Protection (€16.72 million)

The objective of this component is to support urgent rehabilitation of flood protection and drainage control infrastructure, and strengthen the technical capacity of government agencies for improved flood prevention and management

3A: Investments in Flood Protection (€14.72 million)

3B: Project Implementation Support for Flood Management (€2 million)



SOURCES OF FINANCING

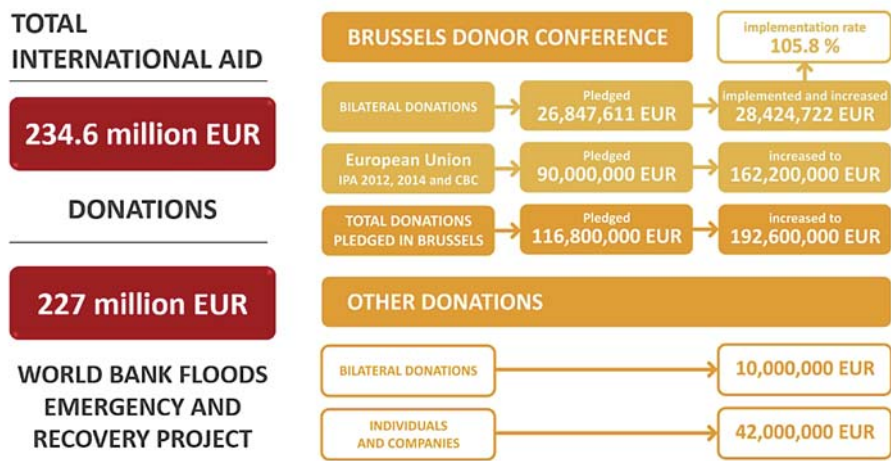


Figure 22: Summary of Post-Flood International Aid

At the Donors’ Conference held in Brussels in July 2014, bilateral donations were pledged in the amount of €26.8 million. However, the Office managed to raise the amount of the donations to €29.1 million (an increase of €2.3 million).

Donations are being implemented through different mechanisms. Some countries administered donations through their non-governmental organizations, others through the Red Cross and other international organizations, and others still by donating equipment and reconstructing infrastructure facilities in direct cooperation with local self-governments or with the assistance of implementation partners. Some countries made their donations available by paying them into the special-purpose donation account for post-flood reconstruction, opened at the National Bank of Serbia. In the period immediately following the floods, a large number of institutions, companies, local and international organizations, individuals from the country and from abroad, and also foreign governments helped with payments. By the end of May 2015, the funds in dinar counter value paid into this account amounted to almost 5 billion RSD (€41.6 million). The Office directed the donations to monetary assistance for individual households, and also to reconstruction of public facilities, primarily the structures within the flood control system.

Agencies of the United Nations such as the UNDP, UNOPS, and UNHCR, each directed assistance through their representative offices directly to the affected populations and implemented projects with local self-government bodies or with the Office. The total value of the projects implemented by UNDP in 2014 and those underway in 2015 through October 2015 amounts to US\$7,178,000, of which US\$2,128,000 comes from UN funds.

8.3.1. EU Assistance

The European Union is the largest donor for post-floods assistance. Funds allocated for the Republic of Serbia within the European Union pre-accession funds amounting to €102 million (IPA 2012:⁵³ €30 million and

53 In the aftermath of the floods, the funds in the amount of €30 million from the IPA 2012 were directed to 24 municipalities for construction of new houses and reconstruction of the damaged ones, reconstruction of public institutions such as schools and kindergartens, construction of Krupanj – Korenita - Krst road, assistance to small and medium-sized enterprises and assistance to farms which sustained flood damage



IPA 2014: €62 million from the National IPA, and also €10 million from the Multi-Beneficiary IPA⁵⁴) have been redirected for the purpose of post-flood reconstruction. With the funds from the European Union Solidarity Fund of €60.2 million, approved in March 2015, the EU donations for post-flood reconstruction amount to €162.2 million in total.

The single most generous grant was pledged by the EU Solidarity Fund (the “EUSF”) in the amount of €60.2 million. Its main purpose is to help cover part of the emergency costs incurred by the public authorities due to the disasters. In particular, it will help to restore vital infrastructure and services, reimburse the cost of emergency and rescue operations, and help cover some of the cleanup costs in the disaster-stricken regions. One of the very important features of the Solidarity Fund is the possibility of retroactive financing, but its negative characteristic is the inability to use funds to build-back-better - this financial assistance can only be used for reinstatement of destroyed or damaged assets back to their pre-disaster levels. Bearing in mind the previous lack of investments in maintenance of flood protection infrastructure, this is causing certain issues in this field of operations. The Government identified the following indicative priorities for funding from the EUSF⁵⁵:

- Road infrastructure - €20 million
- Railway infrastructure - €5.02 million
- Funding of rescue services and temporary accommodation - €7 million
- Preventive infrastructure - €25 million
- Cleaning of disaster affected areas - €3.2 million

8.4. Private Foundations

A number of private foundations have made significant contributions to recovery efforts in Serbia, especially in the housing and educational sector. Some of most important contributions came from the following sources:

Foundation of Dragica Nikolic

The Serbian First Lady’s Foundation made a contribution to post-flood relief in the amount of €3.7 million. The foundation’s donation included direct provision of food and equipment, as well as assistance in the reconstruction of 199 buildings with a total combined surface of over 17,000 square meters.

Foundation Blic and TV Prva

A total of 10 new prefabricated houses were donated to families in the hardest hit municipality of Obrenovac. The total value of this investment from the media foundation was just over €2 million.

Foundation Ana & Vlade Divac

After the May floods the foundation launched a project „Let’s All Help“ and collected US\$1.3 million for rehabilitation of flooded areas. Their activities included:

⁵⁴ €62 million from the National IPA 2014 and €10 million from the Regional IPA will be directed to the sectors of water management, electricity, and traffic and infrastructure. Implementation of these funds has not yet commenced

⁵⁵ Even though EUSF was reformed to simplify the aid criteria and reduce the payment time, disbursement of aid is still quite slow. Funds became available to Serbia only recently, eleven months after the floods. In order to implement the grant, a Government Working Group was tasked with reviewing the documentation submitted to the Office for Reconstruction and Flood Relief by the relevant ministries, public enterprises and local self-government units, related to the costs the bodies and organizations had in relation to the disaster. The Office is in charge of coordinating the activities of delivering funding from the EUSF in the period of 18 months starting from April 2015, when funds were delivered to the Republic of Serbia



SOURCES OF FINANCING

- a) Reconstruction of 89 houses and refurbishing of 49 houses of the most vulnerable families
- b) Building of public spaces, including 4 kindergartens, 4 schools, a library, and 3 playgrounds
- c) Economic grants, through the provision of assistance for agricultural production and for restarting small businesses which are the backbone of 127 households

Delta Fondacija

The foundation associated with Delta Holding company restored 23 houses in Obrenovac, including 4 new houses which were built and 19 which were renovated. The total amount of assistance amounted to almost €900,000, comprised of the following:

- a) assistance to farmers through animal fodder and maize seeds;
- b) aid to evacuated individuals during the emergency; and
- c) reconstruction of housing.

