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PREPAREDNESS FOR REACTION IN EMERGENCY SITUATIONS IN THE CROSS-BORDER REGION

SILISTRA REGION - CALARASI COUNTY

AUGUST 2019



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Project „Joint Volunteering for a Safer Life“, e-MS code: ROBG-332

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This report has been commissioned by the Directorate-General for Fire Safety and Protection of the Population - Ministry of the Interior and prepared in the context of a public procurement with the subject: "Risk Analysis in the Cross-Border Region", in implementation of the project "Joint Volunteering for a Safer Life" "JVSF under the Cross-border Cooperation Program Interreg V - Romania-Bulgaria 2014-2020.



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ABBREVIATIONS

CBR - cross-border region

DGPBZN - General Directorate "Fire Safety and Protection of the Population"

EU - European Union

FMEA - Failure Mode Effect Analysis

GDP - gross domestic product

GIS - Geographic Information System

LAU1 - local administrative unit - municipality

MOEW - Ministry of Environment and Water

NSI - National Statistics Institute

NUTS III - Planning Region

RPN - Risk Priority Number (including priority risk)

RPND - comprehensive risk factor normalized for demographic factor

RPNF - comprehensive risk factor

RPNL - complex risk factor normalized for solvency of a particular municipality

RPNLD - comprehensive risk factor, normalized for the ability of the population to cope with emergencies

SMEs - small and medium-size enterprises



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1. Introduction

The degree of preparedness for reaction in different types of emergency situations, including in the context of international cooperation, depends on effective planning within the regional and municipal disaster protection plans, adequate evaluation of existing and potential risks, available resources (based on the evaluation of the risk) and efficient stakeholder collaboration.

The current analysis of these and other aspects (included within the report “Analysis of the Scale, Frequency, Geographical Concentration, Seasonality and Prerequisites for Disaster Events in the Cross-Border Region”) and the report “Analysis of Regional and Municipal Disaster Protection Plans for the Pilot Region (Silistra Region - Calarasi County)” could be used by the relevant stakeholders to:

- Lay the foundations for a comprehensive model for development of interoperable regional structures in the CBR, with the ability to undertake immediate action and organize local population in case of disaster event occurring, until the arrival of the unified rescue system forces;
- Provide specific guidance for developing a training program, including theoretical and practical preparation for volunteers from the CBR.

The objectives of the analysis will be achieved by analyzing the preparedness for emergency response in the cross-border region. This includes analyzing problems and opportunities, analysis of the current situation and potential opportunities for better cooperation, the degree of engagement of volunteers in the process, and discussion of relevant risk management data that could be used in future scientific research or projects.

Protecting the population is a key principle for community development. As such, the most effective training for emergency response should be based on stakeholders’ dialogue and cooperation. The report will thus identify concrete measures for boosting cooperation between local community, volunteers, civil society organizations, local and state authorities in the cross-border region Silistra-Calarasi.

2. Characteristic of the cross-border region (CBR) Silistra-Calarasi

2.1. Overview of the geographical characteristic

The eligible area of the Program covers NUTS III administrative regions or NUTS III and LAU1 equivalent regions located at the border between the two partner countries and covering the following regions:



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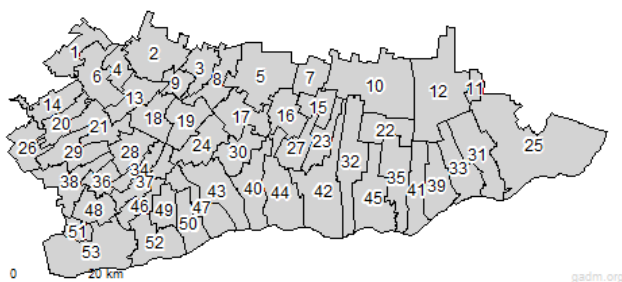
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In Bulgaria: Silistra District (Alfatar, Glavinitsa, Dulovo, Kaynardja, Silistra, Sitovo and Tutrakan municipalities)



In Romania: The administrative division of the territory (as of 31 December 2000) includes 3 cities and 2 municipalities, 50 communes and 160 villages. The county capital is Calarasi (Fundulea, Dragos Voda, Lehliu-gara, Nicolae Balcescu, Dragalina, Stefan Cel Mare, Perisoru, Sarulesti, Fundeni, Valcelele, Vlad Tepes, Lupsanu, Gurbanesti, Valea Argovei, Plataresti, Sohatsu, Stefan Voda, Independenta, Frasinet, Borcea, Frumusani, Alexandru Odobescu, Nana, Vasilati, Ulmu, Jegalia, Ceacu, Unirea, Luica, Model, Soldan, Curcani, Budesti, Dichiseni, Dorobantu, Rosetta, Gradistea, Manastirea, Ciocanesti, Calarasi, Mitreni, Chiselet, Ulmeni, Spantov, Cascioarele, Oltenita, Chirnogi).



The Bulgaria-Romania cross-border cooperation area, falling within the scope of the analysis, covers 7939.1 km² with a total population of 403 483 people. The eligible area in Bulgaria is 2.6% (2851.1 km²) of the total territory of the country. Respectively, the covered area in Romania is 5.088 km² or 2.13% of the total territory.



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The cross-border region is located in Southeastern Europe, in the northeastern part of the Balkan Peninsula. The geographical structure of the cooperation area includes plains, hilly areas and the Danube river basin. The total area of the CBR is 7 934.3 km².

The Silistra region encompasses the eastern plateau sub-region of the Danube plain, with the predominant relief being flat. The climate is moderate continental and falls mainly in the Danubian climate sub-region. **Calarasi county** is part of Sud - Muntenia (South - Muntenia) - a development region in Romania. Like other development regions, the area has no administrative powers, its main function being to coordinate regional development projects and to manage EU funds allocation and absorption. The region is located entirely in the historic district of Muntenia, headquartered by the Calarasi Development Agency. The whole territory is located in the southern part of the Bărăgan plain and is crossed by small rivers with deep valleys. On its southern and eastern sides is the valley of the Danube River, which on the eastern side divides into several branches, forming islands. On the west side are positioned the Arge and Dembovitsa rivers, forming a wide valley before flowing into the Danube.

The northeastern area of the cross-border region is parted by the Danube river and the far northeastern part of the Danube plain in Bulgaria. The area is characterized by moderate continental climate. The wind can be categorized with prevailing northeast-northwest circulation, accompanied by snowfall and ice during the winter. Precipitation (450-550 mm) is below average levels (650 mm). The climate of the area in the plain-hilly part is moderately warm and arid, and in the lowland - moderately hot and arid.

CBR water reserves include both surface and groundwater, and in particular the Danube river basin. Apart from the Danube, there are no high-water rivers in the Silistra region. There is only one significant artificial body of water - the Antimovo Dam, Tutrackan Municipality, as well as some shallow eutrophic lakes, the most important of which is Srebarna Lake. Karst lakes can be found often, with highly volatile water regime.

The cross-border region is not particularly rich in natural resources. The Silistra region has limited amount of mineral resources. On the valley slopes of the dry land, rock sections are revealed for building materials - limestone. Careers for the extraction of Cretaceous soft ornamental limestone for lining are found in the regions of Irnik (Sitovo municipality), Podles (Glavinitsa municipality), Zlatoklas (Dulovo municipality). Deposits of kaolin with a reservoir thickness of about 18 m (prospective for exploitation) have been studied at Kolobar village. On the banks of the Danube there are deposits of inert materials (gravel, sand).¹

¹ Bulgarian National Statistical Institute, 2019



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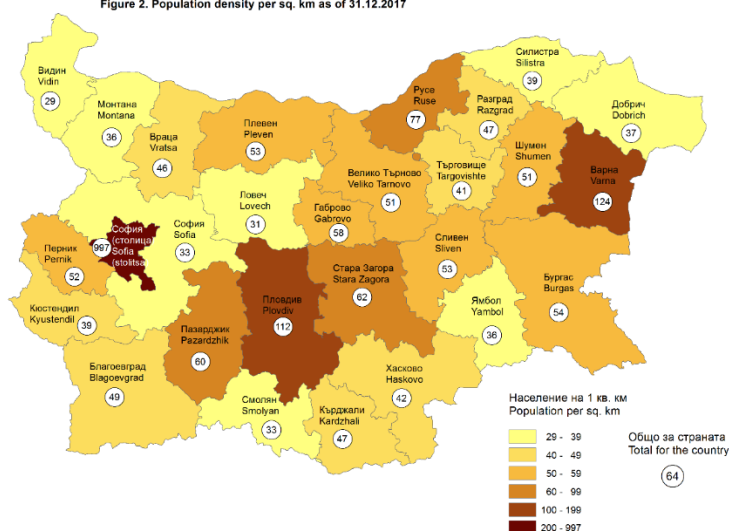
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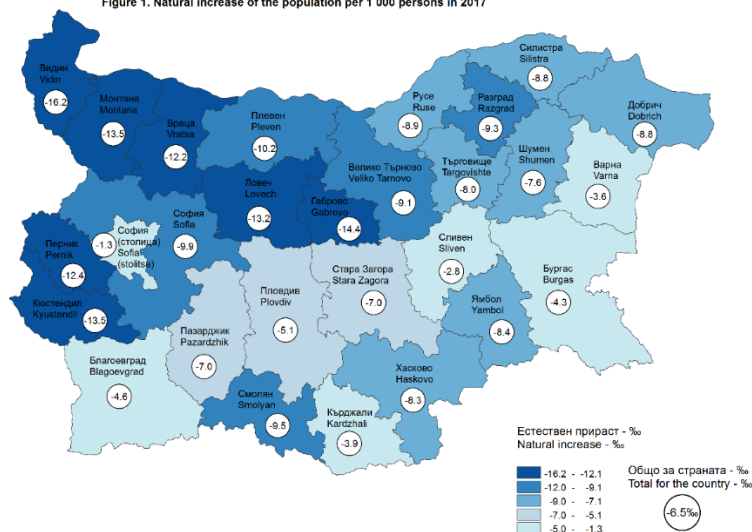
2.2. Demography and economic profile

The structure of the population varies. The population of Silistra region is 119 474 people, with an average density of 41.96 people / km². The district includes 118 settlements, united in 7 municipalities.²

Фиг. 2. Гъстота на населението на 1 кв. км към 31.12.2017 година
Figure 2. Population density per sq. km as of 31.12.2017



Фиг. 1. Естествен прираст на 1 000 души от населението през 2017 година
Figure 1. Natural Increase of the population per 1 000 persons in 2017



The population of Calarasi county is larger, 311 084 people, with the city of Calarasi being the most populated (76 147, as of 2018), followed by Oltenita (27 561). The demographic potential

² NSI, regional assessments. 2017



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of cross-border region is different for the two countries, but the main trend is the one of population decline. In recent years, the population of the Bulgarian side has been aging in line with the national trend. As a result, human capital for economic development, especially in urban areas on the Bulgarian side, is diminishing. Similar processes can be observed in the Romanian side.

Population - Calarasi county

	Total	Men	Women
Total population for Calarasi County	311 084	152 699	158 385
Total urban population	124 638	59 943	64 695
Calarasi	76 147	36 587	39 560
Oltenita	27 561	13 152	14 409
Budeshti	7 617	3 739	3 878
Fundulea	6 692	3 255	3 437
Lechli-Gara	6 621	3 210	3 411
Total rural population	186 446	92 756	93 690

Agriculture and forestry, food industry, wood processing and mechanical engineering are the main economic activities, providing employment in the Silistra region. The economic profile of the Calarasi county is clearly dominated by agriculture, metallurgy is also an important industry.



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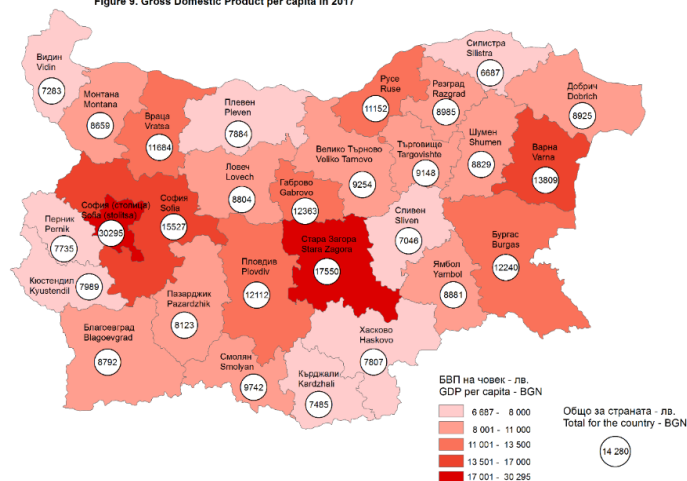


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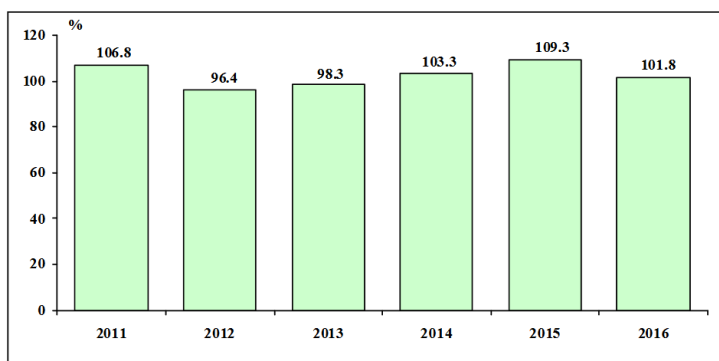
The industrial sector in the Bulgarian part of the CBR includes sub-sectors, such as agricultural machinery, electronics, food processing, woodworking; food and beverage production; etc.³

Фиг. 9. Брутен вътрешен продукт на човек от населението за 2017 година
Figure 9. Gross Domestic Product per capita in 2017



On the Romanian side of the CBR, dominant sub-industries include: metallurgy, food processing and textiles. The industrial production is diverse and is based on traditional activities, including raising poultry, animals, industrializing milk and meat; fish farming; cogeneration of feed; paper production; production of building materials and others: woodworking, metallurgy, gas production and storage, transportation and storage of oil and petroleum products, glass and fiberglass production, biodiesel production. The main industrial products include meat and meat products, clothing, milk and dairy products, steel, crude oil, precast concrete, furniture, paper, glass, mixed feed, sugar.

