BOSNA I HERZEGOVINA
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V L A D A

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ФЕДЕРАЦИЈА БОСНЕ И ХЕРЦЕГОВИНЕ
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BOSNIA AND HERZEGOVINA
FEDERATION OF BOSNIA AND HERZEGOVINA
GOVERNMENT

English language

RISK ASSESSMENT OF FEDERATION BOSNIA AND HERZEGOVINA REGARDING NATURAL AND OTHER DISASTERS

NOVEMBER

2014.

Federal administration of civil protection

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Based on Article 24. item 1) Law on protection and rescue of people and property from natural and other disasters ("Official Gazette of the Federation BH", No. 39/03, 22/06 and 43/10), the Government of the Federation of Bosnia and Herzegovina, at its 139th meeting held on 13.11.2014., adopts

DECISION

ON RISK ASSESSMENT OF THE FEDERATION OF BOSNIA AND HERZEGOVINA REGARDING NATURAL AND OTHER DISASTERS

I

This decision regulates the adoption of the Risk assessment of the Federation of Bosnia and Herzegovina regarding natural and other disasters (hereinafter: Risk assessment).

II

Risk assessment is attached to this Decision as its integral part.

III

Federal administration of civil protection is obligated to deliver a copy of the Risk assessment to all federal ministries, federal departments and federal administrative organizations, to work on tasks that are laid down for the assessment for these authorities, as well as all cantonal governments, heads of municipalities and mayors, in order to align all the important questions for the organization, functioning and development of protection and rescue system in the Federation of Bosnia and Herzegovina.

IV

The cantons, cities and municipalities are obliged to align its Risk assessment with the Risk assessment from item II of this decision, in matters of mutual interest.

Harmonization in paragraph l. of this item, realized in cooperation with the Federal administration of civil protection.

V

On the effective date of this decision, the decision on the Risk assessment of the Federation regarding natural and other disasters ceases to be valid ("Official Gazette of BH", No. 41/05).

VI

This decision shall enter into force on the day following its publication in the "Official Gazette of the Federation of Bosnia and Herzegovina".

V.no. 2003/2014

13. 11. 2014 PRIME MINISTER

Sarajevo Nermin Nikšić

Risk assessment of Federation of Bosnia and Herzegovina regarding natural and other disasters

By the provision of Section 20. of the Methodology for the preparation of Risk assessment of Bosnia and Herzegovina regarding natural and other disasters("Official Gazette of BH", 35/04), it was established that the adopted Risk assessment is subjected to obligatory analysis at least once a year, which assesses the need to update and upgrade and if in the area for which the risk assessment was made certain changes happened that affect the change in the estimated state, update of the risk assessment is carried out immediately after learning of the occurrence of these changes.

Risk assessment of the Federation regarding natural and other disasters, as determined by Article 26, paragraph 2, item 2) of the Law on protection and rescue of people and property from natural and other disasters ("Official Gazette of BH", no. 39/03, 22/06 and 43/10), prepared by the Federal administration of civil protection in accordance with the above methodology, and the final draft of the document, was prepared after harmonization with the federal ministries and other federal authorities, institutions, scientific and other institutions. The working group was appointed by the Decision of the Government of the Federation of Bosnia and Herzegovina V. No. 190/2005 dated 07.04.2005.

Proposal for Risk assessment of the Federation of Bosnia and Herzegovina regarding natural and other disasters was repeatedly discussed by the Federal headquarters of civil protection and gave its opinion, after which they sent it to the Government of the Federation of Bosnia and Herzegovina for consideration and adoption. The Federation of Bosnia and Herzegovina according to its Decision No. V: 328/05 of 30.06.2005 passed the risk assesment of the Federation of natural and other disasters ("Official Gazette of BH", No. 41/05).

By analyzing current developments in the natural and social environment in the Federation of Bosnia and Herzegovina, Bosnia and Herzegovina and beyond, between the creation of the above document to date, Federal administration of civil protection assessed that there have been significant changes and circumstances that require updating and upgrading of the estimated position of vulnerability areas Federation of Bosnia and Herzegovina from natural and other disasters, which is why the realization of this task was approached.

When updating the risk assessment of the Federation of Bosnia and Herzegovina regarding natural and other disasters, the historical, scientific and all other available information about developments and the dangers that threaten people and property in the Federation of Bosnia and Herzegovina, i.e Bosnia and Herzegovina were consulted and used.

CONTENT

LIST OF IMAGES

LIST OF TABLES

A - INTRODUCTION

Federal administration of civil protection, in accordance with Section 20. of the Methodology for the Risk Assessment of the Federation of Bosnia and Herzegovina regarding natural and other disasters, ("Official Gazette of BH", 35/04), approached the updating risk assessments of the Federation BH regarding natural and other disasters ("Official Gazette of BH", No. 41/05) (hereinafter: Risk Assessment), in the same manner and according to the procedures established for the drafting and adoption of risk assessment.