Novak Djokovic Foundation

The foundation focused its activities on improvement of conditions in which children in Serbia get education, grow up, and play. Aware of the post-floods situation in the country, the foundation got involved in restoration of education facilities including 3 kindergartens which were rehabilitated and an additional 2 kindergartens which were refurbished, with a total investment of approximately €850,000.

8.5. Remittances

A number of studies show that besides the economic slowdown, natural disasters and political turmoil are followed by an increase in remittance flows. Remittance flows, as a share of personal consumption, rose after the natural disasters in Bangladesh, Dominican Republic, Haiti, and Honduras.⁵⁶ Likewise, recently Humanitarian Policy Group papers that include detailed case studies of Haiti, Pakistan, Somaliland, Sudan, Indonesia, and Sri Lanka, report that in almost all of these countries remittance flows decreased during the emergency phase but increased sharply in the months and year following the disaster or crisis, showing the altruistic motive of remittances.⁵⁷

In Serbia, however, the flow of remittances dropped in 2014 when compared to the previous year. The following tables show data from the National Bank of Serbia and covering both registered remittances (sent via banks, money transfer operators, and other formal routes), as well as estimates of unregistered inflows of money sent from abroad.

| Country of origin | 2013 | Country of origin | 2014 |
|--------------------|------|--------------------|------|
| Germany | 877 | Germany | 629 |
| Austria | 479 | Switzerland | 380 |
| Switzerland | 357 | Austria | 234 |
| France | 210 | France | 225 |
| Croatia | 116 | Croatia | 201 |
| USA | 116 | Russian Federation | 126 |
| Sweden | 110 | USA | 123 |
| Russian Federation | 80 | Great Britain | 84 |
| Italy | 60 | Slovenia | 66 |

56 <http://inec.usip.org/blog/2013/mar/26/remittances-more-just-money-under-mattress>

57 Sejdini, A., (2014), Migration and Remittances in Balkan 5: A Comparative Evidence



| | | | |
|---------------------------|--------------|-------------------------|--------------|
| Greece | 46 | Italy | 60 |
| Top 10 Countries | 2,451 | Top 10 Countries | 2,129 |
| Other Countries | 405 | Other Countries | 475 |
| TOTAL (€ million): | 2,856 | | 2,604 |

Figure 21: Sources of Secured Financing for Post-Floods Recovery and Reconstruction (in EUR Million)

Source: National Bank of Serbia

The above numbers, however, may paint an unrealistic picture regarding the post-disaster help coming from the Serbian diaspora. The Government opened numerous channels for submission of financial aid, including a special flood-relief account at the National Bank of Serbia in a number of foreign currencies, as well as opening up SMS numbers, PayPal accounts, and other options. Such transfers were recorded separately and not shown as part of remittance flows. Implementation of such funds donated from abroad (and from within the country) was managed by the Office for Reconstruction and Flood Relief.

9. FLOOD PREVENTION

- **Effective prevention and risk-reduction measures are often embedded in other infrastructure spending, making it more challenging to separate out the economic costs attributable directly to DRR**
- **Estimating direct costs of risk-reducing is relatively straightforward, as these include the costs of labor and materials, as well as the cost of financing. Such costs are generally more easily quantified using market prices. Indirect costs of risk-reducing actions, however, can be more difficult to identify and to monetize.**
- **With the average spending of €35-40 million annually over the past period, Serbia could barely finance maintenance of current infrastructure that was damaged after minor local disasters. As a result, there were no new large scale projects in this sector in the past 10 years.**
- **The deprived state of water management and flood prevention in Serbia is a direct result of insufficient financial resources for this sector and a lack of strategic financial management over the past decades.**

In 2005 UNESCO highlighted that for every \$100 spent by the international community on risks and disasters, \$96 go to emergency relief and reconstruction, and only \$4 on prevention.⁵⁸ In the context of an integrated approach towards disaster risk reduction, the Sendai framework for disaster risk reduction sets out four priorities towards implementation of the framework, including investing in disaster risk reduction for resilience, as well as seven targets which include enhanced international cooperation and adequate financing to complement national level plans by countries. Whether through investment in prevention infrastructure, new mechanisms for climate finance, a greater role of the private sector, or mobilization of domestic

58 Haque E., Etkin D., (2012) Disaster Risk and Vulnerability: Mitigation through Mobilizing Communities and Partnerships



resources, resilience is becoming a core element of sustainable development. It is widely accepted that risk-informed investing in resilience to hazards is a smart development.⁵⁹ The Sendai framework Priority 3, “Investing in Disaster Risk Reduction for Resilience” provides tools and best practices for the incorporation of disaster risk reduction into national public development and planning systems, as well as for private sector investments.

The European Commission’s guide on best practices in prevention, protection and mitigation⁶⁰ states that flood protection is never absolute and that things can go wrong. The question of what safety is available at what price is prevailing, as is how much of the remaining risk has to be accepted by society. Emergency and disaster planning in the case of extraordinary situations and as one pillar of risk management is therefore very important.

Disaster risk reduction activities, from strategic planning to developing and implementing risk reduction infrastructure, are costly. Estimating direct costs of risk-reducing activities is relatively straightforward, as these include the costs of labor and materials, as well as the cost of financing. Such costs are generally more easily quantified using market prices. Indirect costs of risk-reducing actions, however, can be more difficult to identify and to monetize. Risk-reducing strategies may have indirect impacts on economic, social or environmental strategies and action plans. Also, risk-reducing infrastructure may disrupt the established patterns of social and economic activities of affected communities. Such indirect costs are not as easy to estimate. Also, prevention and risk-reducing activities may be included in broader strategies and action plans for sustainable development, making it more challenging to separate out the economic costs attributable directly to disaster risk reduction activities. However hard, it is important to note that clarity on the costs of disaster risk reduction actions can facilitate improved decision-making on whether or not such actions should be undertaken.

It is often difficult to measure how much governments spend on prevention because these are specific budget items. Even if some absolute numbers can be derived, they still don’t necessarily imply that it is too little, or too much. It is generally hard to isolate what constitutes prevention and even harder to determine adequate spending. Effective prevention measures are often embedded in other, often infrastructure spending (for instance, on river embankment repairs), and there are indications that investing in structural measures such as maintenance and non-structural ones, such as risk maps, have large benefits.

9.1. Flood Prevention – National Level

Identifying spending on flood prevention in Serbia has similar limitations. Many infrastructure projects, such as roads, bridges, and public building and maintenance have a disaster prevention mitigation component that is hard to analyze separately from the main functions of these projects. One segment of infrastructure that can be isolated, as its main purpose is disaster protection, is water management infrastructure. With its average spending of €35–40 million annually over the past period, the Government could barely finance the maintenance of current infrastructure that was damaged after minor local disasters. As a result, there were no new large-scale projects in this sector in the past 10 years.

The main responsibility for protection against floods and management of the respective infrastructure lies with the Ministry of Agriculture and Environment Protection through its Directorate of Water Manage-

59 Sperling, F., Szekely, F., (2005), Disaster Risk Management in a Changing Climate

60 http://ec.europa.eu/environment/water/flood_risk/pdf/flooding_bestpractice.pdf



ment.⁶¹ The Ministry is responsible for water management in “category 1” watercourses (defined as main rivers and their direct tributaries) and the actual implementation of this mandate is delegated to three PW-MCs: Srbijavode, Vode Vojvodina,⁶² and Beogradvode,⁶³ based on the territorial principle that each is to cover a specified territory of the country. Water and floods management of “category 2” watercourses (defined as local water flows, or tributaries of tributaries to main rivers) is assigned by the law to local authorities, on the territory falling under their administration.