Industrial production for the 2011-2016 period (previous year =100-)



³ Socio-economic data, National statistical institute, 2019



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3. Risk analysis of floods and forest fires on the territory of the CBR

3.1. Overview of the existing risks of floods and forest fires in Bulgaria and Romania

Existing national and regional (at NUTS II, III levels) flood risk assessments in the CBR provide a general overview of the existing risks, which can be categorized as low-to-moderate, with the latter rising in the area of the Danube River basin.



Floods are among the most common natural disaster events in Romania. During the 1960-2010 period, about 400 significant floods occurred, 39 of which are considered significant historical events, based on hydrological criteria and criteria that take into account the extent of the negative effects of the floods. This includes 36 significant historic events for inland rivers and 3 for the Danube, with 375 areas identified as possessing significant risk of inland floods - 24 along the Danube. During this period, 237 casualties were registered (6.6 average casualties / events).⁴

Recent history of floods occurring in Romania demonstrates the major impact of this hazard on both population and infrastructure - floods in 2005 and 2006 affected more than 1.5 million people (93 deaths), destroying an important part of the infrastructure and causing and estimated damage of about EUR 2 billion.⁵

⁴ National Risk Assessment – RO RISK, 2016, National Inspectorate of Emergency Situations, Romania.

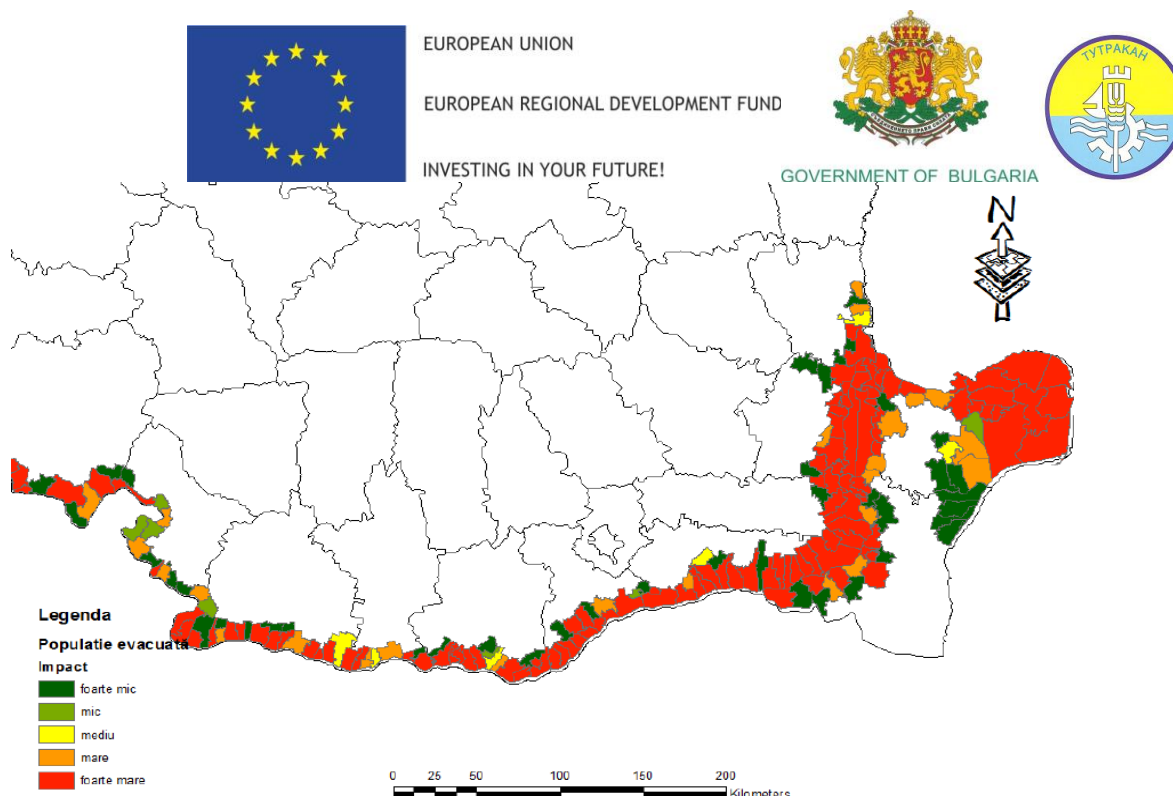
⁵ Country Report, Conditionality Romania, 2016 r.



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In terms of the **risk of forest fires** and historical data on the occurrence of fires, the Silistra region falls below national average. The total forested territory of the district covers an area of 63,276 ha or 1.51% of the forested territory of the country. The forested part of the forest fund is 59 348 ha, with relatively low afforestation - 20.85%. By category forest areas are divided into coniferous - 0.80%, deciduous - 92.99% and independent areas - 6.21%. Over 8% of the total forest area falls under class I for fire danger.

In the 2006-2015 period, 48 fires were registered in the forest territories of the Silistra region, with a total of 472.8 ha. damaged. The average annual size of a fire is 9.25 ha - 1.63 times below the national average. The average annual rate of burning of forest territories is 0.07%, or 3 times below the national average. By type of forest fires are divided into peak - 1,17% and low - 98,83%. The years with maximum values of fire activity are 2007 and 2012, when the size of the burned area exceeded the average for the period - 4.7 and 1.8 times respectively.

Analysis of previous evaluations and studies show that:

- On average, 0.008 forest fires occur on an area of 1000 ha, annually;
- On every 1000 ha, 0,75 ha are burned in the forest areas.⁶

In Romania, forests are usually located in the steepest and more inaccessible areas, in the context of worsened soil conditions. Forest fires occur mostly during the dry periods, especially in forests, located in the hilly subcarpathian region. Regarding the time and location of the fires, it was found that the highest registered rates are usually during the spring season (51%),

⁶ Lubenov, K., 2016, Assessment and mapping of forest fires risk in the country



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followed by summer (25%), fall (18%) and winter (6%). The seasonality of fires is correlated with dry periods, as well as with agricultural practices for burning plant waste. The size of the forest fund in Calarasi County is 22,000 ha.

Human presence and activity are the main causes for forest fires. This statement is also supported by the intracannual and spatial distribution of fire, which is more common in hilly areas in spring and autumn when agricultural burns occur for vegetation management. In the summer, most forest fires occur in the plains when burning stubble is common in the mountains, due to increased human activity in unpopulated areas.

On the territory of Romania, the likelihood and frequency of forest fires has doubled to 341 events / year over the last decade, compared to the historical (1956-2005) average of 175. Climate change is a possible cause of the reported increase. The average area burned has increased by 25%, from 5.2 to 6.5 ha over the same period. Trends in increasing frequency of forest fires and forest areas are consistent with studies showing that climate change is associated with an increased risk of fires.⁷

3.2. Approach to risk assessment

A primary goal of the analysis is to provide comparable, clear and actionable insights with regards to potential disasters and damages, as well as to assess the preparedness for disaster occurrence in the municipalities of the cross-border region. The most comprehensible and easy-to-use approach is through the GIS municipal maps in the CBR. To achieve this, the proposed method for assessing the risk for the population of the various threats is proposed, using a single system for expert assessment and analysis of the available data.

The R^kFMEA method is used for the purposes of data collection and for mapping the threats and risks and to identify areas that are susceptible to specific risks. It also provides useful information to the public. The method is an important planning tool for assisting the authorities and other stakeholders, and for improving the preparedness for reaction in emergency situations in the CBR.

3.3. FMEA and R^kFMEA

3.3.1. FMEA

The FMEA engineering method stands for Failure Mode Effect Analysis. It assesses the vulnerability to a defect or system failure and what it can cause to the entire system, the likelihood of it occurring, and the control and monitoring measures. The three factors are R, P and N, respectively, and are valued from 1 to 10. The original FMEA method has an “N” factor included, which determines the degree of effectiveness of the control function that is taken

⁷ Country Report, Conditionality Romania, 2016 r.



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to check or detect any cause of accident or defect. By modifying this factor as a factor for the effectiveness of a measure or action taken, or of those to be undertaken to reduce the risk of a specific natural crisis event, it already enables a comprehensive risk assessment, including the measures already taken, the likelihood and vulnerability of the measures taken in the presence of a crisis event. This is one of the basic principles enshrined in the R^kFMEA system.

3.3.2. R^kFMEA, L and D factors

Any selected approach should offer a unified method for risk analysis and assessment, and for the evaluation of specific factors. Web-based applications and approaches to regional networks are typical for such systems. These basic systemic principles and considerations are set out in principles and applications in R^kFMEA⁸ as methods and tools for risk analysis and risk assessment and management of preventive measures.⁹

R^kFMEA provides a quantitative risk dimension that allows for a comparison of risk, including the effect of the current and existing preventive measure or action (RPN - Risk Priority Number), and in addition provides an integrated risk factor (RPNF) representing the risk with the emergency and the necessary investment for the prevention and management of resources. The current analysis will not specify the complex risk factor F, but the chosen approach enables the description of the proposed new prevention measures and the subsequent updating of the data. If these or new measures are implemented, this will be reflected in the factor N. In addition to R^kFMEA, two other factors are added for integrated risk assessment, taking into account the solvency of the municipality and its demographic condition - the factors L and D. They are also with values from 1 to 10 - 1 to 3 in case material damages are estimated to be less than 4% of the GDP of the municipality; 4 to 6 for values of 4% to 10%; 7 to 10 for the damages over 10% of GDP; and 10 for damages of 30% or above. The demographic factor D is for the age dependency coefficient, its value being from 1 to 3 for the coefficient below 45%, 4 to 6 for values from 45% to 55% and 7 to 10 for values over 55%.

Historical data and more recent (where available) information for disaster occurrence in the CBR were used for the purposes of the of the risk assessment. In this context, account should be taken of the fact that the availability of the necessary information is limited and there are serious difficulties in attempting comparability - different criteria are used such as the number of casualties, the amount of damage, the number of events that have occurred over a period of time. Data on the physical and economic consequences of disasters have to be considered as, at best, indicative.

The added value of the methodological approach to the analysis is the fact that it allows for the accumulation of a database, which, through regular update, could be integrated to support

⁸ Kanev, 2010

⁹ Kanev, 2011



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risk prevention in the future. Data are collected at the municipal level, analysed and summarized in table form, indicating the source and period. The data are then summarized according to the threat classification. The most challenging aspect in the current task has proven to be the lack of specific information on the status of existing prevention measures, as well as specific plans for future prevention measures. **The main sources of information used include:**

- publicly available data from district and municipal development plans and disaster protection plans;
- data from the Bulgarian and Romanian National statistical institutes;
- data from the General Directorate Fire Safety and Protection of the Population, Bulgaria;
- General Inspectorate for Emergency Situations, Romania;
- Danube Region Basin Directorate;
- Ministry of Environment and Water of the Republic of Bulgaria;
- Other relevant analyses, studies and assessments on national and local level for Bulgaria and Romania, including publications by non-governmental organizations and other stakeholders.

The selection of the specific method for risk assessment allows for dynamic and regular risk monitoring, on municipal level in the CBR, for improving the preparedness for reaction and directing necessary resources in cases of emergency situations. The methodology for risk mapping assessment of floods and forest fires is discussed in detail in the report “Analysis of the scale, frequency, geographical concentration, seasonality and prerequisites for disaster events in the cross-border region”.

3.4. Risk management maps: floods and forest fires threat levels

The developed risk maps are derived from the data collected and summarized via the application of the R^kFMEA methodology, described above. The risk maps include the estimated complex risk based on RPN, complex assessed risk based on complex factor RPNL, RPND, RPNLD.

The same three-colored principle is applied - **red** for high values and hazardous risk areas, **yellow** for moderate or unchanged levels, and **green** for safe or decreasing levels. For the purposes of the current analysis, the most appropriate and informative, based on the most saturated amount of analysed and available data, risk maps are the ones based on RPN and RPNLD. If no geo-referenced damage estimation data are available, then it is best to rely on



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normalized levels of risk to the demographics of the respective municipality, thus using mainly the maps based on RPND.

The data for Silistra District are more detailed, with more up-to-date municipal-level population protection plans, which allows the RPN and RPND calculation tables to be completed in detail. Geo-referenced municipal damage estimation data are extremely insufficient and the L factor is difficult to calculate.

For the Calarash region, the data is even scarcer, despite the extensive country-wide risk analysis, under the National risk assessment (RO-RISK project), carried out in 2016, which is huge in scope and with a very rigorous scientific focus that does not allow for a comprehensible comparison of the CBR situation. Data on existing plans to protect the population at municipal level (commune) are largely missing. The main source of comparable threat and risk data is the aggregated data in the English report to this project - "National Risk Assessment - RO RISK". Prevention measures, especially those of a technical nature proposed for flood prevention, are described in detail in the report, but there is only one municipality, relevant for the scope of the CBR, subject of the present report. There are more details in the regional plan for flood protection of Calarasi for some municipalities along the Danube on the status and availability of dikes. For unclear municipalities, the N factor is considered to be neutral 5, which is the meaning of any protection measure that is considered to be available administrative capacity and alert and alert systems. For municipalities in Romania, an age dependency coefficient was used based on local community statistics data from 1 July 2017, with dependent ages for the population aged 0 to 14, including those aged 60 and older. *The small discrepancy with the statistics for the municipalities in Silistra does not affect the overall picture of the normalized risk and its comparison for the TGR .*

Silistra region municipalities:

Alfatar

Glavinica

Dulovo

Kainardzha

Silistra

Sitovo

Tutrankan

Municipalities/communes in Calarasi county (the assigned number corresponds to the maps):

1 Belciugatele

2 Ileana

3 Lehliu

4 Tamadau Mare

5 Dor Marunt

6 Fundulea

7 Dragos Voda

8 Lehliu-gara

9 Nicolae Balcescu

10 Dragalina

11 Stefan Cel Mare

12 Perisoru

13 Sarulesti

14 Fundeni

15 Valcelele

16 Vlad Tepes

17 Lupsanu

18 Gurbanesti



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19 Valea Argovei
20 Plataresti
21 Sohatu
22 Stefan Voda
23 Independenta
24 Frasinet
25 Borcea
26 Frumusani
27 Alexandru Odobescu
28 Nana
29 Vasilati
30 Ulmu

31 Jegalia
32 Ceacu
33 Unirea
34 Luica
35 Modelu
36 Soldanu
37 Curcani
38 Budesti
39 Dichiseni
40 Dorobantu
41 Roseti
42 Gradistea

43 Manastirea
44 Ciocanesti
45 Calarasi
46 Mitreni
47 Chiselet
48 Radovanu
49 Ulmeni
50 Spantov
51 Cascioarele
52 Oltenita
53 Chirnogi



