



## Post disaster recovery practice in Serbia 2010-2020

Sandra Nedeljkovic<sup>1</sup>, Zeljko Zugic<sup>2</sup>, Dejan Dragojevic<sup>3</sup>

<sup>1</sup> Deputy Director, Public Investment Management Office, Serbia, [sandra.nedeljkovic@obnova.gov.rs](mailto:sandra.nedeljkovic@obnova.gov.rs)

<sup>2</sup> Project Coordinator, Public Investment Management Office, Serbia, [zeljko.zugic@obnova.gov.rs](mailto:zeljko.zugic@obnova.gov.rs)

<sup>3</sup> Senior advisor, Seismological Survey of Serbia, [dragojevic.dejan@yahoo.com](mailto:dragojevic.dejan@yahoo.com)

### Abstract

Paper summarises post disaster recovery practice in Serbia in the last decade. In the last few years (2015 - 2020) in the Republic of Serbia, several important documents (laws, bylaw, official instructions and risk assessment reports) have been adopted, which represent the basis for future methodology for assessing damage from natural and other disasters. Assessment of the building structures represents the most important step, and requires involvement of various engineering fields, that has been seen during recent disaster events like Kraljevo Earthquake (2010) and Floods (2014). In conclusion, the regional institutional cooperation has been stressed as important factor considering similar seismological, geological, hydrological conditions and building practice.

**Key words:** disaster risk reduction, earthquakes, floods, landslides, damage assessment, recovery

# 1 Introduction

The territory of Serbia is highly vulnerable to various types of natural hazards. Serbia is located in the central area of the Balkans and all enumerated geotectonic forms of African convergence and Eurasian plates have a direct or indirect impact on active tectonics in its area and thus on seismicity.

In May 2014, Serbia suffered the most severe flooding in 120 years. The disaster affected 22 % of the total population and was estimated to have cost 4.8 % of Serbia's GDP. As illustration of the impact of the floods, it caused the Serbian economy to contract by 1.8 % in 2014, in contrast with a projected growth of 0.5 %. Additionally, 30 % of the country is at risk from landslides. The Average Annual Loss (AAL) from droughts alone is estimated at 1.4 % of the country's GDP.

With two disasters in different seasons of the same year, 2014, and obvious signs of climate change over a period of years, it was clear that changes were necessary in Serbian institutional, strategic and legal framework regarding disaster risk management. Serbia needs to shift focus from being reactive, responding when disaster occurs, to being proactive, focused on preventive activities and risk-informed planning and investments. The National Strategy for Protection and Rescue had been adopted in 2012, however it was not followed by an Action plan that would secure its implementation. Based on Strategy goals, lessons learned in 2014 floods and based on the Sendai 2015-2030 Framework, the Government adopted the National Disaster Risk Management Program in December 2014, as a comprehensive program for disaster resilience. This program aims to be an umbrella framework to coordinate and implement activities and channel funds related to reducing and managing risks in Serbia.

One of the main specific purposes of the Program is 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. "Strike while the iron is hot" had been in mind of the decision makers, as the disaster events provided the opportunity to improve and systematize disaster risk management in Serbia. Thanks to the Program, Serbia has advanced the Disaster Risk Management agenda in the country by revisiting existing practices and introducing new approaches. The Program will support the government's efforts to better comply with the EU Acquis, notably the Water Framework Directive and the Flood Directive, Climate Change Directive related to adaptation to changing weather conditions, and the Civil Protection Directive. It will not only aim to foster solutions at local and/or national scale, but will also help strengthen the regional platforms for cooperation and river basin management necessary to manage water and floods in the trans-boundary river basins, of which Serbia controls only parts (Danube river, Sava, Drina, Tisza, etc.).

At the end of 2015, the National Assembly has passed the Law on Recovery Following Natural and Other Disasters that became a standard for any disasters that can strike the country. At the same time, the Office for Reconstruction and Flood Relief was trans-

formed into The Public Investment Management Office. Having completed the reconstruction after the 2014 floods, the Flood Relief Office was transformed from an ad hoc body into a permanent one with broader competences.

The Action plan for implementation of National DRM Program for period 2017-2020 was adopted by the Government in March 2017. The preparation of the Action plan was coordinated by the Public Investment Management Office (PIMO) with participation of all line ministries, special organisations, local self-governments, NGO's, and other stakeholders in the country. Along with the Action plan, Disaster Risk Financing Program has also been adopted. Two years after the disaster, Serbia has a consensus-based plan detailing measures, expected results and activities to prepare for respond to and recover from disasters resulting from natural and manmade hazards.

Serbia have a comprehensive disaster risk management system in place, meaning that a solid inter-institutional coordination system is established, resilient to disasters caused by natural and man-made hazards. The action plan will be inclusive, gendered, and will address the needs, people with disabilities and vulnerable groups such as children and the elderly. The components are set in line with the four priorities of the Sendai Framework for Disaster Risk Reduction 2015-2030.