This means that updating risk assessment was done in cooperation with the federal ministries and other federal authorities, institutions, scientific and other institutions. In addition, the process of updating risk assessments provided harmonization with the risk assessment regarding natural and other disasters of Bosnia and Herzegovina, which was considered and adopted by the Council of Ministers of Bosnia and Herzegovina at its 5th session, which was held on 18.04.2012.

Also, in the process of updating risk assessments official points of view are used, the practice and standards of international institutions:, European Commission Directorate General for the Enviroment-Civil protection ,EU Commission in Bosnia and Herzegovina, the Stability Pact for South Eastern Europe - Working Table III, " security issues "- DPPI - Prevention of all forms of disaster, the Council for Civil-Military Emergency Planning for SEE countries, NATO - Partnership for Peace, UNDP and others.

Following the information received, proposals and suggestions from all federal ministries and other bodies of Federal administration, Bureau, scientific and other institutions, the Federal administration of civil protection has prepared a proposal for up to date Risk Assessment, in which it incorporated all the reported data, proposals and suggestions of the mentioned federal authorities and institutions.

Federal headquarters of civil protection, in 2013 and 2014, considered the proposal of the updated risk assessments at its meetings, to which it gave its opinion, after which the document was sent to the Government of the Federation of Bosnia and Herzegovina for consideration and adoption.

The Federation of Bosnia and Herzegovina at its 139th meeting held on 13.11.2014. had reviewed and approved the said document, the adoption of decisions on the risk assessment of the Federation regarding natural and other disasters, V. No 2003/2014 of 13.11.2014. This decision was published in the "Official Gazette of BH", number 95/14 and came into force on 22.11.2014., when the Decision about the Risk Assessment of the Federation of Bosnia and Herzegovina regarding natural and other disasters became invalid ("Official Gazette of BH", No. 41/05).

The conclusions set out in the Risk Assessment of the Federation of Bosnia and Herzegovina regarding natural and other disasters, represents the starting point and basic directions and guidelines for updating and adoption of the Plan for protection and rescue from natural and other disasters in the Federation of Bosnia and Herzegovina, as well as the development and adoption of the Program of protection and rescue people and property from natural and other disasters in the Federation of Bosnia and Herzegovina for the next period.

The estimated level of risk of the Federation of Bosnia and Herzegovina consists of all natural and other disasters that can threaten the territory of the Federation of Bosnia and Herzegovina, which is a significant step towards the establishment of readiness of the community to prevent the formation, mitigation and rehabilitation of the consequences of natural and other disasters in the Federation of Bosnia and Herzegovina.

1. Natural disasters that pose the greatest threat to people and property

- Earthquake,
- Landslides, ice and land subsidence,
- Deep snow and snow drifts,
- Flood,
- Drought,
- Hail (ice)
- Storm and frost,
- The occurrence of human, animal and plant diseases.

2. Technical and technological accidents that pose a threat to people and property

- Large fires,
- Demolition or overflow dams on reservoirs,
- Expansion or explosion of gases and hazardous substances,
- Radioactive and other contamination of air, water and land,

- Mining accidents.

3. Other threats of large-scale disasters

- Mines and unexploded ordnance (hereinafter: UXO),
- A major accident in the road, rail, water and air transport,
- Balance and reflection of social processes in Bosnia and Herzegovina and the region.

4 . Submission of the Bosnian - Herzegovinian population and property to the natural and other disasters of small and large scales is even increased

- Catastrophic consequences and the great state of war destruction 1992 -1995, which changed the ethnic, demographic, economic and social picture of the country,
- Psychological basis of war memory (physical and mental pain), ethno-confessional and national-political entrapment, geopolitical and security of the volatile Balkans,
- The slow process of stabilization, transition and development, on the road to economic, social and political dependence on the one hand and self-sustainability and local ownership of development, on the other hand,
- Slow implementation of structural reforms in public administration, defense and armed forces security-police-intelligence system,
- Slow consolidation of state structures and the fulfillment of the conditions of the Association Agreement and cooperation with the European Union (hereinafter: EU)
- Significant poverty,
- Poor infrastructure and communications,
- A sharp rise in the dense and unplanned construction of residential buildings in the grip of major cities and without prior fulfillment of zoning requirements, the construction of commercial and industrial facilities,
- An increase in illegal construction and illegal construction of housing and other facilities in the affected areas (landslides, floods, etc.).
- Rapidly increasing traffic levels, discharge of chemicals and violent and frequent interventions in the natural environment brings new threats of disasters caused by human factor,
- A series of forms of endangerment of the environment,
- Disappearance and over-exploitation of forest resources,
- Poor management of water resources in Bosnia and Herzegovina,
- Particularly hazardous waste,
- Forms of social pathology.