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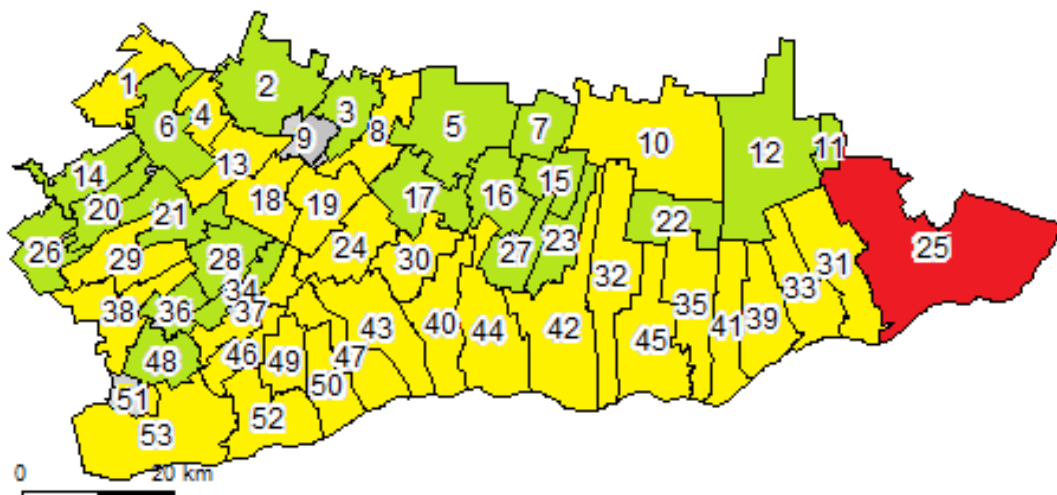
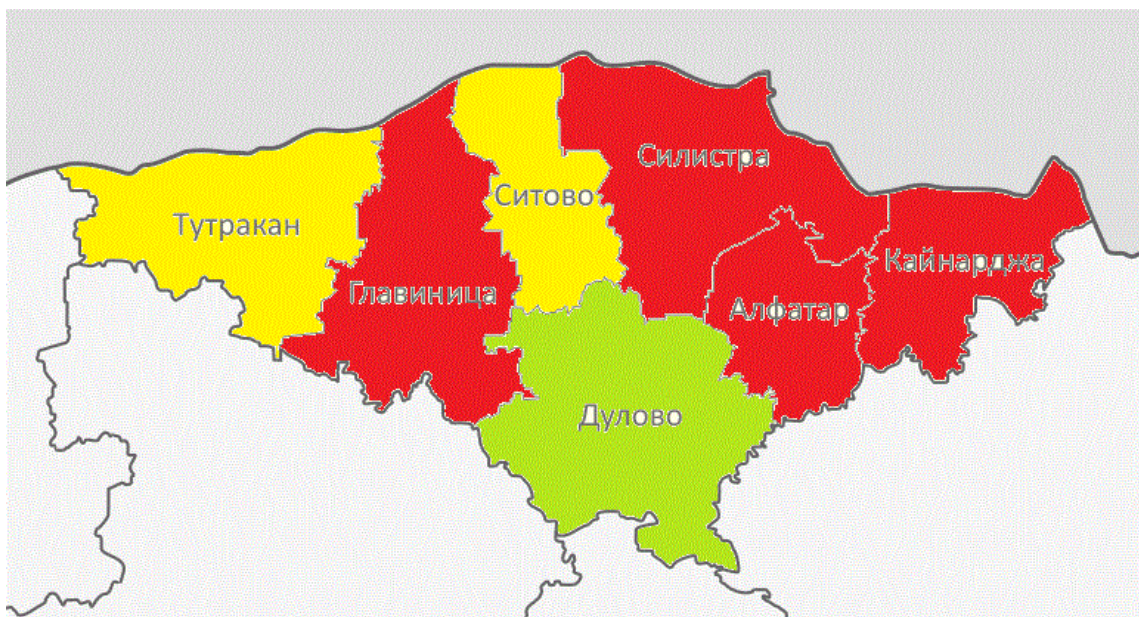
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3.5. Threat maps - floods and forest fires risk

3.5.1. Threat maps - floods

Municipalities in the red are considered to be in most serious threat of floods, in the yellow the threat is more moderate, while in the green it is considered tolerable.



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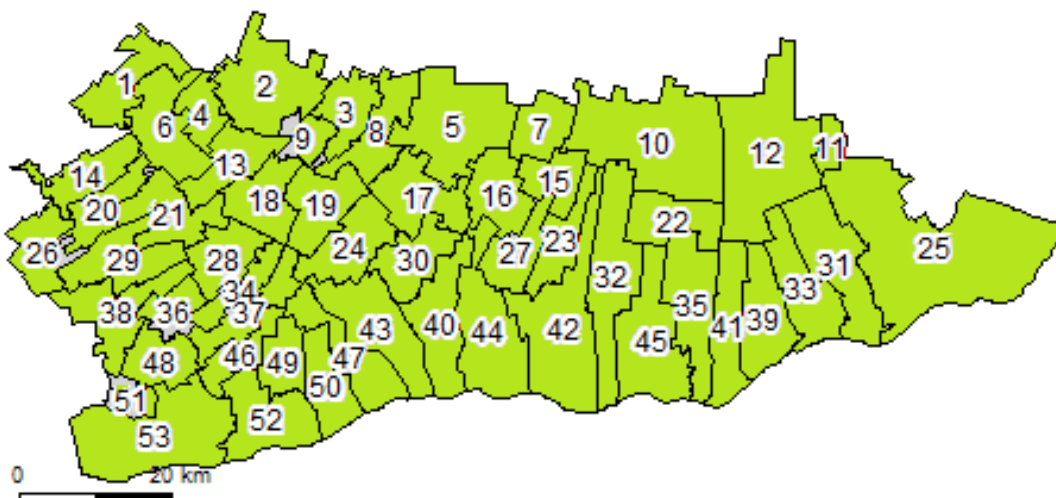
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3.5.2. Threat maps - forest fires



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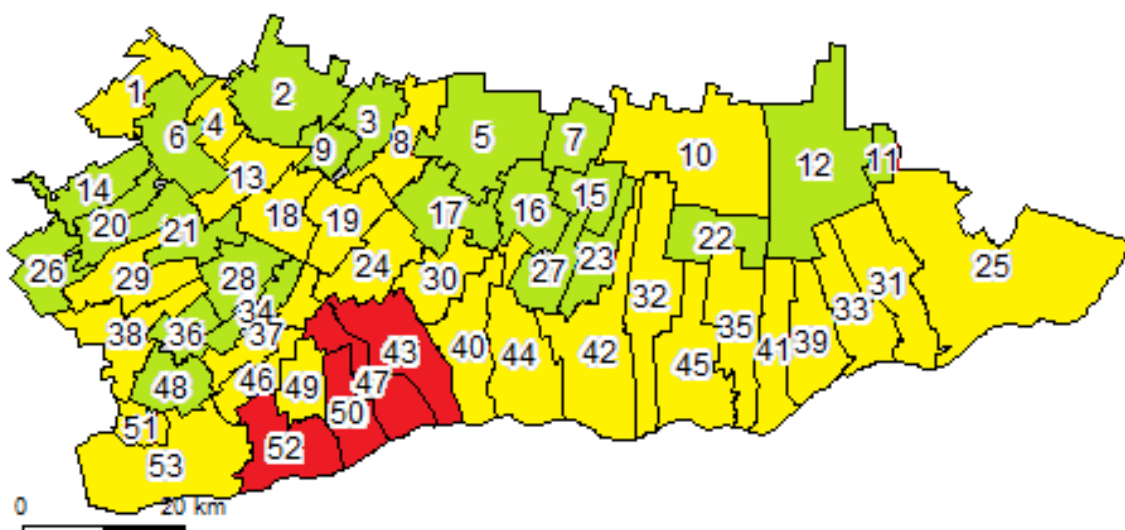


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3.6. Municipal risk maps - floods

3.6.1. Maps, RPN risk levels



The illustrated differences in the levels of risk and threat in Călărași are due to the fact that prevention factors are set in place - the presence of dikes and their maintenance. There are dikes and barrages built along the Danube and Arad valleys, but some of them are not maintained and the risk level is high in these municipalities.



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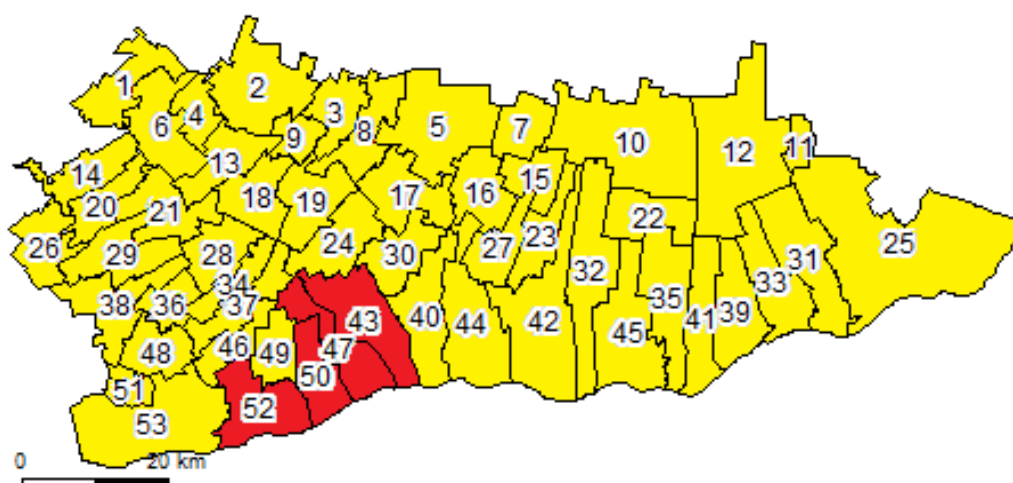
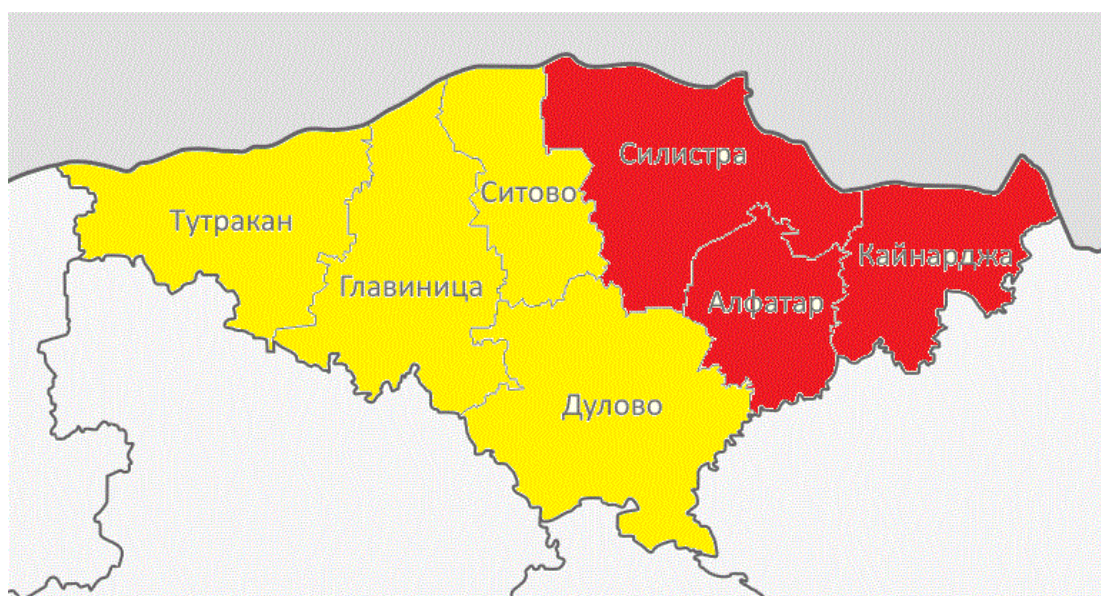
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3.6.2. Municipal maps with normalized risk for demographic factor RPND



The entire population of the Calarasi district is at moderate or high risk of flooding, despite the lower risk level for some municipalities, estimated without the influence of the demographic factor in the respective municipality.