The flood protection system in river basins (especially the Sava and Danube river basins) relies mostly on natural retention areas and flood protection levees. Historically, the main levees were designed for 100-year return period floods (or 1000-year floods in some urban settlements). However, in the 1990s after the disintegration of the former Yugoslavia, during which time efforts were made to treat flood management in the river basins in an integrated manner, flood management has since taken place only at the national level. Hydraulic structures were not maintained properly after the 1990s, some have been damaged but not repaired and monitoring processes have been interrupted. Many reconstruction works are still pending.⁶⁴

61 Directorate of Water Management in the government institution under the Ministry of Agriculture and Environmental Protection; its main task is to develop and implement policies related to water resources management, water protection, development and maintenance of flood protection systems, maintenance of waterways in Serbia, and other activities related to water resources management. The Directorate also directly supports public companies Srbijavode, Vode Vojvodine, and Beogradvode that are managing water resources and implementing all activities on an operational (and regional) level.

62 PWMC Vode Vojvodine is in charge of the Northern Serbian province of Vojvodina. Together with the vast agricultural land, river and canal networks, it is one of the most complex systems, as it directly affects life and businesses of entire population of the province. This system includes a network of major international rivers, embankments, pumping stations, ship locks, sluices, gates, and canals. Given the geographical dispersion of the May 2014 floods, Vojvodina suffered very little damage compared to the Central and Western parts of the country. Consequently, damage sustained from this particular natural disaster was limited. However, a very important fact to consider is that 46% of territory of Vojvodina province (1,000,000 hectares of land) lay under the level of the waters in nearby rivers which flow through the Province. Also, 85% of the land (1,840,000 hectares) is under risk of floods due to surface and ground waters during the longer periods of high waters in rivers after heavy rainfalls. Almost all natural waterways in Vojvodina are regulated today, but are in relatively poor shape as a result of limited financial resources to maintain the whole system. Most of the levees are reconstructed for 100-year floods and they cover 95% of the Danube river length and 85% of Sava and Tisa length. The total length of the embankments that are still not constructed or reconstructed following the floods is 204 kilometers. This PWMC is financed from multiple sources, but primarily from the budgets at the national and provincial levels. Other sources include water-related fees and charges (collection of “old” water fees and charges that used to be revenue of Vojvodina Vode, but became the revenue of the Province since 2011), concession fees, the lease of water facilities, and other similar arrangements. Out of the total revenue of the company of €35.8 million in 2014, almost 85% (€30 million) was a direct subsidy or transfer from the national budget. On top of regular transfers that are used to finance regular maintenance, in the past 5 years Vode Vojvodine obtained additional resources for new investment in water facilities. Projects were financed by the World Bank and the province’s capital investment fund, while Vode Vojvodina managed the implementation and monitoring.

63 PWMC Beogradvode is in charge of water management, building and maintaining flood protection and irrigation systems for rivers Sava and Danube on the territory of the city of Belgrade. This system includes 527 kilometers of river levees, 1.784 kilometers of reclamation canals, and 33 pumping stations. The May 2014 floods caused severe damage to many of those facilities. Beogradvode are in charge of flood protection for their territory of Obrenovac, which was the hardest hit municipality during the floods. Based on national reconstruction program for water management, an estimated €8.8 million will be required to reconstruct all of the damaged facilities in the region in order to prevent new floods.

The average annual revenue of Beogradvode is €3 million and it is provided from the national government and city’s budget. However, this amount is not enough even for regular maintenance. One part of the financing gap for implementation of the program will be covered by World Bank’s Floods Emergency Recovery Project, the EUSF, and bilateral grants, but the remaining gap will have to be covered by the Serbian government.

64 Western Balkans Investment Framework (“WBIF”)(2014), p.16



Figure 24: Map of the Kolubara River Basin

Earlier in 2015, the Jaroslav Černi Institute for the Development of Water Resources, a leading research organization in Serbia's water sector, was commissioned by UNDP and the Office to carry out a study of flood protection in the Kolubara river basin.⁶⁵ Municipalities belonging to the Kolubara river basin sustained damages of over €900 million in the floods of May 2014. Discussions with experts have led to preliminary estimates that investments in infrastructure in the range of €110 million would be sufficient to protect the Kolubara river basin from the risk of floods. If we compare the figure of needed investment to damages of over €900 million in 2014 alone, we can clearly see the benefits of investing in prevention.

Due to the complexity of the state budgeting system and all factors above, the following analysis of the national and local level is not comprehensive and all inclusive, but more selective so as to demonstrate the trends and highlight crucial sectors characteristics.

PWMC Srbijavode is by far the largest of the three water management companies and is in charge of all category I watercourses in the country south of the capital city of Belgrade. Municipalities most affected by floods of 2014 reside in the territory under this company's management, which is the main reason we will analyze more closely this company's operations and financing.

The Government established a Fund for Water Management in 2011 with the idea to create an independent and more stable source of financing for waterways management, flood protection, irrigation measures, and water protection. Charges and fees linked to usage of water resources, usage of water facilities and drainage were planned to be key sources of revenue. Only one year after it was established, amendments to the Budget System Law in 2012 meant that the Fund for Water Management had to rely solely on budgetary funds. The graph below shows the amount of annual financing of the company, as well as a clear declining trend in resources.

⁶⁵ The study will be used to improve safety of citizens and property in this part of Serbia. Results are expected in early 2016. They will form a basis for further investments into preventive infrastructure in this very important river basin.