Going forward, a Law on Disaster Risk Reduction and Crisis Management has been developed, based on international standards, the Sendai Framework and the experience that Serbian institutions had gained in severe disasters of 2014. After a comprehensive discussion among all stakeholders and public hearings completed in December 2017, the Law on DRR has been officially adopted in 2018 [3].

## 2 Institutional framework

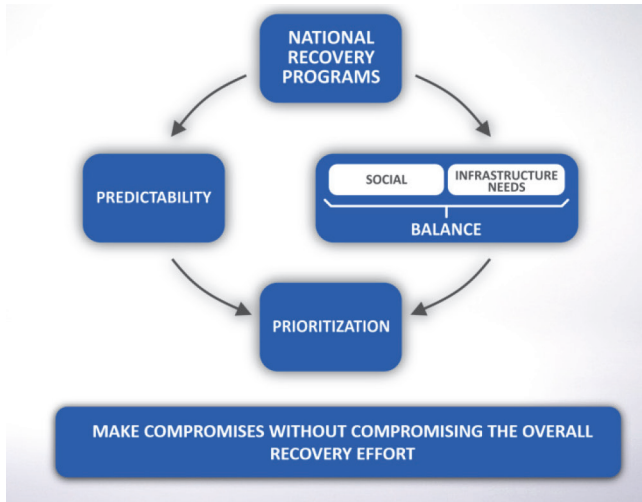
Public investment management office (former Office for Reconstruction and Flood Relief) was established after the floods in 2014 as an operative (not political) national authority for relief and recovery. Key responsibilities of the Public investment management office are:

- Data collection, processing and verification
- Drafting of National Recovery Programs by sectors (including detailed information on damages, proposed measures and cost estimates)
- Fundraising (Office as the key focal point for donors and lenders)
- Coordination of aid disbursement
- Supervision of implementation (including public procurement)
- Approval of payments
- Ensuring transparency through reporting (to the Government, general public and donors)

Damage assessment in Republic of Serbia is defined in the following procedure: the local self-government unit shall without delay form the required number of commissions

that assess the damage caused after natural and other disasters on citizens' property in accordance with the act regulating the uniform methodology for assessing damage from natural and other disasters, adopted by the Government.

The local self-government unit takes care of the uniform and harmonized application of the act on the unique methodology for the assessment of damage from natural and other disasters.



**Figure 1. Government response to natural disasters**

Damage assessment verification is defined by law in the following manner: the Public Investment Management Office verifies the damage assessment performed by commissions formed by the local self-government unit.

Article 17 of the Serbian law [2] defines verification process as an expert procedure which implies confirmation of the correctness and accuracy of the damage assessment performed by the commissions formed by the local self-government unit, based on the act on the unique methodology for the assessment of damage from natural and other disasters.

The Public investment management office organizes the procedure of verification of the damage assessment and determines its scope. If irregularities are found in the verification procedure, the Public investment management Office will inform the local self-government unit with binding instructions on how to correct the irregularities. If the irregularities are large, the Office will take over the organization of the damage assessment at the expense of the local self-government unit.

### 3 Larger disasters in last decade

#### 3.1 Kraljevo Earthquake 2010

The 2010 Serbia earthquake [7] (also referred to as the Kraljevo earthquake) occurred on 3 November in central Serbia just several kilometres from Kraljevo. The earthquake had a magnitude of 5.5 and a maximum Mercalli intensity of VII. In figure 1. is shown comparison of this event to other events in Serbia since 1978 in terms of damage and casualties.

The findings of Marinkovic et al. [1] shown there were no major bottlenecks in the Kraljevo recovery process. One reason was the slow rate of funding that stretched the duration of the repairs.

The second reason is that the earthquake did not cause large volumes of construction work that could not be absorbed by the local construction resource capacities. The only observed bottleneck in handing out construction materials was resolved by giving the homeowners a choice between picking up materials at the central warehouse or receiving money to buy materials elsewhere. To plan future recovery efforts, it is essential to estimate the quantities of repair work in different earthquake scenarios and compare them to the local construction capacity. If bottlenecks are anticipated, the funding rate can be adjusted to match the possible rate of recovery or, with the help of the government, resources from other regions of the country can be mobilized.

| Date ↕     | Region ↕                         | ↕ Tiefe | ↕ Magnitude | ↕ Deaths | ↕ Total damage  |
|------------|----------------------------------|---------|-------------|----------|---|
| 03/08/2015 | Serbia (Kosjeric)                | 4 km    | 4.4         | 0        |    |
| 11/03/2010 | Serbia (Kraljevo)                | 55 km   | 5.5         | 2        |     |
| 09/29/1998 | Serbia (Belgrade, Ljig, Valjevo) | 49 km   | 5.5         | 1        |    |
| 09/07/1984 | Serbia                           | 41 km   | 4.7         | 0        |   |
| 09/10/1983 | Serbia                           | 22 km   | 5.1         | 0        |  |
| 05/18/1980 | Serbia                           | 57 km   | 5.8         | 0        |  |
| 04/13/1978 | Serbia (Brus)                    | 25 km   | 5.7         | 0        |  |

**Figure 2. The strongest earthquake events in Serbia since 1978**

If sufficient funding is immediately available, the recovery process can be shortened, but not beyond the ability to parallelize construction operations, and supply the required material, equipment and manpower considering the seasonal nature of construction work. This event, considering that mayor damage has occurred in one municipality stayed “local scale”, that beside plenty of advantages, shown several important disadvantages, primary in terms of control and verification of technical data and financial documents.