Without pretensions to arbitrate on the situation of civil and social relations in the context of protection and rescue, the document warns, noting that the protection and rescue of people and property in Bosnia and Herzegovina and the Federation of Bosnia and Herzegovina, does not avoid the social processes of socio-economic, political and legal,security and military relations,international multilateral issues of regional cooperation, providing confidence and stability in the countries of Southeast Europe.
Risk assessment, first of all, draws attention to the community (holders planning) in natural, technological and other accidents, the general awareness of the need to prepare for Protection and Rescue, then continuous and detailed analysis of the risks and dangers and offers logical arguments for system answers to the dangers and risks of specific natural disasters in the Federation of Bosnia and Herzegovina.
Planning of spatial development in the Federation of Bosnia and Herzegovina and the state of Bosnia and Herzegovina should be required to rely on the critical points of susceptibility to accidents that were recorded in the assessment of threat, to which more precisely are determined the measures to control and reduce the risk of natural and other disasters.
In the organization of protection and rescue system, the Federation of Bosnia and Herzegovina, through the Law on protection and rescue of people and property from natural and other disasters, (hereinafter referred to as the Law on Protection and Rescue) and by-laws ensure normative, organizational and functional independent and unique system which operates at regular and all the changing relationships, as well as in emergency and war, whatever the nature of the organization of the state structure of Bosnia and Herzegovina.

B - GENERAL ASSESSMENT OF EXPOSURE

1. Natural and geographic characteristics of the territory of Bosnia and Herzegovina

Bosnia and Herzegovina is located in the western part of the Balkan peninsula and is bordered on the north, west and south-west with Republic of Croatia, a distance of 931 km to the east and south of the Republic of Serbia 357 km and Montenegro 249 km. Border length is 1,538 km, of which land 774 km, 751 km river and the sea 23 km.
In the northern part, the territory of Bosnia and Herzegovina has access to river Sava and on the south-to Adriatic Sea in Neum.

Figure 1. Natural and geographic characteristics of the territory of Bosnia and Herzegovina[1]

1.1. Area

Bosnia and Herzegovina covers 51,209.2 km2

51.197 km2

12,2 km2

Bosnia and Herzegovina consists of two entities: the Federation of Bosnia and Herzegovina with 50.638% of the territory, the Republic of Srpska 48.386% of the territory, and the Brcko District Bosnia and Herzegovina with 0.976% of the territory of Bosnia and Herzegovina.

[1] Data of the Federal Bureau of Statistics - Statistical Yearbook / Yearbook 2004 the Federation and the Federal Hydrometeorological Institute.

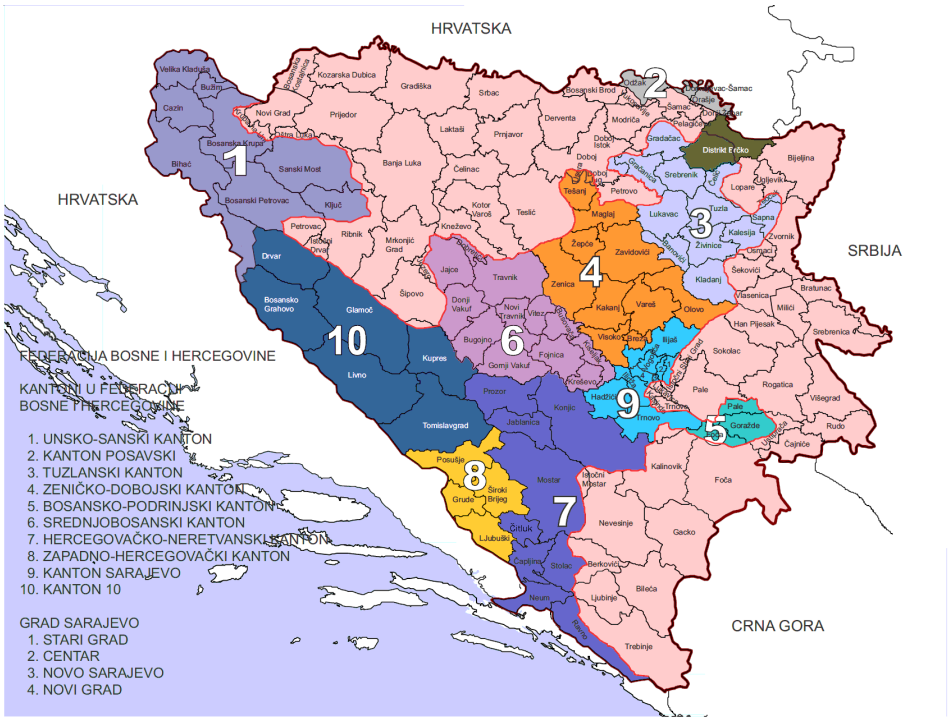


Figure 1.1 Canton map in the Federation of Bosnia and Herzegovina

1.2 Population

According to statistics from the Federal Bureau of Statistics in 2012, in the Federation of Bosnia and Herzegovina lives 2,338,270 inhabitants, of whom 419,467 aged 0- 14 years, 1,590,071 of 15-64 and over 65 328 521 inhabitants.