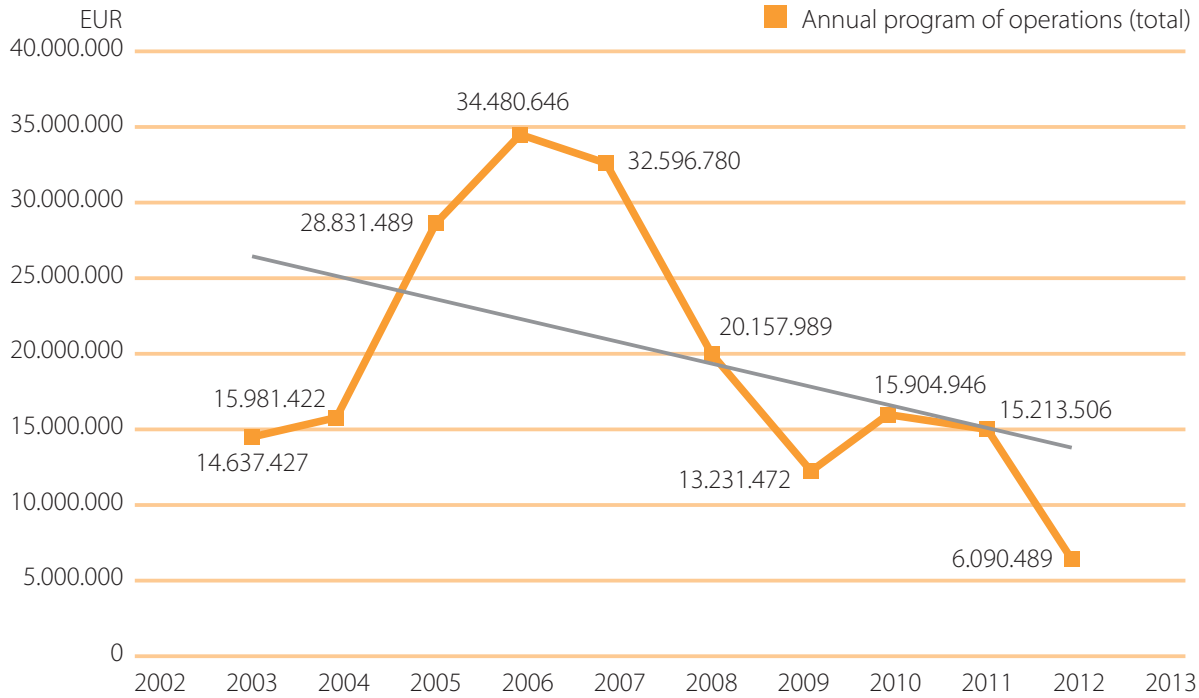


Figure 25: Annual Financing of PWMC Srbijavode

Source: Data from the Annual Program of Operations of PWMC Srbijavode

In 2014, Srbijavode received €11 million for construction and maintenance works based on the initial annual Water Management Program. After several amendments, the total contracted works amounted to €13.6 million and 98% of this was implemented by the end of the year.

Overall, around 80% of total annual spending goes to capital expenditures (mostly for maintenance of existing infrastructure), while 20% represents the company's operating costs. As can be seen from the next chart, spending on both regular maintenance and expansion of the protection system has been declining over years. Currently, the company management estimate that maintenance expenditure is only at a level of 50% of required standards for regular maintenance of external and internal water control structures.

The long-standing reduced scope of maintenance of dams⁶⁶ with flood defense serving retention areas has affected their functional readiness. Available funds do not ensure implementation of the stipulated regular activities and works to maintain and monitor dam stability, stability of structures within the dams, and the condition of banks in the water storage areas. Furthermore, experts state that the condition of a number of dams with unresolved ownership and user status which Srbijavode does not manage also pose a potential risk to downstream areas and represent an acute problem, due to the lack of maintenance and inadequate management.

66 The assessment does not refer to dams belonging to the system of the EPS jurisdiction and control.



FLOOD PREVENTION

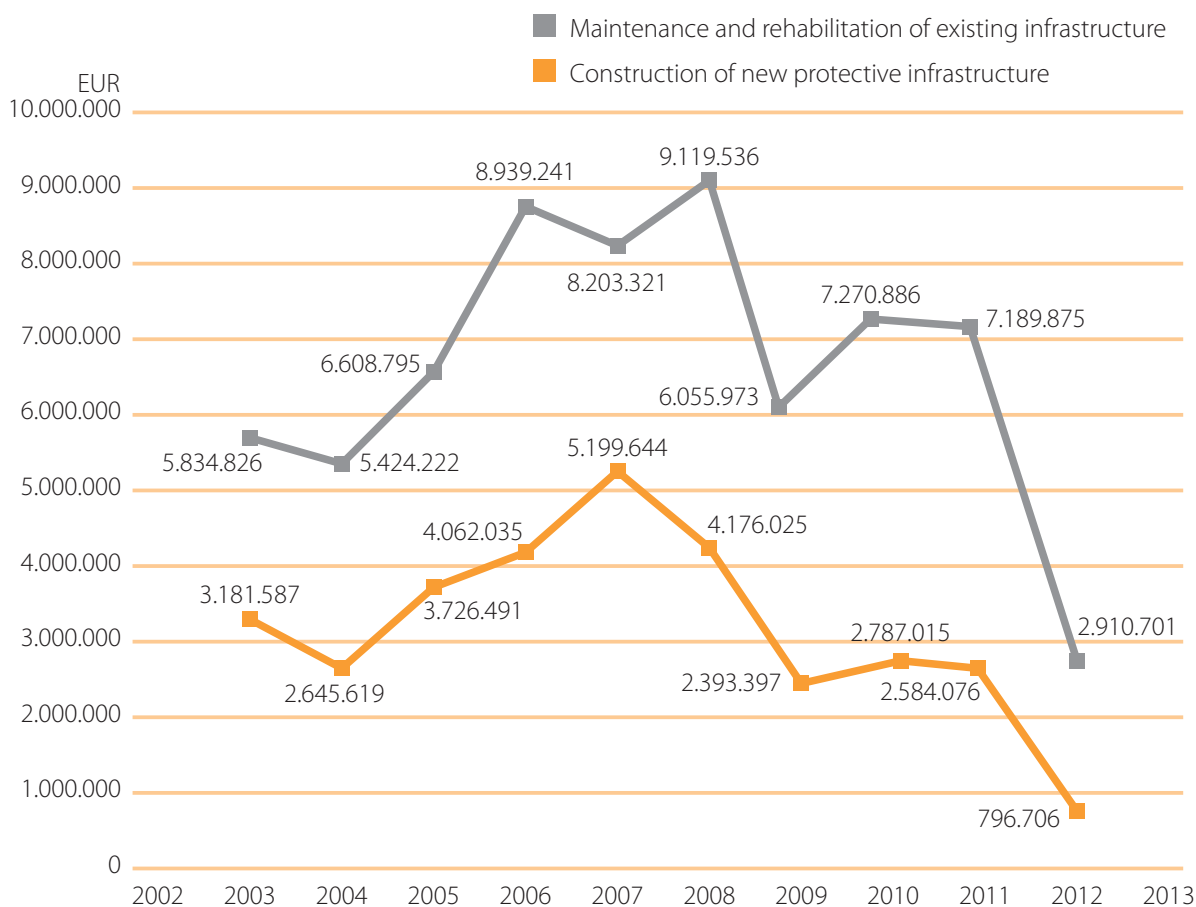


Figure 26: Annual Financing of PWMC Srbijavode – Maintenance of Existing Infrastructure vs. Construction of New

After the floods, Srbijavode professional staff assessed the damage of flood protection objects and based on detailed information gathered on the ground created an urgent recovery and reconstruction plan that was formalized in the National Recovery Program for Water Management. The total value of activities that Srbijavode should undertake based on the Program is estimated at over €14 million, but the Government was able to provide only a part of that amount from its permanent budgetary reserve. One part of the financing gap for reconstruction of waterways in Serbia is covered from the Floods Emergency Recovery Project that was signed with the World Bank in October 2014. To the extent possible, rehabilitation and reconstruction will follow the principle of “building back better” after a natural disaster. Many bilateral donors and international organizations provided grants for reconstruction of the flood protection system. Also, UNDP provided €475 thousand for 18 flash-flood barriers in Western Serbia. A significant portion of EUSF proceeds have been earmarked for restoring vital preventive infrastructure – an indicative amount is € 25 million. It is worth mentioning that EUSF financial assistance can only be used for reinstatement of destroyed or damaged assets back to their pre-disaster levels. Bearing in mind the previous lack of investments in maintenance of flood protection infrastructure, the inability to apply the build-back-better principle in utilizing these funds represents an important limiting factor for resilient development.



