

Comprehensive Risk Assessment of Basic Services and Transport Infrastructure

101004830 - CRISIS - UCPM-2020-PP-AG

Exploitation, dissemination and communication

EXPLOITATION STUDY

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WP-6 | D 6.5

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1. Background

The deliverable D6.5 – Exploitation study enables sustainability of the project's outcomes, especially the risk and emergency management platform beyond the end of the project. It is related to the deliverable D6.2 -Dissemination strategy and deliverable D6.3 – Taylor made outputs. This report has been prepared according to the Annex I *Description of the Action of the Grant Agreement*.

2. National Risk Assessment Platform

2.1 National Crisis Management System (CMS)

According to the Crisis management law (2005), the Crisis Management System (CMS) in North Macedonia is established for: proposing decisions and providing ongoing consultations, coordination, timely response, efficiency and effectiveness in the use of resources in case of crisis, as well as ensuring timely and quality security assessment from all risks and hazards, i.e. providing the so-called "*All risk approach*". In accordance with the legal framework, the CMS is a mechanism that is completely within the competence of the Government of North Macedonia.

The basic functions of the CMS are performed by the bodies of the state administration, the armed forces, the protection and rescue forces, the bodies of the municipalities and the city of Skopje, Public enterprises and public services, companies, citizens, citizens' associations, the Red Cross, Non-Governmental and humanitarian organizations, the media, and other legal entities.

The schematic presentation of this organization of the National Crisis Management System is illustrated in the following Figure 1.

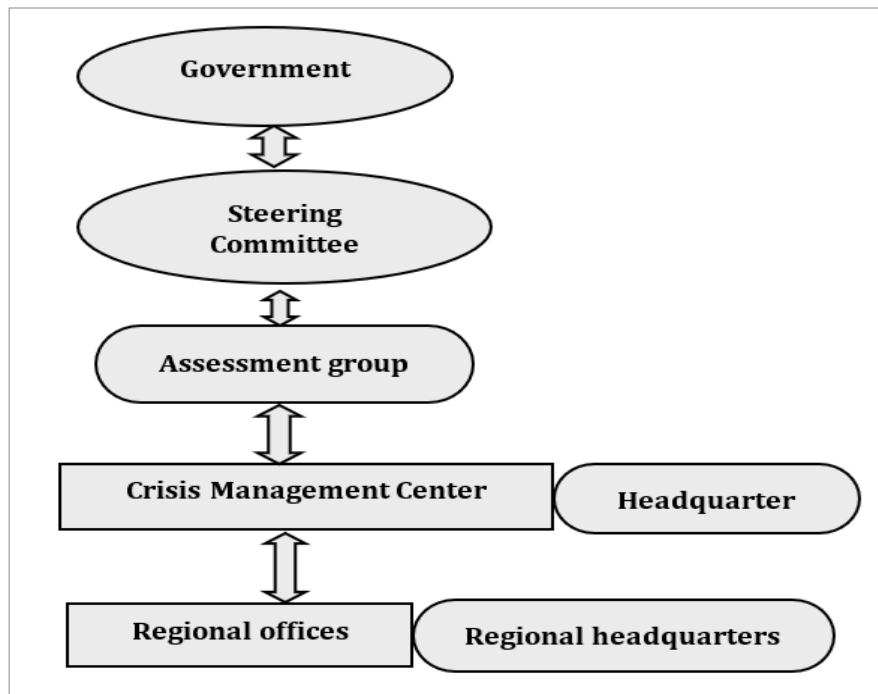


Figure 1. Organizational and institutional setting of the CMS in North Macedonia

2.2 Crisis Management Center (CMC)

Within the CMS an independent body, Crisis Management Center (CMC) is established, which is responsible for providing the necessary administrative, organizational and professional support to the bodies and entities in the CMS.