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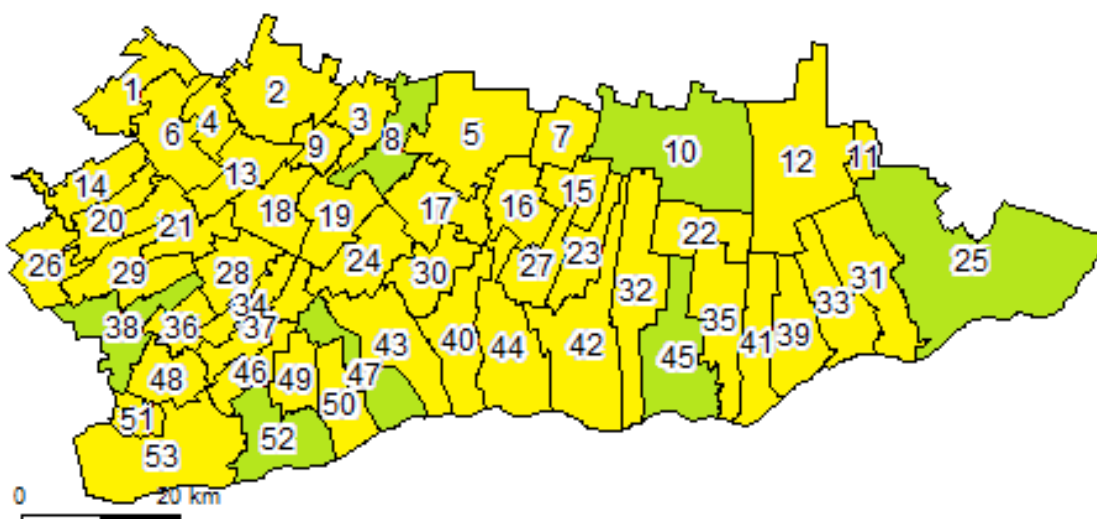


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3.7. Municipal risk maps - forest fires

3.7.1. Maps, RPN risk levels



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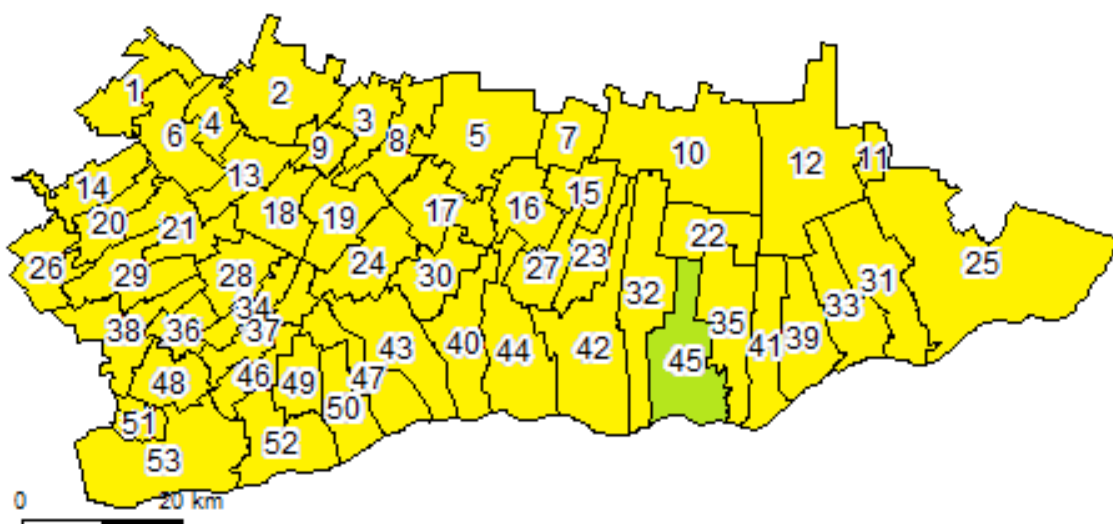
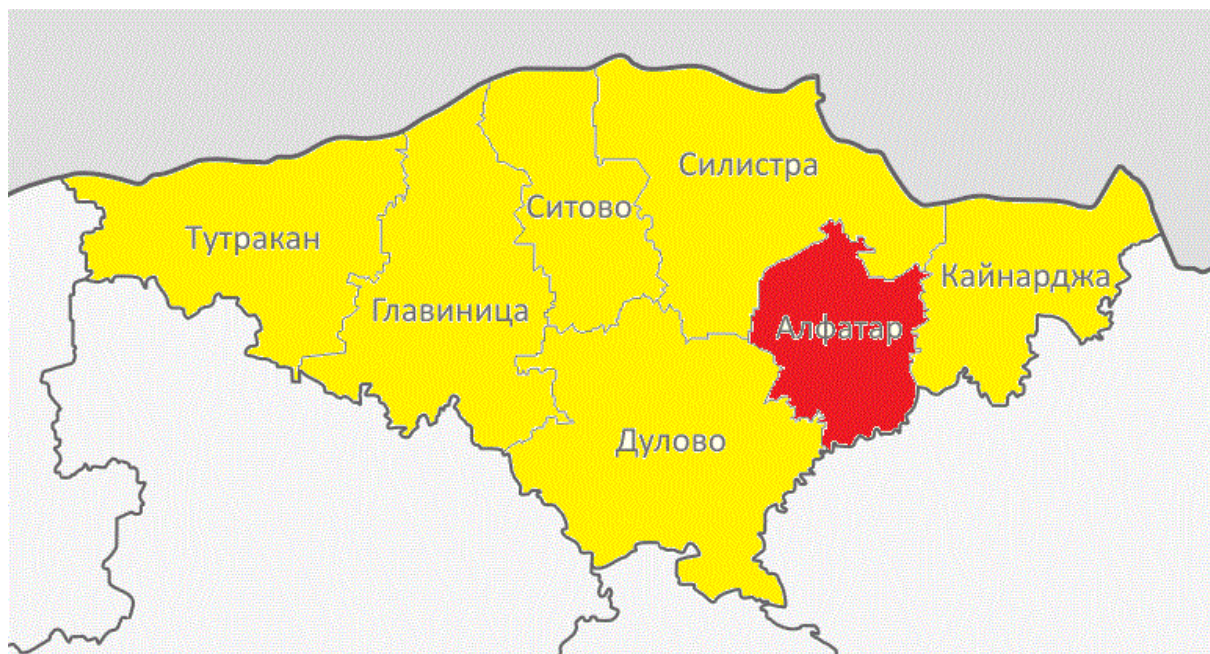
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3.7.2. Municipal maps with normalized risk for demographic factor RPND



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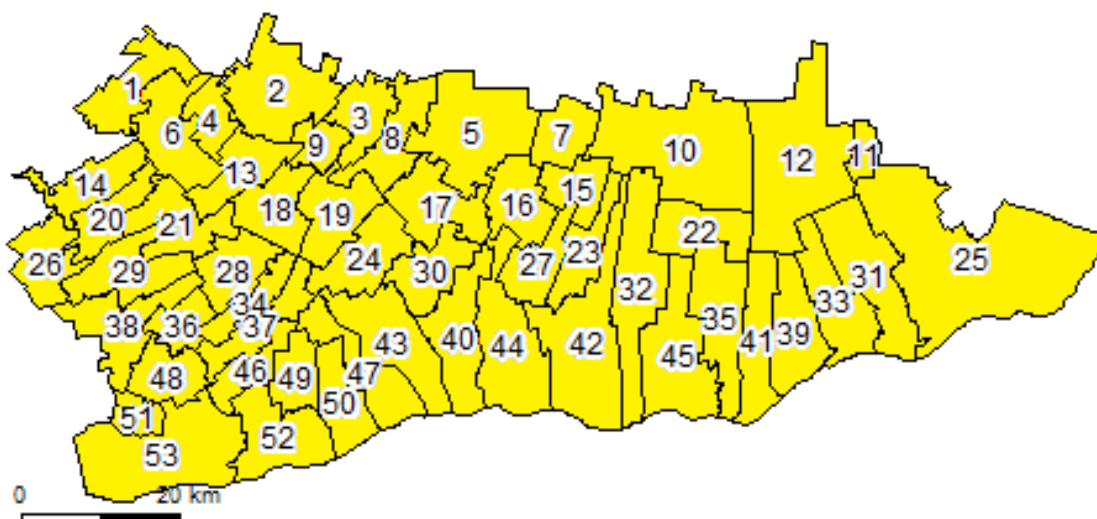
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3.8. Integrated municipal risk maps for floods and forest fires

The integration is done only for forest fire and flood threats, taking into account the arithmetic mean of RPN and RPND for each municipality.

3.8.1. Maps - RPN risk levels



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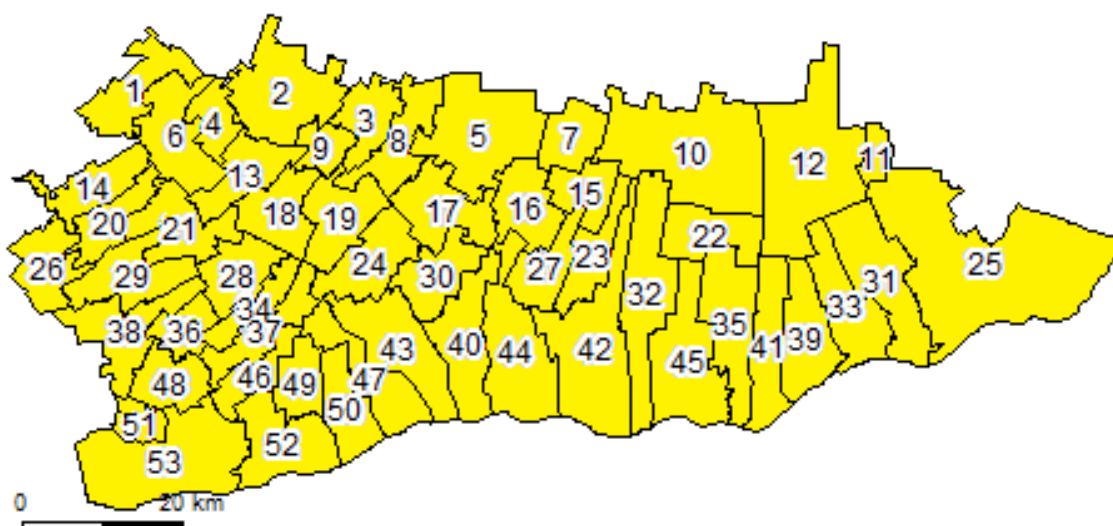
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3.8.2. Municipal maps with normalized risk for demographic factor RPND



All municipalities have moderate normalized risk, but the highest is Oltenitsa, followed by Manastirea. The lowest is Stefan Zell Mare and Perisoru.



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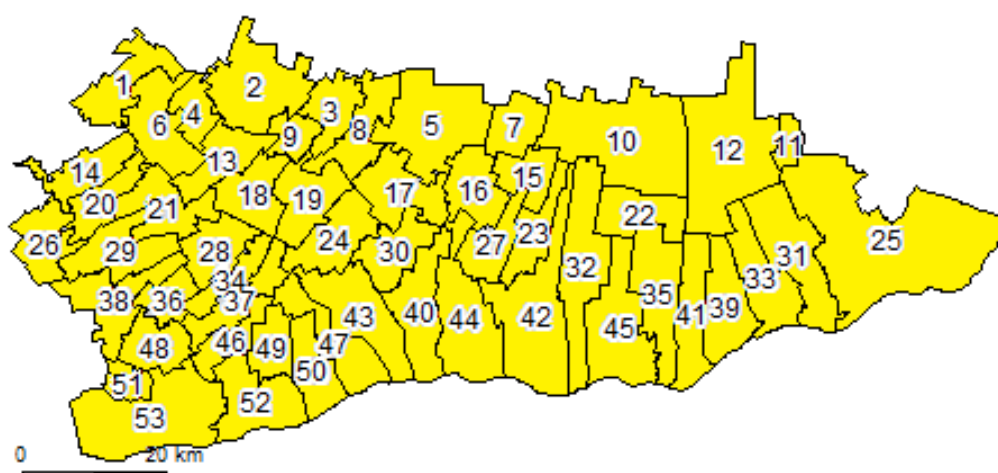
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3.9. Municipal maps with integrated risk - all threats

The integration is done according to the weight of each threat by the ESDP model and classification. A significant proportion of these threats are not available to the municipalities concerned, and their risk values are negligible. Accordingly, the integrated risk for all threats is lower than the maximum for individual threats in some municipalities.

3.9.1. Maps - RPN risk levels



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3.9.2. Comparison of municipalities with normalized risk and RPND demographics

	RPN	RPND
Община	Всички заплахи	
Силистра област		
Алфатар	113	1 021
Главиница	96	771
Дулово	55	442
Кайнарджа	92	738
Силистра	102	812
Ситово	82	737
Тутракан	90	718

Integrated risk maps for all threats and RPND normalized for demographics are the same as those for the RPN risk level. There are significant differences in the levels of this integrated risk across municipalities. The table shows the integrated metrics for RPN and RPND. Again, although the levels of risk are comparable, in normalized risk they stand out as more susceptible to different threats and with higher normalized risk, the municipalities of Alfatar and Silistra, while in Romania they are Oltenitsa and Manastirea, regardless of the different and high level of risk without being normalized to the demographics of the municipality. The human health risk (population risk) maps shown here for different threats to particular municipalities, but for all of them floods and forest fire risk levels are estimated in both formats - risk assessment together with the effect of existing prevention, if

		RPN	RPND
Община		Всички заплахи	
Calarasi област			
52	Oltenita	122	854
43	Manastirea	103	824
47	Chiselet	100	803
53	Chirnogi	96	765
18	Gurbanesti	81	726
24	Frasinet	81	726
29	Vasilati	81	725
30	Ulmu	81	725
40	Dorobantu	80	724
50	Spantov	102	716
51	Cascioarele	85	678
42	Gradistea	83	665
44	Ciocanesti	83	665
38	Budesti	82	657
3	Lehliu	73	655
16	Vlad Tepes	73	655
21	Sohatu	73	655
46	Mitreni	81	648
28	Nana	72	648
49	Ulmeni	92	646
19	Valea Argovei	81	646
2	Ileana	80	638
31	Jegalia	79	634
1	Belciugatele	78	626
13	Sarulesti	78	626
48	Radovanu	69	624
45	Calarasi	104	622
8	Lehliu-gara	89	622
4	Tamadau Mare	87	612
17	Lupsanu	76	607
25	Borcea	87	606
9	Nicolae Balcescu	75	603
10	Dragalina	84	590
14	Fundeni	73	582
15	Valcelele	73	582
20	Plataresti	73	582
26	Frumusani	73	582
27	Alexandru Odobescu	73	582
39	Dichiseni	83	582
6	Fundulea	82	577
32	Ceacu	72	575
34	Luica	71	567
23	Independenta	70	561
33	Unirea	79	555
36	Soldanu	69	555
35	Modelu	79	550
41	Roseti	79	550
5	Dor Marunt	66	528
7	Dragos Voda	75	527
37	Curcani	75	524
12	Perisoru	82	489
22	Stefan Voda	68	478
11	Stefan Cel Mare	74	447


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any, and if necessary - RPN; and for normalized age - dependent risk, RPND. The latter normalized risk shows the extent to which the population of a given municipality is able to "absorb" or cope with the risk posed by any of the threats. This shows that the risk is really higher in municipalities with bigger share of elderly population. Thus, it is advisable to adopt the RPND risk assessment approach, as it provides an objective picture of the municipality's population and its capacity to deal with the risk or how serious the risk is in this case.

4. Analysis of the regional and municipal disaster protection plans in the CBR

The degree of preparedness for reaction in different types of emergency situations, including in the context of international cooperation, depends on effective planning within the regional and municipal disaster protection plans, adequate evaluation of existing and potential risks, available resources (based on the evaluation of the risk) and efficient stakeholder collaboration.

The key question to be answered when analyzing the regional and municipal disaster protection plans in the CBR is "To what degree the identified measures and resources correspond to the levels of risk, in this case specifically related to floods and forest fires?"

In certain cases, the municipal plans for protection of the population are up-to-date but lack detailed risk analysis (or do not mention results from such). The measures undertaken to reduce the risk levels and to control their implementation are available for the Bulgarian part of the CBR, while there is no complete and updated plan for protection at county level, for Calarasi, nor for the level of individual municipalities. Nevertheless, the overall plan, for Romania, though not current, lists specific flood protection measures and their status. In the Bulgarian part of the CBR, Alfatar municipality is most aware of the risks and the only one to provide detailed description of voluntary organization (though additional analysis showed that voluntary organizations are present in other municipalities as well), while fire safety related measures are available in all municipalities of the Romanian part of the CBR.