#### 3.2 Floods and landslides 2014

Contrary to Kraljevo earthquake, the floods and landslides in 2014 affected 24 municipalities. The methodology for assessment [5] that was utilised involves collecting available secondary information from different Government and private sources, verified

and supplemented by field visits by the assessment teams, to estimate the value and extent of physical assets destroyed and the changes in production flows of all affected activities. The all 24 municipalities were included in the assessment, which represent the most affected geopolitical subdivisions, as defined by the Government and extrapolations were later on conducted to expand the estimations to other, less affected localities. In addition to the field visits, special sample surveys of formal and informal industrial and commercial establishments were conducted to obtain first-hand information on damage, losses and needs, as well as to estimate the possible impact of the disaster on livelihoods, employment and income losses of the labour force. Table 1 summarises the results of conducted assessment.

**Table 1. Post disaster needs in Serbia Floods 2014 (World Bank document)**

| POST-DISASTER NEEDS, MILLION EUR |              |                |                |
|----------------------------------|--------------|----------------|----------------|
| SECTOR                           | RECOVERY     | RECONSTRUCTION | TOTAL          |
| Agriculture                      | 40.6         | 111.4          | 151.9          |
| Manufacturing                    | 18.5         | 51.7           | 70.2           |
| Commerce                         | 12.8         | 144.5          | 157.3          |
| Tourism                          | 0.5          | 0.7            | 1.2            |
| Mining and Energy                | 210.0        | 202.0          | 412.0          |
| Housing                          | 58.8         | 204.5          | 263.3          |
| Education                        | 2.0          | 4.3            | 6.3            |
| Health                           | 2.7          | 4.4            | 7.1            |
| Culture                          | 0.1          | 1.2            | 1.3            |
| Transport                        | /            | 128.2          | 128.2          |
| Communications                   | /            | 12.6           | 12.6           |
| Water and Sanitation             | 3.5          | 24.0           | 27.5           |
| Environment                      | 2.8          | 38.7           | 41.5           |
| Governance                       | 2.3          | 14.1           | 16.4           |
| Employment                       | 46.4         | /              | 46.4           |
| Gender                           | 2.0          | /              | 2.0            |
| <b>TOTALS</b>                    | <b>402.7</b> | <b>942.3</b>   | <b>1,345.0</b> |

Although in 2014 the larger area has been affected, the damage assessment and recovery process has been conducted in more consequent manner in comparison to Kraljevo Earthquake 2010. In parallel with the recovery, during 2014-2016 capacity building of local self-governments has been initiated, that is added value for local resilience. This fact stresses the importance of proper institutional framework in emergency situations. The sector for emergency management, Ministry of Interior as a central institution significantly has improved its capacities in both analytic and operative departments.

## 4 Technical questionnaires for damage report

The quality of all above listed data for any type of hazard depends strongly on quality and uniformity of damage assessment (in terms of engineering loss on building structures). At this moment, not many official damage questionnaires exist, and existing ones are not adopted in form of mobile phone application most suitable for quick data processing and georeferencing through the GIS platforms. The additional issue are internal procedures and specificities of several public companies (Public enterprise Roads of Serbia, Public enterprise Electric Power of Serbia, Serbia water authority...) that have its own technical manuals that need to be compatible with overall damage assessment methodology.

## 5 Conclusions

There are valuable improvements in the state of disaster risk reduction practice in Serbia in last decade. The several important law and bylaws has been adopted, relevant institutions have been established and existing ones has been strengthened. This is solid basis for future development and better results in disaster risk prevention, and quick recovery. The next step is developing official Manuals for Economic Evaluation of hazard Control investment, as well as the various technical questionnaires for different types of buildings (houses, roads, dykes, energetic infrastructure...).

The regional cooperation is essential considering similar seismological, geological, hydrological conditions of all countries as well as the similar language and culture. Efficient disaster risk management is based on partnership. Partnership among national institutions, agencies, local self-governments, NGOs, private sector, academic institutions and communities. Disaster risk management cannot be the job for government only. For the system to be efficient, the whole society needs to be involved and have a role of its own. Coordination and collaboration is a challenge not only in Serbia but world-wide. Investing in resilience stays at the top of development agenda for the years to come.

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