The CMC is the only body of the state administration, from the civil sector that has operational center with its own communication information system and telephone number for emergency calls E-112, in accordance with the standards of the European Union. In case of increased risk of crisis in the country or in certain parts of it, CMC implements activities for early warning and alerting of the entities in the system and the population, in order to prevent and reduce the consequences of all risks and dangers. CMC establishes a local organizational structure for crisis management through 35 Regional Crisis Management Centers, including the city of Skopje as a separate unit of local self-government (Fig. 2).



Figure 2. Spatial distribution and boundaries of the Regional Crisis Management Centers:
(Source: <https://bit.ly/3DcEmBi>)

2.3 National Risk Assessment and “E-Assessment” risk platform

The risk assessment process within the CMS is organized on a broader basis and it includes activities for identification of hazards, analysis and evaluation of all risk elements, which relate to the exposure, vulnerability and capacity of the system. In general, risk assessment is divided into two parts, general part and special part.

The **general part of the assessment** covers the elements that refer to: the general description of the objectives of the assessment; the territorial scope of the assessment (the areas of the municipalities and the city of Skopje and the Republic); administrative units on the territory and institutions of the crisis management system; their mutual interaction, communication, coordination and cooperation; sources of data and information, their evaluation and use, as well as mechanisms for their exchange; geographical, demographic and socio-economic data as elements of risk. The general part is a static or less variable part of the assessment, which contains the characteristics and specifics of the territory to which the assessment refers.

The **special part of the assessment**, refers to the changing categories, contains the dynamic phase, which is aimed at monitoring, identification, detection, detailed analysis and assessment of the existing hazards in the given territory, determining the present elements exposed to hazards and their vulnerability built environment (facilities, infrastructure, etc.), population, environment, etc., with quantitative and qualitative analysis and assessment of the ability of the crisis management system to prevent, warn, inform and alert, as well as to coordinate response and deal with consequences from various crises and crisis situations.

The degree of danger to the security of the society determined through the assessment, is:

1. First degree (green) means normal state of affairs (no risk).
2. Second degree (blue) means low risk (normal state of affairs with rarely manifested threats),
3. Third degree (yellow) means increased risk (possible beginning of a crisis or state of emergency),
4. Fourth degree (orange) means high risk and probability for a beginning of a crisis or state of emergency,
5. Fifth degree (red) means the highest risk and threat to the vital values (conditions exist for declaring a crisis or state of emergency)

To provide the necessary preconditions related to the systematization of data in modern and IT-supported databases, the City of Skopje and the country, have been organized in a modern and unique way, by establishing a Web based application system, through which all participants in the process of preparation of the assessment are connected, starting from local to national level.

This application system meets the necessary conditions for providing E-services in this area for all entities in the crisis management system_(Fig. 3).



Figure 3. Presentation of the web application Log in screen
(<http://procena.cuk.gov.mk/Login.aspx?ReturnUrl=%2f>)

This software solution integrates the necessary databases that are in function and correlate with the general and special part of the content of the assessment. In Figure 4 the database access page is displayed.