1.3. Ethnic structure

Bosnia and Herzegovina has a very complex ethnic composition of the population according to the last census in 1991 and it is as follows: 44% Bosniacs, 31% Serbs, 17% Croats, 6% Yugoslavs and 2% other. These are the three constituent and equal people, while others, members of 21 nations have national minority status.

1.4. Religious structures

The religious composition of the population of Bosnia and Herzegovina is a result of historical developments and population movements so that Bosnia and Herzegovina is multi-religious, multi-national and multi-cultural state. The most dominant religions are Islam, Orthodoxy and Catholicism, but there are also some other religions with fewer followers that percentage is as follows:

1.Islam 40%
2. Orthodox 31%,
3. Catholicism 15%,
4. Other 14%.

1.5. Climate

In view of the specific geographical position and relief, the climate of Bosnia and Herzegovina is quite complex and may vary three separate parts, with more or less clear boundaries and transitional areas, namely:

1 in the south-west - the Mediterranean, ie maritime climate,
2. In the middle section - continental mountain or alpine,
3. In the north - temperate continental, European or secondary climate
In the south-western parts of the country, due to the proximity of the Adriatic Sea, which in winter radiates heat accumulated during the summer period, the average January temperatures are high (3 to 5 ° C), while the summers are hot and dry (absolute maximum temperature of 40 to 45°C). The annual precipitation ranges between 1,000 and 2,300 l / m2 and the annual temperature of 12 to 15°C. Snow is rare in this region, although not an impossible occurrence.
In the central part of Bosnia and Herzegovina there is a continental mountain climate, alpine type. The main characteristics of this climate are cold winters (absolute minimum temperature of -24 to -34°C), while the summers are hot (absolute maximum temperature of 30 to 36°C). The average annual precipitation ranges from 1,000 to 1,200 l / m2. Snowfalls are heavy, especially at higher elevations.
In the north of the country there is the moderate continental climate, with fairly cold winters and warm summers but, in relation to the alpine zone, smaller ranges between winter and summer temperatures. The hottest areas are in the northeast, while the mean temperature dropping to the southwest, following the river valleys to the central area. Annual precipitation ranges from 700 to 1100 l / m2. Snowfalls are also present, but less than in the middle section.
Note that, depending on the altitude, between the above-mentioned basic belts we have a transitional climate zones. So, going from south to north as altitude increases, we are talking about the transitional areas, ie. the Mediterranean climate subalpine type, ie, further to the north on moderate continental climate subalpine type.
Here, as an example, two positions from each of the climatic zones:

Table 1.5. Climate belts

Weather stations	Mean annual temperatures (° C)	Annual precipitation (l / m2)	Number of cloudy days (years)	The number of clear days (years).
Bihać	10.6	1306	106	37
Tuzla	10.0	895	95	47
Zenica	10.1	776	96	32
Sarajevo	9.6	931	97	46
Mostar	14.6	1493	78	67
Livno	13.9	1817	86	54

The winds are rare and weak, and when they occur they mostly come from northern and northwestern direction. A moderate continental climate is partly present in the mountainous basin area. This applies to areas with altitudes up to 1,000 m. With increasing altitude, the climate gradually changes to sub-mountainous (pre-mountainous) and above 1400 m is a real mountainous climate.

1.5.1. The mountain climate

The mountain climate resides in central mountain region of our country. This type of climate is most pronounced in the surrounding mountains Oštrelj, Travnik, Sarajevo and Foča. Transitional seasons (spring and fall) are weakly expressed. Compared to the moderate

continental climate, the mountainous climate is more severe. It is characterized by fresh and short summers, cold and snowy winters. Average January temperatures range from -3.5 ° to -6.8 ° C, and the July of 14.8 ° to 16.9 ° C. The absolute minimum temperatures of -24 ° to -34 ° C, and an absolute maximum of 30 ° to 36 ° C. Exceptions are basins that exhibit temperature inversion. Such places are known as frost areas; one of them is located on Mount Igman, where on 25 January 1963, measured a minimum temperature of -43.5 ° C. Thermal fluctuations ranging from 20 ° to 21 ° C. Autumn is warmer than spring. Precipitation is evenly distributed and is about the first 1. 200 mm. They are expressed in the form of rain and snow, which remain for a significantly longer period compared to lower areas. Snowfalls are heavy, particularly in the higher areas. Fog is common and it is present in all months.