4.1. Municipal disaster protection plans - availability

Municipalities with available and recently updated disaster protection plans, based on document review and information from the in-depth expert interviews, are marked in green. The municipal plans with more formalized content and availability of non-specific prevention measures are highlighted in yellow, while those without a recent update (after 2012) are in red. For Romania, data indicate that there is a long-standing plan, only for the Calarasi region. However, additional data are



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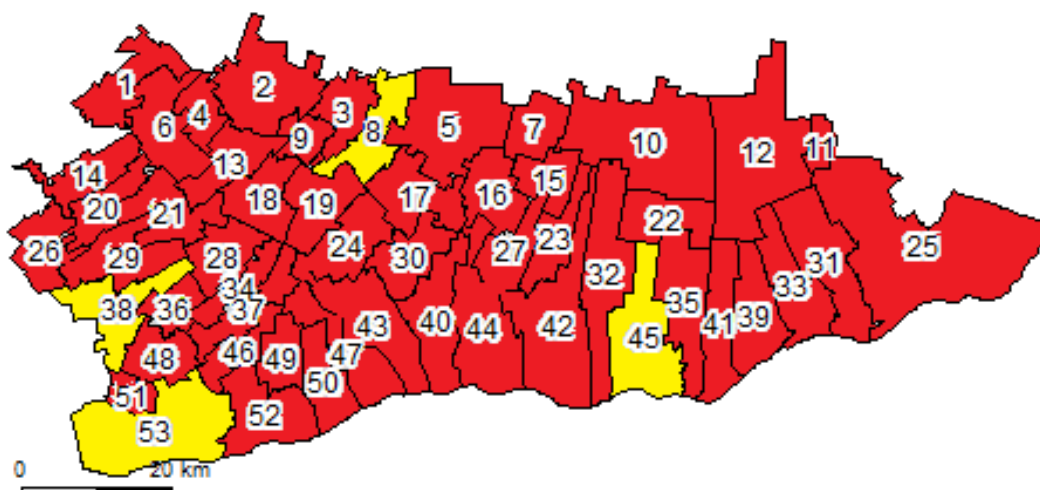
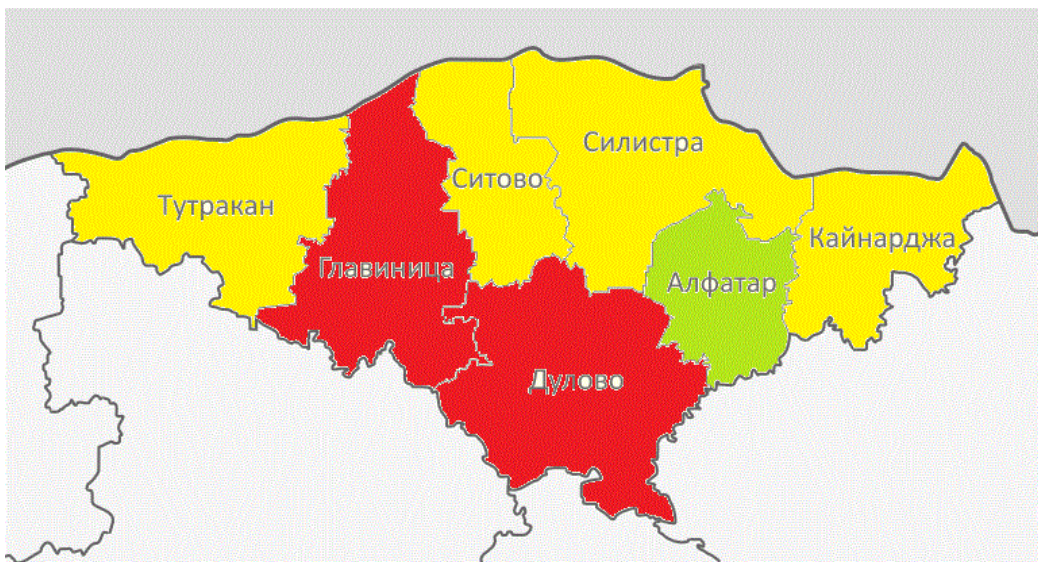
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available from other sources (e.g. National risk assessment, carried under the RO RISK project).



4.2. Existing measures for preventing and limiting damages from floods and forest fires

4.2.1. Disaster prevention and protection measures

Disaster prevention and protection measures, specifically related to protection of the population, which are included (or should be included) in the regional and municipal disaster protection plans, can be initially divided in two categories:



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1. Measures for preventing and limiting damages before the occurrence of the disaster event - prevention measures, based on existing risks analysis; and
2. Measures for limiting the damages and losses after the occurrence of the crisis event - crisis management measures.

In either case, the existing measures may be of a technical nature, through facilities and equipment, communication and information and administrative. The associated financial aspects are not subject of the current analysis, but regardless of the type of measure, it must be effective.

The technical measures, of the first type, include levees along the rivers, plowing fire protection strips, availability of systems for monitoring water levels and temperature anomalies around forest areas, etc. The technical prevention measures of the second type are mainly for the presence of crisis response equipment, physical shelters, specialized hydrotechnical facilities, reservoirs and pumping extinguishing facilities, etc. Communication and information systems include measures to prepare the public and the authorities for understanding the threats and risks, as well as for early warning and notification in the event of a crisis, for guidance and assistance in rescue operations.

Administrative measures are of great importance, as they are key to proper and timely planning. In the first type, they are especially important for spatial planning and urbanization, such as the prohibition or removal of illegal structures and obstacles along the dangerous river basins and gullies, the ban on certain types of agricultural activities in the hazardous areas, close to forest areas, the ban on specific tourist activities in the dangerous months, and others. The second type of administrative measures have to do mostly with the organization and coordination of crisis management activities, organization and structure of rescue teams, preparation of specialized staff and volunteer organizations, preparation and conduct of training sessions, etc.

Critical to all of the above measures is regular actualization, control and maintenance. Regularity requires technical measures to be checked and updated at least once a year, if no shorter time is stipulated by law or other regulations. An illustrative example of the effect of outdated measures are dikes, which prove very telling for levels of risk of flooding along the Dunabe river and the for the Romanian municipalities, which are situated there. As far as the threat of floods is concerned, the most serious risk levels are observed on the territory of Borcea municipality, but the population risk is highest for the municipalities of Oltenitsa, Spantov, Chiselet and Monastirea, due to the fact that the existing dikes are compromised and cannot properly perform their functions.



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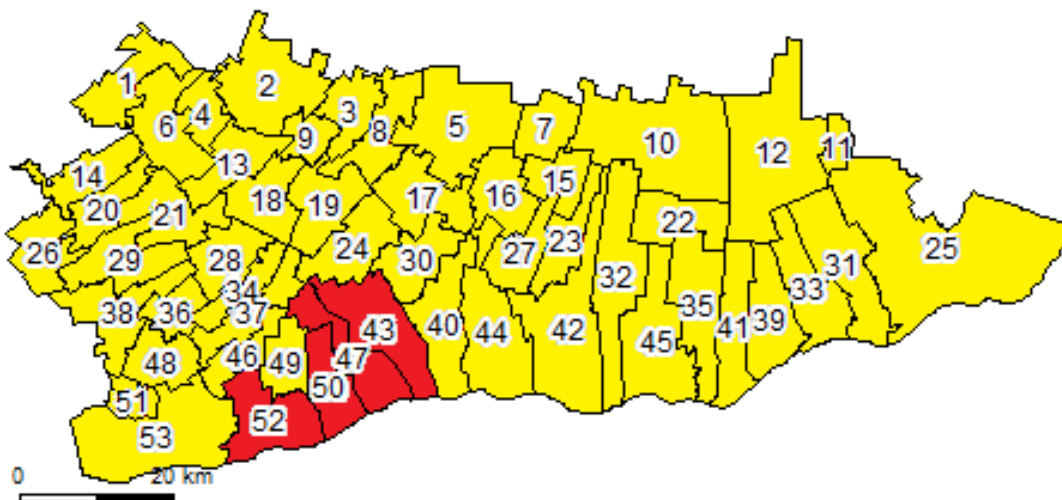
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The available regional and municipal disaster protection plans for the CBR are summarized in the tables below - the full tables are available in the Annex 1. The tables highlight the most important and significant prevention activities and measures for protection of the population. The prevention measures and the crisis management measures and activities are analysed separately. Existing capacities, resources and equipment are not considered here (as they are discussed later on in the report). The tables focus on the risk for the population in the event of floods and forest fires.¹⁰

¹⁰ Таблицата е налична и в Excel формат и като приложение към доклада.



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4.3. Measures for prevention and protection of the population - Analytical tables

Overview of the existing disaster protection plans and volunteer organisations

Regions and municipalities				
Municipality	Residents	Disaster protection plan	Date of last actualization	Volunteer organization
Silistra region	111 957	Available, not regularly updated	2012 - the plan foresees an annual update and training activities - it is not clear whether any more recent updates are available, nor whether training activities have been held.	Mentioned, in relation to participation in events after earthquakes and flooding, but no more details available.
Alfatar	2 704	Formal and general; some specific preventive measures tailored to municipal measures for maintenance of facilities and roads and technique training; It is unclear what share of the planned preventive measures were executed or implemented. The plan distinguishes between preventive measures and measures for disaster protection.	2015	Available



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Glavinica	10 243	General, formal	2012	Volunteer organization mentioned, including list of volunteers as an annex. Education is not mentioned.
Dulovo	27 643	General, formal	2012	n/a
Kaynardja	5 115	Available, up-to-date; includes mainly administrative measures without specific indicators	2017	Mentioned to participate in events but nothing more specific. It is not clear from the plan whether such organisation exists formally or whether its members participated in any trainings.
Silistra	47 130	Up-to-date	2017	Mentioned to participate in events but nothing more specific. It is not clear from the plan whether such organisation exists formally or whether its members participated in any trainings. Mentioned regulations for such organizations, but it is not clear from the plan whether they exist in practice.
Sitovo	5 110	Available, from 2013 and recently updated	2017	Mentioned in the organigram but it is not clear from the plan whether such organisations exist in practice or whether their members participated in any trainings.



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Tutrankan	14 012	Available, 2014	2014	Volunteer organization mentioned, including list of volunteers as an annex. Education is not mentioned.
Calarasi County	311 084	Available, 2011	2011	Available



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Analytical matrix: Prevention measures (see Annex 1)

Област и Община	Мерки превенция																	Други	
	Анализ на риска	Анализ на Риск наводнение	Анализ на Риск пожар	Технически мерки Наводнение налични (Описание)	Технически мерки Наводнение налични КОНТРОЛ	Технически мерки Наводнение Планирани (предложени)	Технически мерки Пожар налични (Описание)	Технически мерки Пожар налични КОНТРОЛ	Технически мерки Пожар Планирани (предложени)	Комунал. Info мерки Наводнение налични (Описание)	Комунал. Info мерки Наводнение Планирани (предложени)	Комунал. Info мерки Пожар налични (Описание)	Комунал. Info мерки Пожар Планирани (предложени)	Административни мерки Наводнение налични (Описание)	Административни мерки и мерки Наводнение Планирани (предложени)	Административни мерки Пожар налични (Описание)	Административни мерки Пожар Планирани (предложени)		
Силистра област	Много общ, само описание грубо на поражения, няма конкретен анализ, по подробен за пром. Аварии и от Румъния ИЗВОДИТЕ не касат превенцията	Практически липсва, много общ	Много общ, само са изброени териториите на горите по общини с потенциал за горски пожари	Споменати само дигите по Дунав	Няма	Изготвяне на карти заплаха и риск от наводнения и система рано предупреждаване. НЯМА план кога!		Няма	Няма	Няма	Няма		Няма	Info за население възможни пожари и правила за действие. (Няма контрол по изпълнение)	Да се направи анализ на риска, но без срок само пожелателно	Подготвеност и прогнози за наводнение	Организационни има описани, но няма план и контрол	Списък на пожароопасни обекти Организация за държавен противопожарен контрол + превантивни мерки, но без срок кога и какви. Карти гори и съгласуване с МЗХ	
Алфатар	Общ	Подробен за заплахата и има груба оценка на риска	Подробен описване на заплахата индустриални, полски и горски. Рискът е оценен грубо	Описани дигите и предпазните съоръжения	Няма	Описани нужди от канализация и защита в някои от населените места	Липсва ПБЗН в гр. Алфатар, но има дейо и пожари	Няма	Няма	1 Обучение за информироване на населението по рискове и действие		1 Обучение за информироване на населението по рискове и действие		Подробен описване на административни мерки, включително поддръжка, обучение, тренировки и обучения за информироване на населението, отговорни лица.					
Главиница	Формален	Груб за заплахата и слаба оценка на риска, но с ниско ниво на риска	Само заплаха	Почистване на дерета и канали	Ежегодна Проверка на потенциално опасни извори	Няма	Разораване на минерализована ивица	Няма	Оценка на риска и карти на гори и зем земни според пожароопасност			Табели за пожароопасни горски зони		Наблюдение и контрол извори и диги			Поддръжка на ивици и противопожарни дига		
Дулово	Практически липсва	Няма анализ за конкретната община	Няма изготвен	Няма	Няма	Няма	Няма	Няма	Няма	Общите	Няма	Няма	Няма	Няма	Няма	Няма	Няма	Няма	Формален и без никаква конкретика
Кайнарджа	Практически липсва	Изброени отоводнителни канали и евентуално засегнати къщи. Дунав липсва	Изброени горските масиви със заплаха. Анализ практически липсва	Няма освен каналите	Привияжи спомената необходимост от комисия за контрол. Няма кога и как действа	Няма	Разораване на минерализована ивица	Няма	Няма	Няма	Няма	Няма	Няма	Поддръжане плана и инспекция на канали и из. Стени	Няма	Привияжиите за поддръжка на съоръжения и почистване	Няма		
Силистра	Подробен за заплахите, рискът е анализан общо, но реферира към места и стради и с рискова таблица, включваща и готовността за реагиране. НЯМА анализ на резултатите от таблицата!	Анализ на заплахите е подробен. Рискът по общо не е анализен и с референция към минали събития	Анализ на заплахите, рискът не е анализан	Диги по р. Дунав	Няма	Няма	Разораване на минерализована ивица и пътища между посеви	Няма	Няма	Няма	Няма	Няма	Няма	Стандартно описване. Няма конкретно за общината	Да се направят карти на заплаха и риск от наводнения, пожелателно		Изготвяне на карти и създаване условия за успешно пожарогасене		
Ситово	Няма общ	Общо местата на заплахите, рискът не е анализан	Липсва. Споменати само причинителите - земеделски стопани	Няма	Няма	Няма	Няма	Описани налични противопожарни водоеми - дига	Няма	Няма	Няма	Няма	Няма	Няма	Няма	Няма	Няма	Няма	
Тутракан	Наличен, най-обстоен за наводненията, другите са схематични и общи	Ясни заплахи, отчита се състояние на технически мерки, посхематичен е анализа на риска, но показва къде има необходимост от интервенция	Схематичен	Диги по р. Дунав	Ежегодна Проверка на потенциално опасни извори. Почистване канали ежегодно и др. Контрол на дигите при високи води	Няма	Няма	Няма	Няма	Има с отговорности и методи	Няма	Стандартни, без конкретика	Няма	Експертиза на съоръжения и опасни обекти, освен останалите стандартни. Обучения	Контрол и проверка и обучение	Изготвяне на карти и съгласуване с Министерствата	Няма		
Район Калараш	Няма общ	Има кратък анализ, с описание на съоръжения и район на заплахите и потенциален риск, обобщен за общината	Няма изготвен	Обстойно описани диги, барикади, годност	Описано състояние	Има фази на изграждане	Няма	Няма	Няма	Стандартни по ясно описание	Няма	Стандартни, без конкретика, но да не създават паника, след одобрение	Няма	Мерките са разделени според вода на предупреждение за наводнение - жълт, оранжев и червен. Наблюдение и контрол извори и диги и ледоход, Предупреждения а при червен и евакуация	Няма	Има, включително подготовка на населението и информация, ясно отговорности на всички институции и хора(национални и окръжни)	Няма		