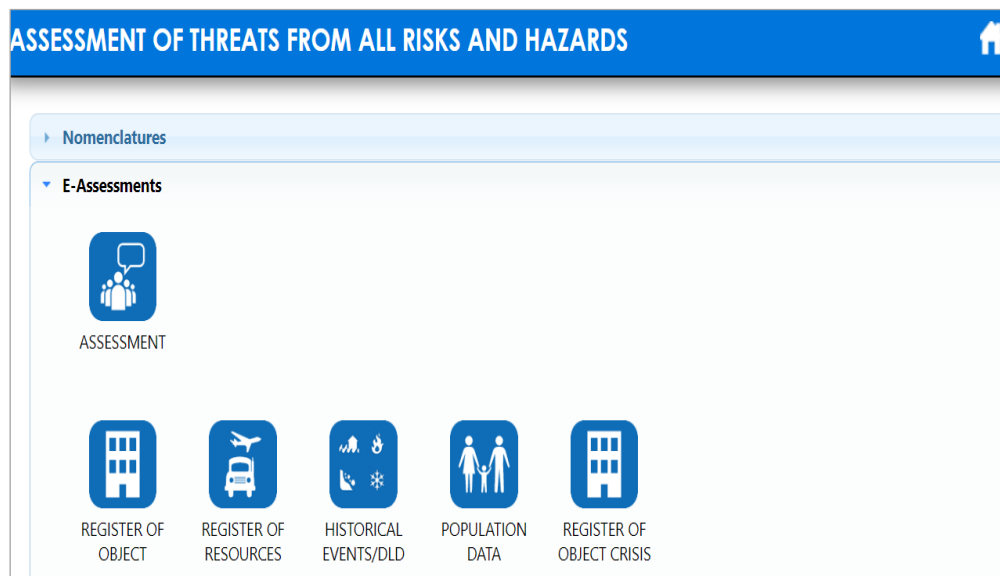


Figure 4. Database access page (<http://procena.cuk.gov.mk/Login.aspx?ReturnUrl=%2f>)

The databases systematized within this platform are shown in Figure 5. Each of these databases has its own purpose for different content parts of the risk assessment. For multifunctional data usage, these databases are integrated into a single Geographic Information System (GIS), where access is provided through a Web-based platform and services. With this, the Crisis management system has established a credible spatial data infrastructure for the purposes of the risk assessment, prevention and early warning process, which are the core competencies of the National Crisis Management System.

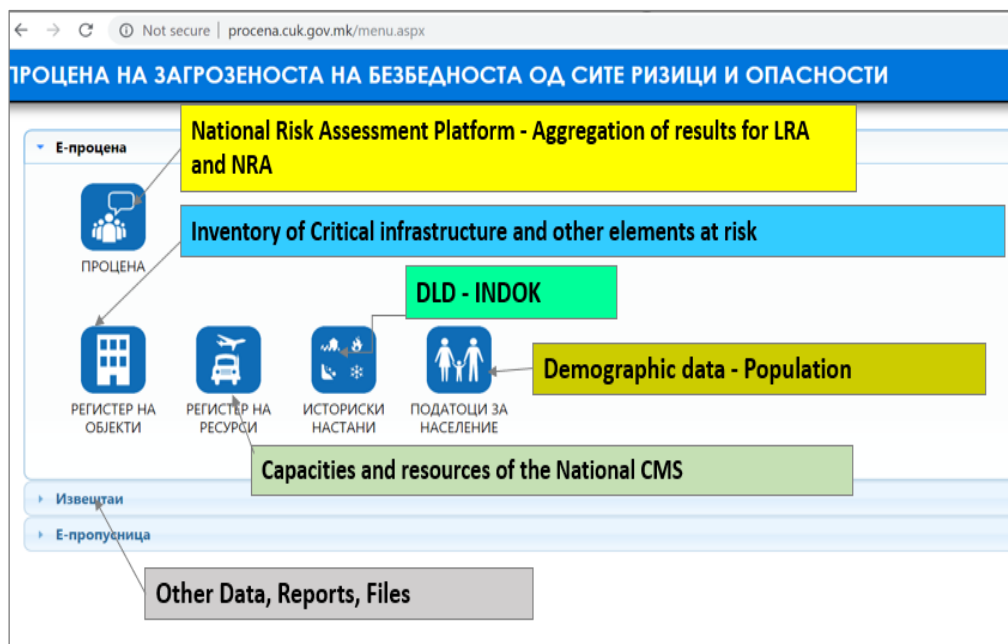


Figure 5. Database structure

To illustrate the performance of this platform and their connectivity with multipurpose CMC's GIS Platform, to show the usability of databases from the inventory of facilities, infrastructure and system resources, the Inventory map are presented below, (Fig. 6).