Unfortunately, international aid can only partially cover the total financial gap. The deprived state of water management in Serbia is a direct result of insufficient financial resources for this sector and lack of strategic financial management over the past decades.⁶⁷ Due to a constantly shrinking budget, some critical water facilities are in a dangerously bad condition, which can cause long term problems with water supply and flood protection for many regions in the country. National experts argue that, based on recent experience from the 2014 floods, the damage that disaster causes could be more than 8 times higher than investments in prevention infrastructure.⁶⁸

9.2. Flood Prevention - Local Level

Due to a long-standing trend of reducing investments in water management coupled with an unresolved issue of transformation, regional water management companies established to undertake protection against adverse water effects and operationally implement flood defense have continued to decay. This chapter will now focus on examining the cases of two local self-governments in Serbia. One, the city of Novi Pazar, invested in prevention works and consequently saved itself from the devastating floods in May 2014. The second one, the municipality of Ub, sustained major damage as a consequence of floods. These cases clearly demonstrate that investing in prevention is economically beneficial compared to investing in response and recovery.

9.2.1. Case Study of Novi Pazar

The city of Novi Pazar, located in the Southwest of Serbia receives a significant amount of rain every spring resulting in flash floods, which historically caused substantial damage. Previously, during spring and autumn, water used to overflow and flood basements, yards and fields. Only in 2013, the total damage from these floods was more than €1 million, while in 2012 it surpassed €2 million. Due to the relatively poor condition of the local budget, the city was historically never able to fully cover the damage to infrastructure, private households, and farmers.

In early 2013 the city initiated a project that would prevent future flash floods in this region. The prevention project was implemented by the United Nations Office for Project Services (“UNOPS”) and funded with €420,000 from the European Union and the Government of Switzerland through the European Partnership with Municipalities Program (“EU PROGRES”). The new prevention system included 13 flood barriers, landslide mitigation works and biological works, including reforestation of around 300 hectares of land. The project was successfully completed in early spring 2014, in less than a year. The anti-erosion works included the development of the technical documentation and the construction of nine barrages on the river tributaries in Novi Pazar and Raška, which helped to reduce the water level by a meter.⁶⁹

The first effects of the new prevention system were visible already in spring 2014. Heavy rainfall in April and May 2014, which caused major floods across Serbia, also hit the area of Novi Pazar with average of 50 liters to square meter of rain in just 12 hours. Flood barriers on Trnavica, Josanica, Izbicka, Ljudska, and Tusimska rivers were able to retain flash flood and mud deposits that could have caused severe damage to the villages nearby and city of Novi Pazar itself. The total investment of €420,000 was “repaid” already in the first year of the investment, as it is estimated by international experts who were interviewed that the damage sus-

67 Financing of PWMC Srbijavode was not clearly regulated by the Law on Water, which creates a lot of uncertainty linked to typically long term construction projects

68 Source: interview with experts from Jaroslav Černi Institute for the Development of Water Resources

69 Institute Jaroslav Černi, (2014), Positive Example of Flood Prevention in Serbia – City of Novi Pazar



tained by the city in spring 2014 would have measured in millions of Euros. The newly constructed facilities are expected to provide effective protection to this area in the coming years as well, further increasing the benefits of this investment in prevention.

9.2.2. Case Study of Ub

The municipality of Ub lies on the Ub River as well as on the downstream section of the Tamnava River. In mid-May, the Tamnava, Ub, Gračica and other smaller tributaries flooded 13,053 hectares of agricultural areas and 1,123 residential buildings in the municipality of Ub, causing evacuation of 7,000 residents and affecting 19,000 inhabitants. The municipality suffered direct damage of over €23.3 million.⁷⁰

The following table shows the annual direct damages⁷¹ caused by floods in Ub since 2005. Damages were mostly present in crops and infrastructure, but in 2014, they also included production facilities and houses.

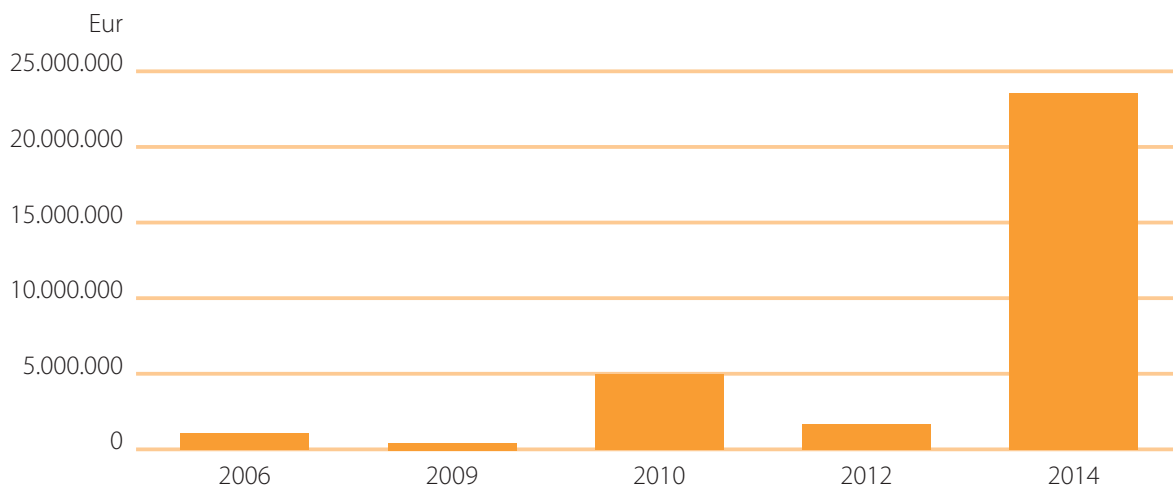


Figure 27: Municipality of Ub – Annual Flood-Related Damages Since 2005

It is clear that, besides the shattering floods of 2014, which devastated the local self-government and forced its inhabitants to evacuate, floods represent a regularly occurring phenomenon that causes tremendous damage on an almost yearly basis for this region.⁷²

Based on preliminary findings of the Jaroslav Černi Institute for the Development of Water Resources, it is estimated that 2 major infrastructure objects would be needed to ensure protection against floods of the municipality of Ub:

- a) **A multi-purpose system on the river Ub** is envisaged for construction, comprised of a dam and a water retention area.

Preliminary estimates show that the envisaged project would cost in the range of €4 million.



70 Based on the PDNA reports, and data obtained from the local self-government of Ub

71 Not including damages to assets of Kolubara mining company (part of EPS system), which is incorporated in the neighboring municipality of Lazarevac

72 Given the torrential nature of river flows in Ub, droughts also represent a regular natural disaster for the many agricultural producers working in the area.



- b) **A multi-purpose system on the river Tamnava**, in the municipality of Koceljeva (upstream of Ub). Given the larger size of the project, total investment is estimated at approximately €6 million. Having in mind that both municipalities of Ub and (primarily) Koceljeva would benefit from this protective infrastructure, the investment cost could be shared between the two local self-governments, resulting in an investment of €3 million for each municipality.