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**Analytical matrix: Protection of the population (see Annex 1)**

Област и Община	Мерки при управление при кризи														Други
	Технически мерки Навождение налечни (Описание)	Технически мерки Навождение налечни КОНТРОЛ (предложени)	Технически мерки Навождение налечни Планирани (предложени)	Технически мерки Пожар налечни (Описание)	Технически мерки Пожар налечни КОНТРОЛ	Технически мерки Пожар налечни Планирани (предложени)	Комунал. Инфо мерки Навождение налечни (Описание)	Комунал. Инфо мерки Навождение налечни Планирани (предложени)	Комунал. Инфо мерки Пожар налечни (Описание)	Комунал. Инфо мерки Пожар налечни Планирани (предложени)	Административни мерки Навождение налечни (Описание)	Административни мерки Навождение налечни Планирани (предложени)	Административни мерки Пожар налечни (Описание)	Административни мерки Пожар налечни Планирани (предложени)	
Силистра област	Терени за настиване, дезинфекция, отводняване	Няма, освен актуализация на плана, но не е ясно има ли такава	Няма	Водоноточия дълбоки сондажи и ВиК, но с много малко дялови рез. Агрегати. Проблем при спирше на тока	Няма	Поддръжка пътища, водоноточия, съоръжения	Привично споменато Инфо за гражданите с СЛЕД предварително съгласуване с Областния Управител	Няма	Привично споменато Инфо за гражданите с СЛЕД предварително съгласуване с Областния Управител	Няма	Описание на необходимите мерки и отговорности - има и обстойно	Няма	Описание на необходимите мерки и отговорности - има и обстойно	Няма	Админ. мерки за сгради и диги за земетресения, но без план и срок. Другите общи. РАЗУЗНАВАНЕ и определяне на места (разни дейности и разрушения) трябва да има предварителен оценъчен план на база на оценка на риска. Такъв няма.
Алфатар	Спасително оборудване и поделон	Няма, освен актуализация на плана, но не е ясно има ли такава	Недостиг на оборудване за външно настиване	Пожарен автомобил	Не е ясно	Няма	Информационна система и сирени	Няма	Информационна система и сирени	Няма	Оперативен дежурен	Детайлно описание с отговорности и последователност на действия	Оперативен дежурен	Детайлно описание с отговорности и последователност на действия	Детайлно описание на дейности и отговорности с последователност и на места с необходимата техника и съоръжения. Не е ясно дали наличната техника е достатъчна или не и за кои случаи на наводнение и пожари би била достатъчна
Главиница									Стандартно описание от Обл. План. Няма конкретика.		Привични действия, без конкретика. Има отговорности поимено, но дали са актуални. Предвидени контрол с наблюдатели, но не е ясно от кога и как действат		Привични действия, без конкретика. Има отговорности поимено, но дали са актуални		Планът не е конкретен. Няма анализ на необходимата техника и съоръжения. Не са ясни връзките и взаимодействията на екипи и администрация при кризи
Дулово	Общите като постановка, няма конкретика	Няма	Няма	Няма	Няма	Няма	Общите	Няма	Няма	Няма	Стандартно описание в пожелателен режим без конкретика и посочени имена	Няма	Няма	Няма	Трудно би послужил за ръководство и справка при настиване на бедствие
Кайнарджа	Опакителни привични, без конкретни дейности спрямо място на събитие	Няма	Няма	Опакителни привични, без конкретни дейности спрямо място на събитие	Няма	Няма	Стандартно пожелателно плюс сирените	Няма	Стандартно пожелателно плюс сирените. Има спомена сайта на общината с мерките за пожарна безопасност.	Няма	Стандартните действия, без конкретика за общината	Няма	Стандартните, но има споменати за бързо реагиране и тренировки за пожарна безопасност.		Плановите са общи, без конкретика и не биха помогнали за бързо реагиране в случай на бедствие и криза
Силистра	Няма	Няма	Няма	Няма	Няма	Няма	Привично споменато Инфо за гражданите с СЛЕД предварително съгласуване с Областния Управител		Привично споменато Инфо за гражданите с СЛЕД предварително съгласуване с Областния Управител		Описание на дейности и отговорности институции, но няма конкретно за обектите на заплахата и риска	Всичките мерки са с пожелателен характер. Не е ясно как се изпълняват и кой контролира подготовката	Описание на дейности и отговорности институции, но няма конкретно за обектите на заплахата и риска		Защедявания са описани, но отново няма конкретно име и дали знаят за тези си задължения
Ситово	Няма	Няма	Няма	Няма	Няма	Няма	Детайлно, включително имена и телефони в случай на бедствие	Няма	Детайлно, включително имена и телефони в случай на бедствие	Няма	Привична организация и ред на събиране и действия с конкретни имена. Съхранява не ясни процедури	Няма	Привична организация и ред на събиране и действия с конкретни имена. Съхранява не ясни процедури	Няма	Независимо от липсата на анализ на риска и на голяма част от реалните при управление на кризи, планът за действие, който е общ за всички видове заплахи, е с разпределение на задачите и е ясен и конкретен и би бил ефективен при настиване критично събитие. Няма анализ и описание на ресурсите
Тутракан	Техника и пъськ и материали	Няма	Няма	Няма	Няма	Няма	Наблюдение диги и язовири при дъждове и високи води и инфо за всички от постове. Всички оставали стандартни мерки с последователно структуриране	Няма	Стандартно и какво да прави населението	Няма	Привичните от всички, но с позоваване и на предполагаеми засегнати места	Няма	Стандартни без конкретика	Няма	
Район Калараш	Ремонти и укрепване на диги и други работи по съоръжения	Наблюдение	Няма	Предоставя се от съответните организации. Няма яснота	Няма	Няма	Стандартно плюс сирените	Няма	Стандартно след разрешение	Няма	Привични за население с евакуация, много кратко, основно мониторинг и поддръжка на съоръжения и ремонт и работи за доброволните формирования	Няма	Привични за всяко ведомство, но с пълен списък и контакти на всички нива, включително и за доброволните формирования	Няма	Няма анализ на риска нито местатакъдето може да се случат нито мерки за предотвратяване и превенция



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4.4. Analysis of the measures included in the disaster protection plans

The analysis of the measures set out in the disaster protection plans shows a serious lack of a detailed risk analysis. Many of the reviewed plans foresee the preparation of threat and risk maps. It is namely the mapping exercise that proves most effective for the purposes of taking fast governance (public management) decisions on protection and crisis management measures. But in many cases geo-referenced information is not available, and even when available, it is subject to aggregation and analysis.

For this major reason - the **lack of specific risk analysis** - the disaster protection plans lack recommendations for prevention measures. In this context, risk analysis does not need to necessarily be an expensive and timely exercise. It can be carried out solely on expert level, at municipal level, and based on a description of possible damage in the face of specific threat. Based on this analysis, measures for protection of the population and measures for reaction in case of disastrous event occurring should be foreseen. In this case, risk maps can be produced at the level of individual municipalities and be comparable to neighbouring ones in the CBR, as analysed in this report.

Another key deficit is the lack of specific information regarding the already existing prevention measures - related to the status and maintenance of available prevention measures. Part of these measures are the plans themselves, but they do not indicate what was envisaged, what was implemented and what would be the impact of this activity.

Another common challenge to effective planning is the neutral nature and formalism of many of the protection plans. From the point of view of compliance of the plan with the specific circumstances in the municipality, the municipalities of Alfatar and Sitovo are more specific and tailored. Others lack specifics, often replaced by extensive descriptions of procedures and activities that are, in most cases, borrowed from the regional plan or the plans of neighbouring municipalities.

Despite the discussed shortcomings, the analysed (where available and up-to-date) disaster protection plans can be useful as a methodological guide. This however is not their primary purpose. For the purposes of prevention and protection of the population, specific plans have to be produced, based on risk analysis, with:

- clear potential consequences and damages;
- prevention and protection measures;
- consistent activities of the rescue teams, equipment and population of the specific municipality and the site of a possible disaster;
- evacuation plans, if necessary;



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- up-to-date information on chain of command, rules, assistance and voluntary assistance.

The analyzed plans also lack information on trainings, evacuation and rescue operations exercises. Data on voluntary organizations is not sufficient, despite often mentioned. It is not clear what the structure of these organizations is, who participates in them, what is their degree of preparedness, and what is communication/mutual activities with them on part of the authorities. In addition, no horizontal link is established with neighboring municipalities, for the purposes of mutual assistance and joint prevention, rescue and rehabilitation activities.

4.5. Management of emergency situations, resources and capacity for reaction in the event of crisis - forest fires and floods

4.5.1. Participating structures in the management of emergency situations

Bulgaria	Romania
Operational centers in the territorial unit of General Directorate "Fire safety and protection of the population"	Committees for emergencies
Regional administration	National Committee for Emergency Situations
Regional Management Center	Council of Ministers and other public institutions for emergency situations
Economic operators at regional level	Committee for the Municipality of Bucharest for emergency situations
Municipal administration	Municipal councils for emergency situations
Municipal Management Center	Local councils for emergency situations
Municipality	General Inspectorate for Emergency Situations
Economic operators at the municipal level	Professional public services for emergency situations
Emergency medical treatment centers and other healthcare facilities	Operational centers for emergency situations



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Units / structures of ministries in the region	Commander of the action
Rescue system	
Armed forces	
Non-profit entities	
Volunteers ((a) voluntary formations for disaster protection, fire and other emergencies, formally registered in the municipalities and (b) natural and legally associated persons (sports clubs, social groups, etc.))	

Source: Feasibility studies on the establishment of the technical solutions necessary to improve the preparation and intervention in case of emergency, 2012

4.6. Volunteer engagement, stakeholder cooperation capacity and synergies in the CBR

Volunteers have a key role to play in disaster management. In Bulgaria, "a volunteer may be any able-bodied natural person over the age of 18, who is clinically healthy, does not suffer from a mental illness and has not been convicted of a deliberate crime of general nature unless rehabilitated." ¹¹ Recruitment of volunteers is carried out by the mayor of the respective municipality, after a decision of the municipal council, which determines the number of people in any given voluntary organization. The procedure for the recruitment of volunteer candidates is then started, with announcement published in the media and/or on information boards in the municipality.

¹¹ Disasters Protection Act, art.40



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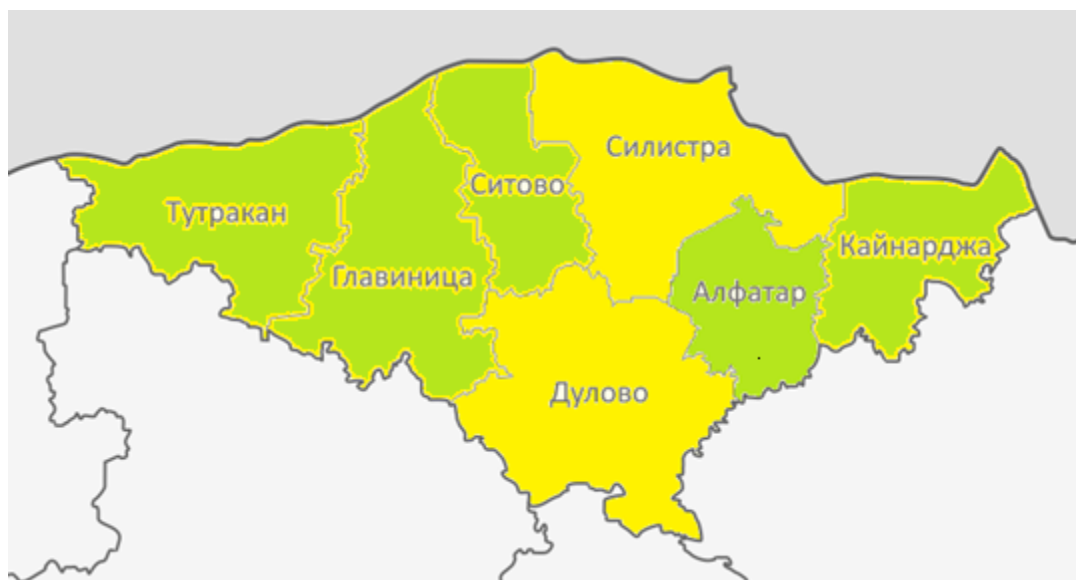
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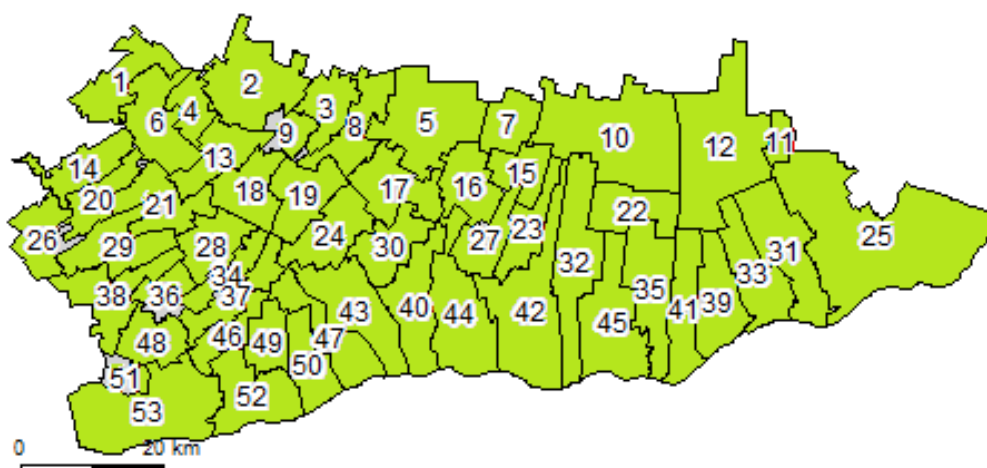
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Availability of voluntary organizations in the CBR



The Romanian volunteer map is more condensed:



Voluntary organizations (formations) are created on a territorial basis, for independent action and/or for supporting the main components of the Unified Rescue System (ESS), performing the following basic activities for the protection of the population:

- rescue operations;
- containment and elimination of fires;



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- search and rescue operations;
- performing emergency disaster recovery works;
- providing first aid to the victims of fires, disasters and emergencies;
- other protection related operations.