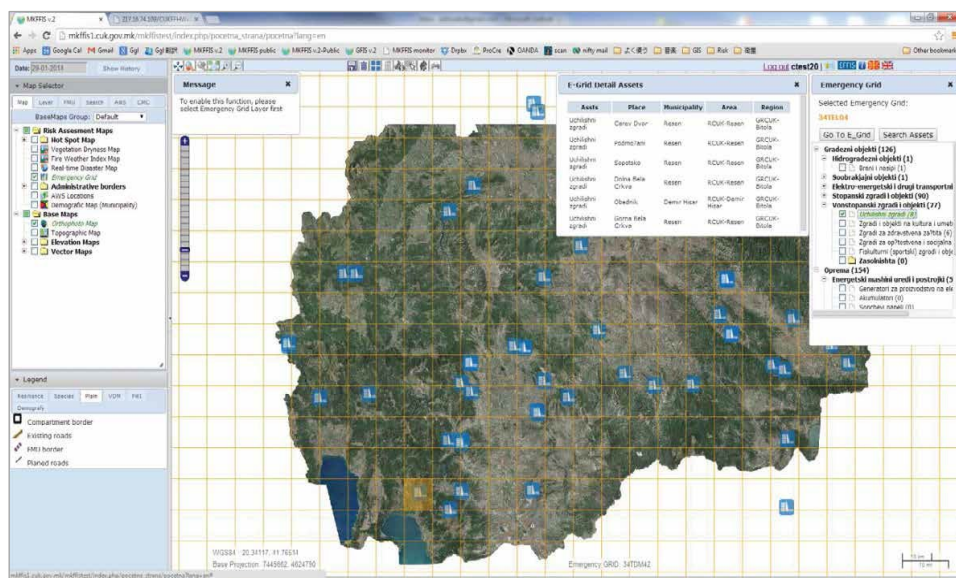


Figure 6. Inventory map of facilities and infrastructure
(<http://mkffis.cuk.gov.mk/broshura/MKFFIS-en.pdf>)

3. Implementation of CRISIS module in the National Risk Assessment platform

For the purposes of the Comprehensive Risk Assessment of Basic Services and Transport Infrastructure (CRISIS) project, the already achieved basis of the E-Assessment platform was used, as well as the experiences of its application in the daily duties of the CMC. Namely, from the existing "Register of Facilities" database, a certain set of data was extracted that refers to facilities of interest to the project, such as: schools, hospitals, seats of the Local Self-Government, Regional Offices of the CMC, Fire Departments units etc. (Figure 7).

REGISTER OF OBJECTS

SEARCH CRITERIA

Type of object

Municipality

Place

Attributes

A facility for educational purposes

Health care facility

A facility that houses the regional center of CMC

A facility in which a regional unit of the SSO is located

Facility in which TPPE is located

--Add a criterion--

Export CRISIS

Search

Clear

Save

Initial State

☐ Edit Columns

☐ Generate a report

Type of object	Place	Regional deaprtment-RCUK	Municipality	Region	Attributes	« Created	Last updated
A facility that houses the regional center of CMC	Bitola (Bitola)	RCUK-Bitola	Bitola	GRCUK-Bitola	1.Name and Surname of the person from the data source* [Dushko Hristovski], 2.Employee at* [PORKOA RCUK Bitola], 3.E-mail* [dusko.hristovski@cuk.gov.mk], 4.Contact phone number [075-317-759]	5.10.2021	5.10.2021 13:34
Health care facility	Bitola (Bitola)	RCUK-Bitola	Bitola	GRCUK-Bitola	1.Name and Surname of the person data source* [Kire Josifovski], 2.Employee at* [PJU Zdravstven dom Bitola], 3.E-mail address* [zdravstvendom.bitola@yahoo.com], 4.Contact phone number [072-272-192]	30.9.2021	30.9.2021 14:02
A facility for educational purposes	Bitola (Bitola)	RCUK-Bitola	Bitola	GRCUK-Bitola	1.Name and Surname of the Person data source* [Vladimir Dimovski], 2.Employee at* [OU Kiril and Metodij Bitola], 3.E-mail* [sv.kim.bitola@bitola.com], 4.Telephone for contact [075510041]	25.9.2021	25.9.2021 10:35
	Bitola (Bitola)	RCUK-Bitola	Bitola	GRCUK-Bitola	1.Name and Surname of the Person, source of data* [Peco Dimovski], 2.Employee at* [OU Dr. Trifun Panovski Bitola], 3.E-mail* [trifunpanovski@yahoo.com], 4. Contact phone	25.9.2021	25.9.2021 10:52