1.5.2. Humid continental climate

Moderate continental climate is present in northern Bosnia and valleys of secondary flows Una, Sana, Vrbas, Bosna and Drina from Višegrad. It is characterized by warm summers and cold winters. Summer absolute temperature can rise to 40°C and the absolute minimum winter can drop to -35 °C.

The average temperature of the hottest month (July) is between 20 °C and 22 °C, while the average temperature of the coldest month (January) ranges from -1 ° C to -2 °C. Fall and spring temperatures are uniform. The average temperature is higher than 10 °C. The quantity of rainfall in BH is affected by humid air mass coming from the west (the Atlantic Ocean) and south (the Adriatic Sea). Precipitation is the most variable hydrological parameter in terms of space and time, a fact that is drastically obvious in Bosnia and Herzegovina. Average annual precipitation in BH is about 1,250 mm, which is 2,030 m3 / s of water. Annual precipitation amounts range from 800mm in the north along the Sava River to 2000mm in the central and southeastern mountainous regions of the country. In the continental part of BH belonging to the Danube River catchment area, a major part of annual precipitation occurs in the warmer half of the year, reaching its maximum in June. The central and southern part of the country with numerous mountains and narrow coastal regions is characterized by a maritime regime under the influence of the Mediterranean Sea, so the monthly maximum amounts of precipitation are reached in late autumn and early winter, mostly in November and December.

The winds are rare and weak, and when they occur mostly come from northern and northwestern direction. Moderately continental climate is partly present in the Mountainous Basin area. This applies to areas with altitudes up to 1,000 m. With increasing altitude, the climate gradually changes to sub-mountainous (pre-mountainous) and above 1400 m real mountainous climate.

1.5.3. Mediterranean (Mediterranean) climate

Mediterranean (Mediterranean) climate is represented in the southwestern parts of the country, and low- and high-Herzegovina. Therefore, we distinguish between two types of Mediterranean climate. Area of low-Herzegovina, which corresponds to the lower Neretva and surrounding karts fields lower than the first 000 m above sea level: these are Ljubuski, Imotski- bekija, Mostar and Stolac. This type of climate, low-Herzegovina arises from the fact that its space under the direct influence of the sea air. Adriatic Sea during winter radiates the surrounding area accumulated heat during the summer and winter temperatures are significantly higher. The average January temperature ranges between 3 and 5 °C.

In summer, the influence of the Adriatic Sea is negligible, due to the limestone rocks, which, when heated changing the temperature of the area. Summers are very hot and dry and the absolute maximum temperatures of 40 to 45 ° C. Mean annual temperatures range from 12 to 15 ° C, while the absolute minimum and dropping to -17 °C. In this area, the tempest is dominant, with a shift from the southern wind. The calmest month is October and February windiest. The wettest month is October, with 200 mm of precipitation on average. There is almost no snow.

1.5.4. The modified Mediterranean (Mediterranean) climate

The modified Mediterranean (Mediterranean) climate encompasses the area of high-Herzegovina. In this higher Herzegovina and southwestern mountainous area climate is approaching the mountain, but with Mediterranean features. Air temperature decreases with increasing altitude and distance from the sea. For every 10 km away from the sea temperature drops by 0.6 °C to 0.8 °C. Winters are harsh with the absolute minimum temperatures of -14 °C to -25 ° C. Average January temperatures range from -1.8 ° to -6 ° C. The average of the

absolute maximum temperature may rise up to 40 °C. As in the low-Herzegovina autumn is warmer than spring, but the fluctuations in temperature increased. In this area it falls about first 800 mm of rainfall annually. Tempest is most pronounced in winter and very strong at the folds. Cloudy condition has been increased from the low-Herzegovina.

The wind regime in Bosnia and Herzegovina influences several different factors, primarily Dinara Mountains that descend to the northwest-southeast, close to the Adriatic Sea, and the influence of the Pannonian Plain in the north. Depending on the climatic areas in Bosnia and Herzegovina it is dominated by different types of wind. The shape of roses (frequency, direction and mean wind speed) depends on the orography of terrain, so they are different for each station.

Average annual wind speeds that may be of 1.5 m / s to 4 m / s with a period of silence from 20 to 45%.

In the zone of continental climate, in the river basin, they are facing frontal winds and the emergence of wind, which blows from east to west. Extreme gusts of wind can reach 40 m / s and wind speed of 17.2 m / s and its registered more than once a year. In the Alpine climate extreme winds are blowing at high altitude, ie. the tops of the mountains, while the valleys are generally protected.

The characteristic wind for the region's Mediterranean climate is storm. Based on the above medium speed, it can be seen to occur in low-Herzegovina, and that the most prominent area of Mostar, where the annual average wind speed is of 3.3 m / s.