Different types of volunteer training exist (initial basic training, specialized training, training for a manager of voluntary organization, support training) and every volunteer, post registering in a voluntary organization, undergoes an initial basic training. The training of volunteers is provided employees of the territorial structures of the General Directorate "Fire Safety and Protection of the Population" (DGPBZN) - Ministry of Interior, first aid lecturers with medical education and educational qualification degree "Master", volunteers from the Bulgarian Red Cross with relevant qualification or volunteers (trainers) on the spot, in licensed centers for vocational training qualification at the Ministry of Interior or other accredited schools and licensed centers. The trainings are carried out in accordance with programs approved by the Academy of the Ministry of the Interior, in agreement with the Director of the DGPBZN.¹²

Five voluntary organizations (the first one created in 2007) are currently operational in the region of Silistra, including a total of 63 volunteers in the following municipalities:

- Glavnica;
- Alfatar;
- Kaynardzha;
- Sitovo;
- Tutrakan.

In Bulgaria, there are 234 officially registered voluntary organizations, with a total of 3 115 volunteers. A considerable part, especially in the Silistra region, are also employees of the respective public administrations. It should be noted that, by law, Silistra and Dulovo municipalities are not required to have such a structure, while Tutrakan has recently established its first.¹³

The publicly available data on local level in Romania is very limited, thus there is no information with regards to the number of volunteers on municipal level. Unlike Bulgaria, there are two types of volunteering distinguished in Romania - in addition to the traditional understanding of volunteering, there are (as can be described) professional volunteers. Romanian law also provides for the establishment of volunteer fire and disaster groups (intervention groups) at local level. In contrast to

¹² Regulation on the Procedure for Establishing and Organizing the Activity of Voluntary Organizations for the Prevention or Management of Disasters, Fires and Emergencies and Removal of their Consequences, 2012

¹³ Regional administration, Silistra, 2018





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the Bulgarian experience, the existing disaster protection plans, in the Romanian part of the CBR, mention and provide contact information for their volunteers.

4.7. Material resources and capacity Ресурси и капацитет

Calarasi County	Fire Department Calarasi	Fire truck	4
		Truck rescue activities	1
		Truck for evacuation in smoke, gases and for lighting	1
		Ambulance	1
		Mechanical ladder	1
		Specialized truck	1
		Truck	3
		Pyrotechnic truck	1
		Motopump trailed	1
		Inflatable boat	1
	Group intervention Borchia	Fire truck	2
		Pumps that can be trailed	1
		Inflatable boat	1
	Fire Department Oltenitsa	Fire truck	2
		Truck rescue activities	1
		Truck	1
		Motopump trailed	1
		Inflatable boat	1
	Group intervention Budesti	Fire truck	2
		Motopump trailed	1
		Inflatable boat	1
		Fire truck	2


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	Group intervention Kiselet	Motopump trailed	1
		Inflatable boat	1
	Fire Department Lehliu Gara	Fire truck	2
		Truck rescue activities	1
		Truck rescue activities off-road (terrain)	1
		Ambulance	1
		Truck	1
		Bus TB	1
		Motopump trailed	1
		Inflatable boat	1
	Fire Department Dragalina	Fire truck	2
		Truck rescue activities	1
		Ambulance	1
		Truck	1
		Motopump trailed	1
		Inflatable boat	1
Silistra Region	Regional service for fire safety and protection of the population - Silistra	Fire truck	5
		Fire truck with ladder	1
		Small dimensional equipment	9
	Regional service for fire safety and protection of the population - Kaynardzha	Fire truck	1
		Small dimensional equipment	2
		Fire truck	2



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	Regional service for fire safety and protection of the population - Tutrankan	Small dimensional equipment	7
	Regional service for fire safety and protection of the population - Glavinica	Fire truck	1
		Small dimensional equipment	2
	Regional service for fire safety and protection of the population - Dulovo	Fire truck	2
		Small dimensional equipment	6
	Rescue group - Silistra	Trucks rescue activities	3
		Specialized truck	2
		Small dimensional equipment	16

Source: Feasibility studies on the establishment of the technical solutions necessary to improve the preparation and intervention in case of emergency, 2012

The analysis of the resource data above with the information, available in the disaster protection plans, especially those more recently updated, shows that the **municipal plans do not describe or evaluate the existing capacity, material and technical capabilities or resources needed for firefighting, water pumping, water supply to the public, and other rescue and rehabilitation activities.** However, a share of the municipal plans includes description of the available equipment and vehicles, municipal or private property, which can be used in activities to protect the population in the event of disasters.

This structure of the municipal disaster protection plans does not answer one critical question - Are there sufficient resources available to the local fire safety department and structures, the Ministry of the Interior, the municipalities and private organization to perform effective disaster relief activities? No report provides such an analysis and assessment of what would be required in addition to provide material security and human resources for rescue activities. Again, consideration should be given to the risk assessment, as it will show where and what



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would be needed and whether these funds will be available within a certain critical period of time after a potential disaster occurs in a specific location.

Municipal plans, based on risk analysis and available capacity in the municipality, may envisage appropriate partnerships for assistance and cooperation with material resources and people from neighboring municipalities, aligning these plans with the district disaster protection plan and the risk analysis scenarios of the different municipalities. Such ex-ante scenarios and co-ordination of aid options will help to increase synergies in CBR, can reduce disaster response times, contribute to more efficient and efficient use of available capacity, as well as less potential damage for the population and the economy.

5. Conclusions and recommendations for improving the preparedness for reaction to emergency situations in the CBR - approach for more inclusive participation and development of interoperable regional structures

The degree of emergency preparedness at different levels, including in the context of international cooperation, depends on cohesion, dynamics and integration of three interrelated processes:

- 1. Effective planning**, within the framework of regional and municipal plans for protection of the population;
- 2. Adequate and regular assessment of existing and potential risks**, taking into consideration available material, technical and human resources;
- 3. Effective cooperation between stakeholders at different levels of governance and society** - from community members to volunteers, from civil society organizations to local and state authorities in the cross-border region.

The undertaken analytical and evaluation activities identify several specific groups of deficits, related to the organization and the applied methods, and in particular to their content and relevance, for:

- assessment of vulnerability of the cross-border region to natural and human-made disasters, as well as evaluation of the scope, frequency, geographical concentration, seasonality and prerequisites for disasters;
- quality, scope and adequacy of planned activities in the framework of the regional and municipal disaster protection plans, for the pilot region (Silistra-Calarasi).

The identified risk levels take into account the age structure factor of the population in the cross-border region. The risk levels for all threats, according to the ESPON classification, are comparable for the two regions, remaining in the yellow risk area.



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Silistra and Calarasi differ when it comes to risks, associated with floods and forest fires - the levels are almost two times higher in Silistra. However, they still remain in the yellow risk area, which provides significant ground for risk management cooperation and joint planning of prevention measures and preparations for reaction in cases of emergency. The analysis of municipal disaster protection plans and capacities, as well as the risk assessment, could facilitate the regional structures in their cooperation. This would enable them to undertake immediate actions and organize the local population in a case of disaster until the arrival of the single system forces.

In certain cases, the municipal plans for protection of the population are up-to-date but lack detailed risk analysis (or do not mention results from such). The measures undertaken to reduce the risk levels and to control their implementation are available for the Bulgarian part of the CBR, while there is no complete and updated plan for protection at county level, for Calarasi, nor for the level of individual municipalities. Nevertheless, the overall plan, for Romania, though not current, lists specific flood protection measures and their status. In the Bulgarian part of the CBR, Alfatar municipality is most aware of the risks and the only one to provide detailed description of voluntary organization (though additional analysis showed that voluntary organizations are present in other municipalities as well), while fire safety related measures are available in all municipalities of the Romanian part of the CBR. This is also due to differences in the legal framework.

Common for the CBR`s disaster protection plans is the lack of in-depth risks analysis. Another common deficit is the lack of specific prevention measures, as well as the procedures for their control/implementation. The prevention measures` planning, as well as the planning for crisis management measures, should be namely based on risk analysis, in order to be effective, efficient and adequate in case of disastrous event occurring, and in order to limit the potential damages for the local population and the economy.

Identified deficits and potential solutions

- Comprehensive risk analysis is needed at local, municipal, level and planning for prevention and crisis response. Regular, at least once a year, monitoring of the implementation of the measures should be undertaken, taking into account their effectiveness in protecting the population and limiting potential damages.
- Analysis of the capacity of the local community to understand the existing threats, risks and their potential/capacity to adequately respond to such threats/risks is necessary.



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- Regular exchange of information should be adopted as practice, particularly related to measures taken and implemented for prevention. This should be done at least once a year, which in turn will mobilize all participants/authorities to constantly update their data and measures at least once a year.
- Exchange of positive experience/practices of soft prevention information measures (e.g. local TV broadcasting and radio channels, local social networking groups, etc.) between public authorities, voluntary organizations and other stakeholders, should be considered.
- There is a need of organization of joint events, such as flood evacuation and mobilization for extinguishing and limiting the spread of forest fires.
- Training of bilingual staff should be made practice for more effective communication between institutions of the CBR, for authorities, non-governmental and voluntary organizations for joint action in the event of a crisis.
- Simulated joint evacuation and rescue exercises in the event of a flood, fire or earthquake should be conducted regularly.

District and municipal disaster protection plans lack an analysis of the existing (current) capacity of available equipment, material and human resources, adequately corresponding to the risk levels in the given municipality/region. A thorough analysis can envisage cooperation measures between municipalities, within the CBR, including provision of equipment and human resources. This will shorten the response time and help for more effective investments in the future, as a means of protecting the population in the event of disasters and accidents. Specific deficits and challenges include the following main aspects:

- Municipal disaster protection plans are not updated regularly and there is no analysis of the effect of the prevention measures taken, if any. New measures, or lack of updates to old ones, result in risk alteration (in this case an increase).
- The plans are not specific to the circumstances and threats to the municipality. Many of them are very detailed in theory and principle procedures, but formalized with lack of specificity for the municipality, its capacity, material, human and technical resources at its disposal.
- Plans are often not tailored as information material for the population, to prepare them to avoid severe consequences in cases of crisis occurring.



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- Completely missing are any measures for raising awareness, in a way that provide understandable and easily accessible to the population information, related to the threats, consequences or risks, including how residents can prepare and respond in the event of a crisis. Training of volunteers as well as efforts to increase their numbers and training play a key role here.
- Completely missing for the disaster protection plans are evacuation plans with routes and temporary accommodation, tailored to the specific threat in a given settlement or place of threat. Again, this is due to the lack of a thorough risk analysis. One of the most important measures to protect the population in the event of a disaster is also lacking - the supply or availability of drinking water and household water. This measure is essential especially in the event of an earthquake, flood or other serious disastrous event, while forest fires require the provision of water depots in the vicinity of the potential event.
- The levels of awareness among local and regional authorities, citizens and stakeholders not yet at satisfactory levels, such as to correspond to an responsible and adequate emergency response. One of the main measures for limiting the damage and consequences of accidents is the awareness of the population and public organizations about the levels of risk and possible locations and manifestations of a crisis event.
- From an administrative perspective, the plans are very comprehensive, provide methodological steps, but are often overly formalized.
- As a result from the formalization of the process, the regional and municipal disaster protection plans, in combination with the provision of scarce up-to-date information on resource availability, cooperation channels and risk analysis, the effective inclusion of relevant stakeholders is largely limited.
- A potential solution, next to the importance of training and public events/discussions, is the development of shortened versions, manuals, for use in times of crisis. These “simplified plans” can be made available to the population, as leaflets, raising awareness of specific threats to the municipality.
- The analysis of publicly available information also suggests that the potential for building synergies between regional structures in the CBR is also limited, due to, among others, lack of data comparability. The hinders the completeness and objectivity of the risk assessment.



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- Many of the plans lack specific contact information for crisis response and public access, which positively contributes to controlled disaster management and rescue without panic among the affected population.
- The administrative preparedness for reaction is difficult to be assessed for the Romanian part of the CBR, due to lack of publicly available information. However, based on analysis of additional documents and information materials on other projects, as well as data from in-depth interviews, point to the existence of administrative problems, such as lack of coordination and regular actualization of protection plans, prevention and communication measures.

The main recommendation of this report is adopting an integrated approach to risk analysis at municipal level, prepared with the participation of municipal experts, volunteers and other relevant stakeholders, who are familiar with the local reality. Measures for prevention and reaction in case of disasters should be undertaken and updated regularly, at least on annual basis.

Regional and municipal disaster protection plans should be thought as unifying framework, integrating and channeling this entire dynamic process, and be used as an effective tool for including relevant stakeholders and informing the general public. The fact that, though available in most case, the municipal plans tend to be formalistic and lacking actuality, hinders the effective coordination and the degree of preparedness for emergency situations in the CBR.