The previous initial estimates show that investment of approximately €7 million could protect the municipality of Ub against future floods. If we recall that the damage in Ub exceeded €23 million in 2014 alone and that almost every year it suffers multi-million euro damages from floods, the case for investing in preventive infrastructure is a very clear one. In addition to flood prevention, the water retention areas would also serve a very important purpose of providing irrigation possibilities in times of droughts, which is a crucial factor of sustainability and further development of these drought-prone areas (caused by the torrential nature of the rivers). Furthermore, other “no regret” investments for flood prevention include non-structural and environmentally friendly activities, such as tree planting. With or without future floods, such actions bring substantial non-financial benefits to local communities and the environment.

10. DISASTER RISK MANAGEMENT FRAMEWORK

- **During the recovery process after the May 2014 floods, the Government started developing a systemic approach towards prevention and disaster risk management**
- **The first step was to extend the mandate of the Office for Reconstruction and Flood Relief to cover prevention, in addition to recovery**
- **In December of 2014, the Government passed the National Disaster Risk Management Program – a comprehensive program for disaster resilience intended to be used as an umbrella framework to coordinate, channel funds, and implement activities related to reducing and managing risks in Serbia**
- **The specific purposes of the Program will be to build a national disaster risk management system with the necessary capacity and clear responsibilities to reduce the existing risks, to avoid the creation of future risks, and respond more efficiently to disasters.**
- **The Action Plan for implementation of the National DRM Program currently under development is in full accordance with the Sendai Framework’s 4 priorities for action**
- **In late 2015 Serbia finalized drafting of its first Law on Disaster Risk and Crisis Management and the Law on Reconstruction Following Natural and Other Hazards**
- **With these laws and the DRM Action Plan, Serbia aims to be one of the first countries in the world with the DRM legislative framework fully aligned with the Sendai Framework for Disaster Risk Reduction**

In the last 10 years, the Republic of Serbia was hit by four big natural disasters, of which two were floods and the other two were earthquakes. These events served as a warning and a reminder that a more serious approach is required to implement prevention measures, such as planning and realization of investments based on risk awareness.



DISASTER RISK MANAGEMENT FRAMEWORK

During the recovery process after the May 2014 floods, the Government started developing a systemic approach towards prevention and disaster risk management facilitated by the Office for Reconstruction and Flood Relief. With that in mind, in November of 2014, the Government first extended the mandate of the Office to cover prevention, in addition to recovery. In December of 2014 the Government (with the support from the WB, EU, UN and Government of Switzerland) passed the National Disaster Risk Management Program,⁷³ a comprehensive program for disaster resilience, intended to be used as an umbrella framework to coordinate, channel funds, and implement activities related to reducing and managing risks in Serbia.

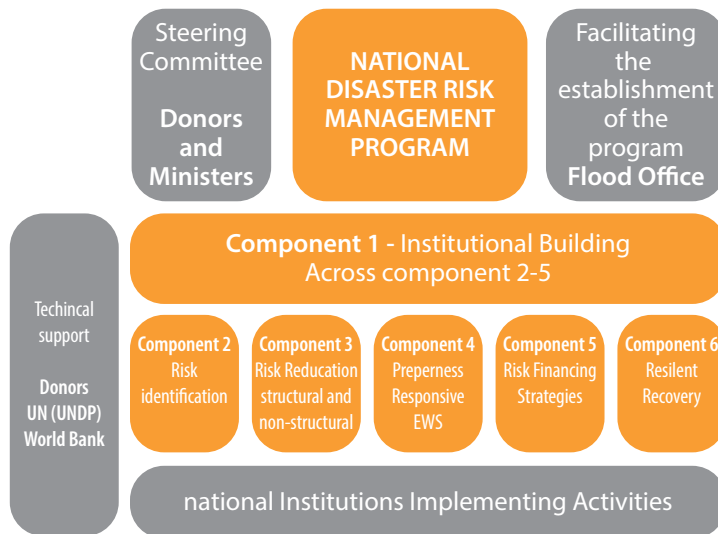


Figure 28: Outline of National Disaster Risk Management Program of the Republic of Serbia

Only 7 months after the disastrous flooding, the Government has managed to shift its focus from recovery toward prevention. The main goal of the program is to improve the system in place, by revising the current procedures and practices and by introducing new approaches. The specific purposes of the program will be to build a national disaster risk management system with the necessary capacity and clear responsibilities to reduce the existing risks, to avoid the creation of future risks, and respond more efficiently to disasters. The program will help mobilize international donor funding, facilitate coordination across donors and key stakeholders, and ensure that financing will be directed to prioritized investments. This program is funded by different funding mechanisms including a multi-donor trust fund specifically prepared for this purpose. The program lays out a framework with six components and will be implemented through annual work plans:

- 1) Institutional building;
- 2) Disaster risk identification and monitoring;
- 3) Structural and nonstructural risk reduction;
- 4) Early warning systems and preparedness;
- 5) Risk financing strategies; and
- 6) Resilient recovery.

One of the main specific purposes of the program will be to build a national disaster risk management system with the necessary capacity and clear responsibilities to reduce the existing risks, and avoid the creation of future risks, as well as to respond more efficiently to disasters.

In March 2015, at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Japan, the first major agreement of the post-2015 development agenda was adopted. The Sendai Framework for Disaster

73 Government of the Republic of Serbia (2014). National Program for Disaster Risk Management. Belgrade: Government of the Republic of Serbia, Regulation 05 No. 217-16233/2014-1



Risk Reduction 2015-2030⁷⁴ (“Sendai Framework”) outlines seven clear targets and four priorities for action to prevent new and reduce existing disaster risks:

- (i) Understanding disaster risk;
- (ii) Strengthening disaster risk governance to manage disaster risk;
- (iii) Investing in disaster reduction for resilience; and
- (iv) Enhancing disaster preparedness for effective response, and to „Build Back Better“ in recovery, rehabilitation and reconstruction

The Sendai Framework aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries over the next 15 years.

Even though the Serbian DRM Program was adopted before the Sendai Framework, one can clearly see an alignment between the 6 program components adopted by Serbia and the Sendai Framework’s 4 priorities for action. This alignment will be even more clearly visible in the Action Plan for implementation of the National DRM Program which the Government of Serbia is currently developing with help of UN and World Bank and in full accordance with the Sendai Framework’s 4 priorities for action.

As the next step, in late 2015 Serbia finalized drafting of its first Law on Disaster Risk and Crisis Management and the Law on Reconstruction Following Natural and Other Hazards. With these laws and the DRM Action Plan, Serbia aims to be one of the first countries in the world with the DRM legislative framework⁷⁵ fully