In all periods of the year there is possible values of storm scale, but they are usually in the colder part of the year. Anticyclonic storm characterized by gusts of wind 30-37 m / s, while the winds over the 17.2 registered 5-10 times a year. The maximum wind speed of 44 m / s happened once in 50 years.

Figure 1.5.4. Types of climate in Bosnia and Herzegovina

1.6. National product

According to the Agency for Statistics of Bosnia and Herzegovina ("Thematic Bulletin", ISSN 840-104 X) gross domestic product (GDP) per capita in 2011 for Bosnia and Herzegovina amounted to $ 4,753, while the Federation of Bosnia and Herzegovina amounted to 4,070 USD. Gross domestic product for the Federation of Bosnia and Herzegovina in the constant prices as an important indicator of the dynamics and level of economic development of a country (economic growth when it eliminates the effect of price changes) in the period 2001 - 2008 years grew at a rate of 2.5 to 5, 8.

Due to the global economic crisis that affected our country in 2009 there was a recorded negative rate of real GDP growth in the amount of -2.6. However, in 2010 the real GDP growth rate of the Federation of Bosnia and Herzegovina amounted to 0.8 and 1.0 in 2011 which shows a slight recovery of our economy ("Statistical Bulletin", Federal Bureau of Statistics, no. 178/2012).

Although our country has had a high rate of GDP growth in the postwar period, purchasing power parity is one of the poorest countries of Europe together with Albania. Natural resources like water, forest resources, land and mineral resources which are abundant in our country are relatively rich in natural resources, in which one can see the advantage over neighboring countries. Thus, in industries such as manufacturing, agriculture, electricity, construction, mining and fishing creates 34% of value added and in services activities 66.0%.

In the Federation of Bosnia and Herzegovina, the largest share of manufacturing industry in GDP in 2011 to the processing industry (12.7%),followed by agriculture (5.1%), construction and supply of electricity (3.9%) and mining (2.4%). Manufacturing in the Federation of Bosnia and Herzegovina since 2000 to 2011 had a positive growth rates ranging from 3.2% to 26.4% (data for 2007), and in 2009 recorded a decrease of 12% as a result of the global economic crisis.

In addition, our country has a wealth of in unconventional sources, such as geothermal energy, solar energy and wind energy, which are insufficiently or not used. The greatest wealth of our country are the natural beauty that are under-used for tourism purposes, and to be protected as national parks, nature reserves, recreational areas with the preservation of biological resources that is flora and fauna.

In due course the natural resources of Bosnia and Herzegovina will not be a limiting factor of development, and it is therefore necessary to work on the prevention of their irrational use.

It should be noted that illegal activities as a form of NOE activity are not included in the estimates of GDP in our country.

1.7. Employment

According to the Federal Bureau of Statistics ("Statistical yearbook / yearbook 2012") in the Federation of Bosnia and Herzegovina in 2011 the average number of employees amounted to 440,747 (173,764 women and 266,983 men), and most activities of employees were observed in the manufacturing industry, trade, public administration.

At the same time there were 367,515 unemployed persons (188,791 women and 178,724 men).

Thus, the average unemployment rate in the Federation of Bosnia and Herzegovina in 2011 amounted to approximately 48.59%. Since 2007, the unemployment rate increased by 6.5%. What is the problem in our country is a large number of employees working unregistered (illegal), that information is not included in the aforementioned data on the number of employees.

Table 1.7.Data on the number of employees in Bosnia and Herzegovina[2]

1.	Number of inhabitans	3.828.397	(2009)
2.	Number of children	1.250.000	(2009)
3.	The percentage of children under the age of 14 years compared to the total population	18,33 %	(2009)
4.	The percentage of people below the poverty line at the national level	18,56 %	(2009)
5.	The percentage of poor children in Federation BH	18,00 %	(2009)
6.	The percentage of poor people in RS	20,00 %	(2009)
7.	The percentage of poor people in Brcko district	27,00 %	(2009)
8.	Life expectancy index (vital index)	1,02 %	(2009)
9.	Percentage of labor force due to total population	51,00 %	(2009)
10.	The percentage of the total unemployment rate in relation to the workforce	41,60 %	(2010)
11.	The number of employees in BH	422.950	(2010)
12.	The number of unemployed in BH	511.000	(2010)
13.	According to the general index of social exclusion (HSEI) society in BH is somehow marginalized (in% relative to the total population)	50,32 %	(2007)
14.	Infant mortality rate in BH	13,00 %	(2009)

Because of reasons as to why the census in Bosnia and Herzegovina is not carried out here the data of the Federal Bureau of Statistics is used.

1.8. Land

Land of Bosnia and Herzegovina is extreme hill-mountain area, with an average altitude of 150 m. The climate is moderate continental and in a smaller part of the Mediterranean.