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**6. Annex 1: Analysis of the measures for prevention and crisis management in the CBR**

Region and municipalities	Prevention measures																	
Municipality	Risk analysis	Analysis of flood risk	Risk analysis of fire	Flooding technical measures available (Description)	Technical measures available Flood Control	Flooding Planned technical measures (proposed)	Fire technical measures available (Description)	Fire technical measures available CONTROL	Fire technical measures planned (proposed)	Communic. Info Flooding measures available (Description)	Communes. Info Flooding measures planned (proposed)	Communic. Info available measures Fire (Description)	Communes. Info Fire Planned measures (proposed)	Administrative measures Flooding available (Description)	Flooding administrative measures planned (proposed)	Administrative measures Fire available (Description)	Administrative measures Fire planned (proposed)	other
Silistra region	Many common, only rough description of the damage, no specific analysis on comprehensive changes. Conclusions does not concern prevention	Practical missing many common	Very common, only lists the areas of forests by municipalities with potential for forest fires	Mention only the dikes along the Danube	None	Mapping threat and risk of flood early warning system. When None plan!		None	None	None	None		Info population possible fires and rules of action. (No control implementation)	To analyze risk, but without term aspirational	Preparedness and flood forecasts	Organization al have been described, but None plan and control	List of fire-prone objects; Organization for state fire control + preventative measures, but no deadline when and what maps; Forest maps and coordination with MAF	
Alfatar	common	Detailed threat and there is a rough estimate risk	Detailed Description of the threat industrial, field and forest. Risk is assessed grossly	Described dikes and protective equipment	None	Described needs of ditches and protection in some of the settlements	FSPP missing in Alfatar	None	None	1	Training for informing the population risks and action	1	Training for informing the population risks and action	A detailed description of administrative measures, including support, training, drills and trainings to inform the population responsible parties.				
Glavinica	formal	Rough threat and poor risk assessment, but low risk	only threat	Cleaning of gullies and channels	Annual inspections of potentially dangerous dams	None	Plowing of mineralized strips	None	Risk Assessment and maps of forests, according to risk of fires			Signs of fire forest areas		Monitoring and control dams and dikes		Support strips and fire landfills		



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Dulovo	practical missing	No analysis of the specific municipality	no prepared	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Formal and without any specifics
Kaynardja	practical missing	Listed drainage canals and potentially affected houses. Danube missing	Listed forests with the threat. Analysis practically absent	None except canals	Generally referred to the need for Control Commission. No when and how it works	None	Plowing of mineralized strips	None	None	None	None	None	None	Maintenance plan and inspection of canals and dam. Walls	None	The principal maintenance and cleaning equipment	None	
Silistra	Detailed the threats, the risk is analyzed in general, but refers to places and buildings and risk table, including readiness for reaction. No analysis of the table!	Threat analysis is detailed. The risk in general but is available with reference to past events	Threat analysis, risk is not analyzed	Dikes along the river. River	None	None	Plowing of mineralized strips and roads between crops	None	None	None	None	None	None	Standard description. No particular municipality	To make maps of the threat and risk of flooding wishful		Mapping and creating conditions for successful fire	
Sitovo	no common	Total seats threats, the risk is not analyzed	Missing. Mentioned only causes - farmers	None	None	None	None	Described available firefighting reservoirs - landfills	None	None	None	None	None	None	None	None	None	
Tutrankan	Available, the most comprehensive floods, others are schematic and general	Clear threats reported condition, technical measures, schematic risk analysis, but shows there is a need for	schematic	Dikes along the river. River	Annual inspections of potentially dangerous dams. Cleaning canals annually and control	None	None	None	None	There is a charge and methods	None	Standard without specifics	None	Examination of equipment and hazardous objects, among other standard Training	Control and inspection and training	Mapping and coordination with the Ministries	None	

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		interventi on			dikes at high water													
Calarasi County	no common	There is a brief analysis with a descriptio n of facilities and area flooding threat analysis and potential risk generalize d for the municipali ty	no prepared	Extensively described dams, weirs, fitness	described condition	There are phases of constructi on	None	None	None	Standardiz ed but clearly described	None	Standard without specifics, but not to create panic, after approval	None	The measures are divided according to code flood warning - yellow, orange and red. Monitoring and control dams and dikes and ice formation, and Warnings in red and evacuation	None	There is, including the preparation of public information, clear responsibiliti es of all institutions and individuals (national and regional)	None	



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Region and municipalities	Measures Risk Management															
Municipality	Flooding technical measures available (Description)	Technical measures available Flood Control	Flooding Planned technical measures (proposed)	Fire technical measures available (Description)	Fire technical measures available CONTROL	Fire technical measures planned (proposed)	Communic. Info Flooding measures available (Description)	Communes . Info Flooding measures planned (proposed)	Communic. Info available measures Fire (Description)	Communes . Info Fire Planned measures (proposed)	Administrative measures Flooding available (Description)	Flooding administrative measures planned (proposed)	Administrative measures Fire available (Description)	Administrative measures Fire planned (proposed)	Result	other
Silistra region	Lairages, disinfection, drainage	None, except update the plan, but it is not clear there such	None	Sources deep wells and plumbing, but with very little diesel Res. Aggregates. Problem blackout	None	Support roads, water supplies, equipment	Generally mentioned; Info for citizens after prior consultation with the Governor	None	Generally mentioned; Info for citizens after prior consultation with the Governor		Description of necessary measures and responsibilities - has thoroughly		Description of necessary measures and responsibilities - has thoroughly			Admin measures for buildings and dams to earthquakes, but without a plan and a deadline. Determining locations (various activities and destruction) should have a preliminary assessment plan based on risk assessment. Such gone.
Alfatar	Rescue equipment and shelter	None, except update the plan, but it is not clear there such	Shortage of equipment for temporary accommodation	Fire truck	It's not clear	None	Information system and sirens	None	Information system and sirens	None	operational duty	Detailly described responsibilities and sequence of actions	operational duty	Detailly described responsibilities and sequence of actions		Detailed activities and responsibilities described in sequence and in places with necessary equipment and facilities. It is unclear whether the equipment available is sufficient or not and for which cases



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																of flooding and fires would be sufficient
Glavinica									Standard description of the reg. Plan. No specifics.		Principal activities without specifics. There supervisors name, but not updated. Planned control, but it is unclear how long and how they work		Principal activities without specifics. There are officers by name, but is obsolete			The plan is not specific. No analysis of necessary equipment and facilities. Not clear connections and interactions between staff and administration in Crisis
Dulovo	General as staging, no specifics	None	None	None	None	None	common	None	None	None	Standard Features in desirable mode without specifics and names mentioned	None	None	None		Hardly served as a guide and reference when disaster strikes
Kaynardja	Descriptive principles without concrete actions to place Event	None	None	Descriptive principles without concrete actions to place Event	None	None	Standard wishful plus sirens	None	Standard wishful plus sirens. There are mentioned on the municipal website with fire safety measures.	None	Implies the choice activities without specifics for the municipality	None	Standard, but there are also mentioned training and practice fire safety.			Plans are common, no specifics and would not have helped rapid response in case of disaster and crisis
Silistra	None	None	None	None	None	None	Generally mentioned; Info for citizens after prior consultation with the Governor		Generally mentioned; Info for citizens after prior consultation with the Governor		Description of activities and responsible institutions, but None kaonkretno the objects of threat and risk	Formal measures. Not clear how to perform and who controls the preparation	Description of activities and responsible institutions, but no specifics related to the objects of threat and risk			The obligations are described, but again no specific name and specific duties

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Sitovo	None	None	None	None	None	None	Detailed, including names and telephone numbers in case of disaster	None	Detailed, including names and telephone numbers in case of disaster	None	Principled organization and order of collection and actions with specific names. Shortened but clear procedures	None	Principled organization and order of collection and actions with specific names. Shortened but clear procedures	None		Despite the lack of risk analysis and a large part of the requisites in crisis management action plan, which is common to all types of threats, with distribution of tasks and is clear and specific and would be effective if crisis occurred. No analysis and description of resources
Tutrakan	Equipment and sand and materials	None	None	None	None	None	Monitoring dikes and dams in rains and high waters and info for all of posts. All other standard measures; consistent structure	None	Standard but what do people	None	The principal of all but a reference to suspected affected areas	None	Standard without specifics	None		
Calarasi County	Repairs and reinforcement of dykes and other works facilities	surveillance	None	Supplied by the respective organizations. None clarity	None	None	Standard plus sirens	None	After a standard permit	None	Principle of population evacuation, very short, basic monitoring and maintenance of facilities and repair and restoration activities	None	Principles for each department, but a full list and contacts at all levels, including voluntary units	None		No risk analysis nor or specific potential locations; no prevention measures



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7. Annex 2: Risk assessment methodology and calculations

Template data entry

column	2	3	4	5	6	7	8	9	10	11	12	13	14	17	18	19	15	16
Data	Municipality	Type of major threat	Type of threat	Where and what can be done	Vulnerability R	Assessment: number of affected	Assessment: possible damage	Probability (P) of occurring	Available preventive measures	Assessment of the effect of prevention (N)	RPN	Factor L	Factor D	RPNL Ability to handle risk * damage	RPND Ability to handle risk * demographic factor	RPNLD Complex risk factor for coping	Proposed future prevention	Sample Value of future measure
Type of data / how to fill	Name / Code Selection menu	Natural or Technological Choice of menu	Selection menu	Free text / description	Index of 1 to 10; choice of menu	number	A rough estimate in Euro	Index of 1 to 10; choice of menu	Free text / description	Index of 1 to 10; choice of menu	Automatically calculated	Automatically calculated	Automatically calculated	Automatically calculated	Automatically calculated	Automatically calculated	Free text information	A rough estimate in Euro
Example	Tsarevo / BGS13	natural	floods	Spill in the lower reaches and mouth of Veleka, road, bridge, beach and camping overwhelmed, overwhelmed tourists without access of light vehicles over the bridge.	6	1000	2000000	7	Information from passing people and synoptic forecast rainfall	9	378	3	8	1134	3024	9072	Monitoring system upstream level	100 000



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Indicators municipal level, Silistra

Threat and severity%							
Municipality	Residents	Dependent	Active	Age dependency factor		Protection plan	Volunteers
Silistra region	111 957	46 753	65 204	72%	8	-	
Alfatar	2704	1278	1426	90%	9	Available, 2015, no concrete measures	Available
Glavinica	10 243	4346	5897	74%	8	Available, 2012	Available
Dulovo	27 643	10 974	16 669	66%	8	Available, 2012	N/A
Kainardzha	5115	2140	2975	72%	8	Available, 2017, mainly administrative measures	Available
Silistra	47 130	19 613	27 517	71%	8	Available, 2017	N/A
Sitovo	5110	2268	2842	80%	9	Available, 2017	Available
Tutrakan	14 012	6134	7878	78%	8	Available, 2014	N/A

Floods

Source	Description	R score	Source P	Probability P	N source	Description	Rating N	Rating RP	Damages (source)	Damages, including estimated amount in EUR	Total municipality	Scraps plan	RP N	RP N weight	RP ND	RP ND weight
OP ZP B	Flooding from rainfalls, Alphatar, improvement after dikes installation	8	OPZPB; NSI reference	7	OP ZP B	Levee in Alfatar	4	56	OPZ PB	7 people died; flooded houses and ground floors			224	34.944	2016	314.496
OP ZP B	Flooding from the rainfalls, Danube overflow of dams, many reservoirs with potential spill	7	OPZPB; NSI reference	7	OP ZP B	Danube embankment, cleaning, inspection	4	49	NSI	1300000	Houses with ground floor and along the Danube		196	30.576	1568	244.608
OP ZP B	Floods from rain	3	OPZPB; NSI reference	3	OP ZP B	No specific unless disclosure	4	9	OPZ PB	There is no			36	5.616	288	44.928
OP ZP B	Floods from rain	7	OPZPB; NSI reference	7	OP ZP B	No specific unless disclosure	5	49	OPZ PB	210000	Houses with ground floors		245	38.22	1960	305.76
OP ZP B	Floods from rain, river and dams	7	OPZPB; NSI reference	7	OP ZP B	No specific unless disclosure control dikes and cleaning	5	49	OPZ PB	500			245	38.22	1960	305.76



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OP ZP B	Floods from rain and river	7	OPZPB; NSI reference porn	6	OP ZP B	No specific unless disclosure control dikes and cleaning	4	42	OPZ PB					168	26.208	1512	235.872
OP ZP B	Floods from rain and river	7	OPZPB; NSI reference porn	6	OP ZP B	No specific unless disclosure control dikes and cleaning	5	42	OPZ PB					210	32.76	1680	262.08

Forest fires

Source	Description	R score	Source P	Probability P	N source	Description	Rating N	Rating RP	Damages (source)	Damages, including estimated amount in EUR	Source	Forest area municipality	Scraps plan	RP N	RPN weight	RPN D	RPND weight
OPZPB	Many forest area	6	NSI Fires	5		There is no fire department in the municipality	7	30			248564	104 837	Weak for forest fires	210	23.94	1890	215.46
OPZPB	1/3 forest area	5	NSI Fires	5	OPZPB	Includes specific measures; Heli site; water sources	5	25			507126	166 154	Weak for forest fires	125	14.25	1000	114
OPZPB	1/4 forest area	4	OPZPB NSI	5	OPZPB	N/A	5	20			570037	140000	There is almost nothing	100	11.4	800	91.2
OPZPB	1/5 forest area	4	OPZPB NSI	5	OPZPB	N/A	5	20			314950	64,150	Basic administrative	100	11.4	800	91.2
OPZPB	1/7 forest area	3	OPZPB NSI	5	OPZPB	N/A	5	15			515891	68,273	Basic administrative	75	8.55	600	68.4
OPZPB	1/8 forest area	3	OPZPB NSI	5	OPZPB	N/A	5	15			271000	34047	Basic administrative	75	8.55	675	76.95
OPZPB	1/6 forest area	4	OPZPB NSI	5	OPZPB	N/A	5	20			440000	74000	Basic administrative	100	11.4	800	91.2



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RPN	RPND	RPN	RPND	RPN	RPND
All threats		Only floods and forest fires, ESPON classification		Average for floods and forest fires	
113	1021	59	530	217	1953
96	771	45	359	161	1284
55	442	17	136	68	544
92	738	50	397	173	1380
102	812	47	374	160	1280
82	737	35	313	122	1094
90	718	44	353	155	1 240



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