Figure 7. Register of Facilities of interest

The attribute data set for these selected basic services was upgraded by additional data, in accordance with GEM (Global Earthquake Model/Methodology) and based on that the *CRISIS Module* was created (Figure 8).

Figure 8. CRISIS Module Data set

Additional attributes for the CRISIS database are grouped into 7 sections:

- **Section 1** - General information about the person filling out the entry form, which includes the name and surname of the responsible person, working position, what is his professional background, email address and contact phone number,
- **Section 2** – Object data source, contains information about the data source that was used to fill out the form and whether project documentation is available for the specific facility,
- **Section 3** – Location, Material and Regularity, mainly information about the location of the object, what material it is constructed, the regularity of the object, etc.
- **Section 4** – Basic characteristics of the facility, which includes information about construction system, its ductility, the shape of the roof, the type of roof covering, the material of the roof and the inter-floor constructions, the construction system of the roof and the inter-floor construction, the external walls, the foundation, etc.
- **Section 5** – Purpose, capacity, year of construction, stories and placement, information about what the building it is intended for, the year of construction/reconstruction, number of floors underground (basements) and above ground, height of the ground floor, slope of the terrain, placement of the building in relation to the surrounding buildings and shape of the building,
- **Section 6** – Consequences and Exposure, containing the information about possible damage to the building and the reasons for their occurrence, the number of users during the day and night, the area of the building as well as the cost of building the building,

- **Section 7** – Building interventions (reconstructions, additions, upgrades, conversions, demolition), includes information about possible reconstructions, repairs, reinforcements and other construction works that were performed during the operational period of the building.

The CRISIS Module was applied to the area of 18 municipalities (Bitola, Bogdanci, Valandovo, Vevcani, Gevgelija, Debar, Debarca, Kavadarci, Mavrovo i Rostusha, Novaci, Novo selo, Ohrid, Prilep, Resen, Struga, Strumica, Centar Zhupa) from North Macedonia, which belonged to the CBR that included the project, and the data on the facilities of interest were collected and entered into the new module by officers from the Regional Crisis Management Centers (RCMCs), coordinated by main offices in Ohrid, Bitola and Strumica and supervised by CMC HQ Skopje.

4. Exploitation of the CRISIS module

Exploitation as a planned process of transferring the successful results of the CRISIS project is addressed to strengthening of capacities of CMC as well and CMS, from additional quality of risk assessments to appropriate decision-making process in regulated local, regional, national level and strengthening cross-border cooperation with neighbor countries.

- Expanding and Improving (qualitative and quantitative) of necessary databases with CRISIS module that are in function and correlate with the general and special part of the content of the local and national risk assessment enables a concrete link of the causative circle between the danger (as a probability of negative consequences) and the damages (as the final consequence of the negative impact of the danger) expressed on the population, the environment, specific objects, infrastructure or other valuables on the territory of the Republic of North Macedonia.

In general part, CRISIS module enables research, documentation and analysis of information and documents about accidents and disasters that occurred in the past and were caused by hazards characteristic determining/profiling potential sources of danger that could cause certain security threats to the RNM, the probability of occurrence (in time, place, intensity), with a scientifically and methodologically enhanced process of processing verified information in an organized and coordinated inter-departmental cooperation with the entities of the CMS and visualization of the findings from the Assessment, separate maps for profiled hazard, as well as other procedures and activities.