74 Full Sendai framework can be found at: http://www.unisdr.org/files/43291_sendaiframeworkfordren.pdf

75 The new legal framework has the following guiding principles:

- 1) Principle of priority – risk reduction and emergency management represent the national and local priority;
- 2) Principle of integrity – risk assessments and preventive measures and activities undertaken to prevent and reduce the risks of natural and other disasters;
- 3) Principle of intersectorial collaboration and partnership – management of natural and other hazard risks shall imply intersectorial collaboration and partnership among all stakeholder institutions and parties, including civil society organizations, within the multisectoral national platform;
- 4) Principle of the primary role of local communities - local self-government units shall have the primary role in managing natural and other hazard risks, supported by competent state and provincial institutions;
- 5) Principle of protection of human rights – all authorities and other parties participating in the implementation of measures and activities to manage natural and other hazard risks shall consistently ensure protection of human rights, gender equality and especially protection of the poor, old, children, disabled persons, refugees and displaced persons, and also of other vulnerable groups of population;
- 6) Principle of notifying the public – provision of information to the public about natural and other hazard risks and also about the measures to protect against their consequences;
- 7) Principle of the right to protection – everybody is entitled to protection against the consequences of natural and other hazards without any discrimination, while the protection of human lives shall take priority over all other protection and rescue activities;
- 8) Principle of gradual deployment of forces and resources – in protection and rescue activities, forces and resources of the subject local self-government unit are deployed first, and in cases when the forces and resources are not sufficient - the relevant authority ensures deployment of other forces and resources from the territory of the Republic of Serbia, including the Police and the Serbian Armed Forces when necessary;
- 9) Principle of solidarity – the citizens affected by the consequences of a natural and other hazard shall be entitled to humanitarian and state aid;
- 10) Principle of equality in exercising the right to state aid – all citizens shall be entitled to exercise the right to state aid without any discrimination whatsoever;
- 11) Principle of gender equality – ensuring observance of the principle of gender equality;
- 12) Special protection of vulnerable groups – when responding to requests and allocating state aid, the precedence shall be given to disabled citizens, seriously ill persons, single parents, beneficiaries of social assistance, Roma citizens, retired persons, women and the unemployed;
- 13) Principle of assisting an illiterate party – the body receiving the requests for state aid shall provide all required assistance to illiterate citizens;
- 14) Principle of efficiency and cost-effectiveness – the competent authority shall undertake every action without any delay and at the lowest expense possible;
- 15) Principle of conscientiousness and honesty – all participants in the procedure shall establish crucial facts conscientiously; and
- 16) Principle of building back better – the authorities participating in the preparation and implementation of reconstruction shall make efforts so that the reconstruction process would implicitly include construction of a better system which would improve the society’s and infrastructure’s resilience to natural and other hazard.



DISASTER RISK MANAGEMENT FRAMEWORK

aligned with the Sendai Framework. On the basis of the acquired experience and detailed analyses conducted following the May 2014 floods, the expert team with external support from UNDP and the World Bank started drafting the laws establishing a systemic solution both in terms of prevention, risk assessment and reduction, and in reconstruction and provision of assistance in the wake of natural and other disasters.

Based on the Law, a new national authority, Department of Risk and Emergency Management will be established to perform public administration activities in the area of natural and other hazard risk reduction and emergency management (and other activities specified by the Law). Being a multi-sector national platform, the Department is intended to represent a national mechanism coordinating and aligning the activities of all parties in natural and other hazard risk reduction and emergency management at the national, provincial and local level, ensuring their participation in the decision-making process, encouraging partnership and coordination between the public and private sector and civil society organizations and academic community relevant to natural and other hazard risk reduction and management of emergencies.

Proposed draft laws explicitly designate risk reduction priority as the key principle by introducing new legal institutes and provisions aligned with the legal framework of the Republic of Serbia, Kyoto Protocol to the United Nation Framework Convention on Climate Change, Sendai Framework for Disaster Risk Reduction, with the Checklist on Law and Disaster Risk Reduction and relevant EU directives. In order to ensure efficiency, the laws explicitly establish the tasks, roles and responsibilities of all relevant institutions from the national to the local level. By setting up the Department as a multi-sector national platform, the Government will be ensuring a sufficiently high level within the system of public authorities to effectively coordinate with other public authorities in order to reduce the risks, from the national to the local level. The laws include legal provisions aimed at increasing the safety and reducing vulnerability, specifically in the areas regulating spatial planning and construction, utilization of real estate, environmental protection, climate change, social care and education. The intended Laws introduce new institutes, such as Risk Reduction Plans,⁷⁶ Risk Register,⁷⁷ High Risk Zones,⁷⁸ and Immediate Risk Zones.⁷⁹ Responsibilities and authorities have

76 Risk Reduction Plans" are the plans of specific preventive, organizational, technical, financial, normative, supervisory, and educational and other measures and activities the relevant public authorities and other parties, on the basis of assessment of certain risks, shall undertake in future in order to reduce the risks of natural and other hazards and mitigate their consequences.

Risk Reduction Plans shall be adopted separately for the territory of the Republic of Serbia, autonomous provinces and local self-government units, while the measures and activities laid down in the plan shall be aligned and submitted to the Department for approval purposes. Should the Department establish that a risk reduction plan is inadequate in terms of its content and methodology, it shall not grant its approval. Should the competent authorities fail to adopt the risk reduction plan within the deadline and in the manner stipulated by the Law, the Department shall prepare the plan at the expense of the self-government and submit it to the competent authority for implementation purposes. Relevant public authorities whose scope of activity includes protection of infrastructural facilities and systems of national, provincial and local importance (educational and medical institutions, facilities accommodating a large number of people, water supply facilities, energy generation facilities, roads, commodity reserves, food and water security reserves, etc.) shall adopt risk reduction and special critical infrastructure protection and strengthening plans.

77 Risk Register" is an interactive, electronic, geographical and informative database for the territory of the Republic of Serbia kept by the Department of Risk and Emergency Management.

78 High Risk Zones" are geographical areas with a high risk of occurrence of significant natural and other hazard consequences. In high risk zones, risk reduction measures and activities laid down by risk reduction plans shall be implemented according to their priorities. In high risk zones, certain activities may be limited or made conditional upon undertaking of special risk reduction measures, if those are activities may cause new or increase the existing risk factors.

79 "Immediate Risk Zones" are geographical areas with a high level of certainty that a natural or other hazard will occur with long-term consequences which would be hard to eliminate, while protection and rescue measures will be significantly difficult to implement. In immediate risk zones, activities causing new or increasing the existing risk factors (excavation and other earthworks, facility construction and installation, etc.), and also activities which may expose people and material goods to serious consequences (disposal, parking, gathering of a large number of people, events, etc.) shall be prohibited, except when previously approved by the permit issued by the Department.



been stipulated for all participants in the early warning system, namely for public authorities, local bodies, telecommunication and media companies, scientific institutions, civil organizations and others. Draft laws give special consideration to gender, sex and special needs of highly vulnerable groups.