In Bosnia and Herzegovina dominated the space above 200 m above sea level, which is a part of the surface of 44,450 square kilometers, or 87%. The average altitude is around 525 ms large number of mountain peaks above 2,000 m.

Area to 500 mn / m comprises 20,930 square kilometers or 41% of the territory, from 500 to 1000 mn / m 17 400 km², or 34%, totaling 75% of the territory of Bosnia and Herzegovina in the amount of up to 1,000 mn / m.

Areas to 500 mn / m, were represented in the northern and southern part of Bosnia and Herzegovina and the valleys of the rivers Una, Sava, Vrbas, Bosna, Drina, Spreca and the Neretva.

The area above 1,000 mn / m covers about 12,900 square kilometers or 25% of the territory of Bosnia and Herzegovina.

The lowest elevation point in Neum (Adriatic Sea) and is 0 m, the highest mountain in Bosnia and Herzegovina is Maglic, whose altitude is 2,386 meters and is located in the municipality of Foca

According skewed courts in Bosnia and Herzegovina, only 8,111 square kilometers, or 15.8% of the territory is a smaller slope of 13%, or 84.2% of the territory is a slope greater than 13%, which greatly hampered the application of mechanization in agricultural production.

Share of forest land in these areas is slightly higher than the agricultural, noting that much of the forest land covered by degraded and low woods and bushes. Expressed relief, with a sharp and steep slopes, geological, overgrown fields and manner of use to a regimen of rainfall opting hydrography watercourses in the upper parts of catchment areas which significantly affect the hydrological regime of watercourses in the central and lower parts of the basins.

Although methodologically different, collecting data on the coverage of forest land in Bosnia and Herzegovina has demonstrated a trend of reducing them. Roughly based on the presented facts, we can conclude that the percentage of forest cover in the past 30 years has decreased by about 11 - 12%. In absolute size now stands at 2,017,403 hectares, or about 40% of the total area of Bosnia and Herzegovina.

When asked, how were the result of the reduced the area under forest vegetation and forest land, the possible answers are:

[2] Agency for Statistics of Bosnia and Herzegovina

- The former forest area and forest land most likely disappeared expanding urban areas, opening the open pit mines, the tailings mines and thermal power plants, expanding farmland, lakes, accumulations, sports fields for winter sports and are now entering the area of the other categories.
- The second reason is technical in nature, due to non-use of very precise geometry of figures, which can be used on steep terrain, and where there is a majority of forest land in Bosnia and Herzegovina, the surface thereof are slightly reduced (NFG 2001).

From the foregoing, it can be concluded that in Bosnia and Herzegovina due to the specific orography (relief entirety), form and composition of forests, for the purpose of state forest inventory, cannot use satellite shots, which cannot provide data of sufficient quality and precision (NFG 2001).

Air-photo shot could possibly be used in combination with terrestrial or earth research. To eliminate the approximate data and assess the actual condition of not only the surface, but also all other valuation parameters, forest health, in Bosnia and Herzegovina it is necessary to renew the forest inventory at the national level.

According to the long-term program of forestry development from the period 1986-2000, the forests and forest lands cover 2,709,769 ha territory of Bosnia and Herzegovina (about 53%) of which are forests 2,209,732 ha (43%), and 500,037 ha of bare land (about 10%). Area of forest land owned by the state amounts to 2,186,332 ha (81%), of which 1,806,495 hectares of forest, with the total growing stock, about 238.6 million m3, while 379,837 hectares of bare land. Area of forest land in private ownership is 523,437 ha (19%), of which 403,237 ha of forests, whose wood stock was 51.7 million m3, while 120,200 hectares of bare land.

The quality and structure of forests are unsatisfactory. High or so-called economic forests cover 1,291,924 hectares, which before the war was possible more rational management. Other woods, even 917,808 ha are low forest - coppice (deciduous) and degraded forests (mostly deciduous) with a very small stock of wood, so that the management of these forests requires additional investment funds for their translation into a higher, more productive form.

As for bare land, a portion (108,500 ha) is the degraded land unfit for afforestation, which means that this part permanently lost to re-cultivation. As a result of the war bare land have been extended, and in some instances and land degradation is in the course. The war has further accelerated the degradation of forests. There is no accurate data on the size of the damage, because they cannot be collected for obvious reasons. Based on the previous, incomplete analysis, it is estimated that the damage to forests is very high and that they are the direct and indirect character. The direct damage caused by Act of grenades and other projectiles, mines, then fires, uncontrolled felling and theft of wood. Indirect damages are much more complex and ordinary man does not notice them. They appeared due to the absence of preventive protection of forests during the war, which has helped the destabilization of forest ecosystems and the difficulties that these measures are performed today.