In the special part, CRISIS module improve determination of assessed exposure and vulnerability of the specific elements towards which the risk is directed such as: the special characteristics, specifics and circumstances of the individual, community, facilities and the systems that make them susceptible to the negative influences of harmful effects of given hazard, a qualitative and quantitative analysis of the values created, identification of the typology of the facilities and their number, infrastructure and critical objects that are sensitive to the particular hazard, a qualitative and quantitative analysis of the exposed population was carried out (gender structure, age groups, groups with special needs, etc.), the impact assessment (vulnerability and exposure) of the actual danger to facilities and infrastructure, the impact assessment (vulnerability and exposure) of the particular danger to the population, their lives and health, mortality and injuries, an impact assessment (vulnerability and exposure) of the institutions/entities of the CMS (capacity and capabilities) has been prepared, an assessment of direct, indirect and long-term physical and economic losses by categories of

considered risk elements, and a cumulative assessment and economic balance of the potential risk impact on the economy of the local and national level.

Final benefit is addressed to improve capacities and capabilities of the CMS for prevention, early warning and response to the assessed risk, with reviews being made for:

- departmental strategies, policies and plans for mitigation/prevention, dealing with the estimated risk, respectively, response resources (human, material, technical, etc.) existing on the territory of the Republic of Macedonia, assessment of needs (equipment) and departmental preparations (training, exercises) for the implementation of necessary measures and activities aimed at prevention, early warning and managing the assessed situation,
- coordination, communication and deciding on the use of measures and resources, through standard operating procedures, measures to deal with and eliminate the consequences of accidents and disasters, assessment of damages with expressed financial implications, and managing the revitalization after the elimination of the crisis.

Result of findings of local risk assessments and national risk assessment improved with CRISIS module enable taking timely concrete and complete measures, planning and budgeting of appropriate activities in the function of strengthening the capacities of the municipalities and the Republic and the CMS in general.

- Planned process related to benefits of CRISIS module will be addressed to achieve the following usable values:
 - informative value – informing and familiarizing various target groups, institutions and the population;
 - useful value in the crisis management process and supporting the decision-making system at the local and national levels;
 - strategic value – a basis for long-term activities, strategies, policies, plans and more;
 - tactical and operational value – activation of the system or its sections;
 - cooperative value – sharing data and information between subjects in the crisis management system;
 - partnership value – fulfilling its interests and respecting the interests of other institutions, as partners and associates as well and future programmes and initiatives, on the other hand.

5. Conclusions

- The additional attributes added by the CRISIS module contribute to the creation of a harmonized exposure model of basic services in the municipalities of the cross-border region with Albania and Greece
- Possibilities those attributes to be added for the other inventories in the Database of exposed infrastructure, facilities (register of objects)

- Possibility of qualitatively enriching the Assessment for the municipalities, the city of Skopje and the country, with more details about the buildings
- Harmonization with European and other standards in the area of interest

The Exploitation study presents 'live platform' which promotes the project outcomes not just to first responder agencies but to wider community. Practical implementation of project results into emergency management systems in CBR countries is not an easy task (strict laws procedures, administrative obstacles and permissions...), therefore cannot be done in a short period of time. Application of one module of Web based platform in Macedonian Risk Assessment platform, was very promising and encouraging us that we are on the right track. Although this implementation was far from easy task, but it is excellent example that it can be done, and it can be applied also to other national management systems in CBR. We just need to be persistent and work together on improvement and promoting of WBP to policy and decision makers and success will be inevitable, in the long term.

References

- [1] [Documents download module \(europa.eu\)](#) Grant Agreement-101004830-CRISIS.pdf
- [2] Law on Crisis Management (Official Gazette No. 29/05, 36/2011, 41/2014, 104/2015, 39/2016 and 83/2018).
- [3] Brzev S., C. Scawthorn, A.W. Charleson, L. Allen, M. Greene, K. Jaiswal, and V. Silva (2013), GEM Building Taxonomy Version 2.0, GEM Technical Report 2013-02 V1.0.0, 188 pp., GEM Foundation, Pavia, Italy, doi:10.13117/GEM.EXP-MOD.TR2013.02.