11. RECOMMENDATIONS AND CONCLUDING REMARKS

- **The floods of May 2014 made evident a number of vulnerabilities of the Serbian population and economy. For strengthening the Serbian DRM system, recommended actions include:**
- **Multi-hazard risk assessment, mapping and monitoring, and Serbia should also promote risk-informed urban planning and land management to avoid locating homes and production activities in flood-prone areas**
- **Increase the scope of funds both for maintenance and rehabilitation of the existing system of protection and also for implementation of new works and measures**
- **Increase financial resilience by promoting disaster risk financing strategies, including disaster risk transfer and insurance, and introducing ex-ante financing mechanisms**

According to the Global Assessment Report (“GAR”) for 2015, economic losses from disasters such as earthquakes, tsunamis, cyclones and flooding are now reaching an average of US\$250-300 billion each year. Future losses (expected annual losses) are now estimated at US\$314 billion in the built environment alone. This is the amount that countries should set aside each year to cover future disaster losses. Additionally, the global average annual loss is estimated to increase up to US\$415 billion by 2030 due to investment requirements in urban infrastructure alone. However, this growth in expected losses is not inevitable. UNISDR estimates that annual investments of US\$6 billion in appropriate disaster risk management strategies could generate benefits in terms of risk reduction of US\$360 billion. This is equivalent to an annual reduction of new and additional expected losses by more than 20%. Such an annual investment in DRR represents only 0.1 per cent of the US\$6 trillion per year that will have to be invested in infrastructure over the next 15 years.⁸⁰

The direct **benefits of investing in disaster risk reduction is the avoided costs of disasters**. There are also a **number of associated or extended economic benefits of undertaking disaster risk reduction activities**. For example, flood protection structures can provide bases for irrigation or potable water and hydroelectric power. Another example is that improvements in civil society networks and linkages can improve governance and stimulate more organized social structures. However, it is very important to incorporate risk reduction into a broader national investment and development agenda. This helps to overcome the perception that disaster risk management competes for scarce budgetary resources with other infrastructural projects. Instead, all new investment should be risk-informed, so that disaster risk reduction is well integrated and contributes to an improved economic and social environment. There are some good examples for this: (i) well-designed and drained roads that do not trigger landslides or floods will permit the smooth transportation of goods and people at all times; and (ii) safe schools and hospitals will ensure the security of children, patients, educators and health workers against earthquakes or fires.

80 UNISDR, (2015), The Global Assessment Report on Disaster Risk Reduction (GAR)



RECOMMENDATIONS AND CONCLUDING REMARKS

The floods which hit Serbia in May 2014 made evident a **number of vulnerabilities of the Serbian population and economy** that – in view of climate change – deserve special attention in the years to come. Some of the most pertinent recommendations for strengthening the Serbian DRM system are explored next.

1. In line with the **Sendai Framework Priority 1: Understanding disaster risk**, policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics, and the environment. Such knowledge can be leveraged for the purpose of pre-disaster risk assessment, for prevention and mitigation and for the development and implementation of appropriate preparedness and effective response to disasters. In this context Serbia should engage in a multi-hazard risk assessment, mapping and monitoring. The country should also promote risk-informed urban planning and land management to avoid locating homes and production activities in flood-prone areas. These are some of the envisaged activities to be carried out under Component 2 - Disaster risk identification and monitoring of the National DRM Program.

2. When it comes to the **Sendai Framework Priority 2: Strengthening disaster risk governance to manage disaster risk**, Serbia has already taken important steps in developing a systemic approach towards prevention and disaster risk management. As we showed in Chapter 10 of this study, the adoption of a **National Disaster Risk Management Program** and drafting of the country's first **Law on Disaster Risk and Crisis Management** and the **Law on Reconstruction Following Natural and Other Hazards** represent very important policy achievements. However, a lot remains to be done to develop and implement disaster risk reduction strategies and plans, especially on local level. Serbia could dedicate more effort to empower local authorities, through regulatory and financial means, to work and coordinate with civil society, communities and private sector in integrating disaster risk management practices into everyday activities.

3. Watson et. al.⁸¹ argue that the more DRR is effectively and efficiently integrated into sustainable development, the less easy it is to track, creating difficulties for allocating resources, adding that data on national expenditure for DRR are scarce. Nonetheless, it is evident that the existing system of flood, erosion and torrent control structures in Serbia is inadequate. The **Sendai Framework Priority 3: Investing in disaster risk reduction for resilience** states that public and private investment in disaster risk prevention and reduction through structural and non-structural measures are essential to enhance the economic, social, health and cultural resilience of persons, communities, countries and their assets, as well as the environment. This priority for action is compatible with Component 3 of the Serbian DRM program related to structural and non-structural risk reduction measures. For the purpose of flood risk prevention and reduction, it is necessary to **increase the scope of funds both for maintenance and rehabilitation of the existing system of protection and also for implementation of new works and measures**. These include complex, long-lasting and expensive activities (including the selection of the optimum concept and technical solutions, drafting of technical documentation, resolution of ownership and legal issues, adoption of planning acts, and, most importantly, the provision of financing for the entire process). Even though all levels of the Government (including the national level, the provincial level for Vojvodina and at the municipalities) participate in water management financing, available **resources are insufficient and unpredictable**. This also hinders planning and preparation for the next investment cycle in the construction of protective systems, thus increasing levels of flood risk in the years to come.

The management of PWMCs agree that reintroduction of earmarked revenues (drainage fee, irrigation fees, and water facilities usage fees) as direct revenues of the Water Management Fund would be a key step

81 Watson, C., Caravani, A. et. Al., (2015), Finance for Reducing Disaster Risk: 10 Things to Know, ODI



in solving the financial issue of the sector. However, this solution has to be aligned with the Ministry of Finance's public finance management strategy that envisions centralization of all tax and non-tax revenues in the budget. **Presenting the importance of risk management and advantages of investment in prevention rather than paying high reconstruction costs should be a priority.** The Water Management Fund would potentially most benefit from reliance on longer term financial planning of budgetary funds and project loans. In times of economic hardship, **gradually increasing budgetary funds**, within a fiscally sustainable overall envelope for DRM would be the best strategy for the water management system going forward. As most of the expenses are related to capital expenses and construction projects, **long-term financial planning is crucial.**

4. Another important gap identified as a consequence of the May 2014 floods is that Serbia has to **develop a robust disaster risk financing strategy.** This should be carried out under Component 5 – Risk Financing Strategies of the National DRM Program and **in line with the Sendai Framework Priority 3: Investing in disaster risk reduction for resilience**, to promote mechanisms for disaster risk transfer and insurance, risk-sharing and retention and financial protection, as appropriate, for both public and private investment in order to reduce the financial impact of disasters on Governments and societies, in urban and rural areas. Donors especially emphasized the necessity for **development of disaster insurance market in Serbia**, as hardly any household or business affected by the floods had disaster insurance coverage. Implementation of other **ex-ante financing mechanisms is also a prudent way to increase financial resilience** and reduce reliance on donor funds. In general, international aid is not the most reliable source of funds for disaster related financing and even though it was generous after the floods in May 2014, the response of the international community might be significantly lower after a future major disaster. Serbia has to focus on improving its disaster-related financing mechanism and to reduce fiscal exposure of the Government by systematically supporting the private insurance market.

5. In Serbia, the year 2014 may have needed to be the year of recovery and reconstruction after the devastating floods. The process that Serbia is undergoing at present is not only about building back, but about building back better, in line with the **Sendai Framework Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.**

Much like the year 2015, the years to follow will be the years of preparedness and prevention. Serbia needs to build upon the good things achieved, as well as upon the mistakes made so as to avoid repeating them again. The floods of 2014 have caused the country to realize that a single disaster can render meaningless considerable investments into development. Not nearly enough, as we have shown in this report, has been invested in prevention. Lessons learned from the floods of 2014 include the need to further strengthen disaster preparedness for response, take action in anticipation of events, integrate disaster risk reduction in response preparedness and ensure that capacities are in place for effective response and recovery at all levels. However, since the floods of 2014, the country has shown full commitment to put prevention at the top of its development agenda. In addition to policy changes, in 2015 alone, Serbia commenced implementation of DRM projects worth at least €70 million. This is a start towards addressing recovery, and prevention, but a long ways from the finish.



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