The occurrence of diseases and pests, which threaten the survival of some forests today, is a natural sequence in the process of chaining biologically harmful agents. There is a real danger that these biotic harmful agents (bark beetles before all) is out of control, to further spread and to cause even greater damage to the wider expanse, where these agents will not respect any agreement on the division of administrative areas.
Topographical, geological, climatic and other conditions and circumstances are conditioned by diverse hydrographic picture of Bosnia and Herzegovina. Hydrographic situation of the territory of Bosnia and Herzegovina is not unique, but there are evident large differences in the density of the river network, the number of springs, lakes and other geological objects and phenomena with two catchment areas which gravitate all the Bosnian river.

The territory of Bosnia and Herzegovina as a whole is within the mountain massif Dinara, which is marked by complex and mostly very difficult geomorphologic conditions. The area is a complicated state of nature, in these areas are the largest deposits of coal, salt, iron ore, alumina, quartz, limestone, gravel and other minerals.
When contemplating the natural and geographical characteristics of the territory of Bosnia and Herzegovina must be borne in mind that it is part of a rocky composition that favors the creation and development of landslides. Add to that a complex tectonic and geomorphic relationships, then it is understandable a large number of phenomena movement land, causing huge environmental, security

and economic problems in many urban areas, on roads, in mines, hydropower, water supply and other facilities.

2. Natural and geographic characteristics of the area of the Federation of Bosnia and Herzegovina

2.1. Area

According to the latest statistics, the area of the Federation of Bosnia and Herzegovina is 26,110.5 km2, as compared to the total territory of Bosnia and Herzegovina is 51%.

2.2. The administrative and territorial structure demographic Federation of Bosnia and Herzegovina

The Federation of Bosnia and Herzegovina is administratively divided into 10 cantons. Cantons consists of the municipality, which in the territory of the Federation of Bosnia and Herzegovina is 79, including the city of Mostar with approximately 2,843,685 inhabitants[3], as shown in Table 2.2.

Table 2.2. The administrative and territorial structure demographic Federation of Bosnia and Herzegovina

Total population	Present population	Refugees
2.843.685	**2.324.712**	**518.973**

Canton	Gender	Total	0-14	15-64	65 +
1	2	3	4	5	6
Una-Sana	**Total**	**297.362**	**58.078**	**206.950**	**32.334**
	Male	142.351	29.990	96.715	13.646
	Female	155.011	28.088	108.235	18.688
Posavina	**Total**	**44.686**	**5.875**	**34.068**	**4.743**
	Male	20.609	3.099	15.637	1.873
	Female	24.077	2.776	18.431	2.870
Tuzla	**Total**	**501.638**	**88.870**	**362.673**	**50.095**
	Male	235.527	45.709	169.731	20.087
	Female	266.111	43.161	192.942	30.008
Zenica-Doboj	**Total**	**401.137**	**79.626**	**278.714**	**42.797**
	Male	193.907	40.951	133.783	19.173
	Female	207.230	38.675	144.931	23.624
Bosnia-Podrinje	**Total**	**35.213**	**5.096**	**26.161**	**3.956**
	Male	16.034	2.648	11.851	1.535
	Female	19.179	2.448	14.310	2.421
Central Bosnia	**Total**	**262.673**	**54.419**	**172.287**	**25.967**
	Male	123.501	28.024	83.559	11.918
	Female	129.172	26.395	88.728	14.049
Herzegovina-Neretva	**Total**	**224.535**	**38.653**	**154.641**	**31.241**
	Male	103.390	19.875	70.362	13.153
	Female	121.145	18.778	84.279	18.088
West Herzegovina	**Total**	**81.522**	**15.086**	**56.928**	**9.508**
	Male	37.697	7.791	25.903	4.003
	Female	43.825	7.295	31.025	5.505
Canton Sarajevo	**Total**	**401.687**	**66.163**	**281.467**	**54.057**
	Male	187.929	34.278	131.164	22.487
	Female	213.758	31.885	150.303	31.570
Canton 10	**Total**	**84.259**	**11.648**	**61.323**	**11.288**
	Male	38.975	5.942	28.269	4.764
	Female	213.758	31.885	150.303	31.570
Federation BH	**Total**	**2.324.712**	**423.514**	**1.635.212**	**265.986**
	Male	1.099.920	218.307	768.974	112.639
	Female	1.224.792	205.207	866.238	153.347

[3] According to the Federal Bureau of Statistics, the state of 30 06.2011.

Risk assessment could capture all of the data because it was not published in the statistical bulletin and in the course of the publication of the results of a recent census in Bosnia and Herzegovina, and the data will be incorporated during the amendments to the Risk Assessment.

2.3. Distribution of economic and infrastructural objects

Economic and infrastructure facilities of importance for the Federation of Bosnia and Herzegovina are presented in the following charts, diagrams, etc

2.3.1. The electric power situation in Bosnia and Herzegovina

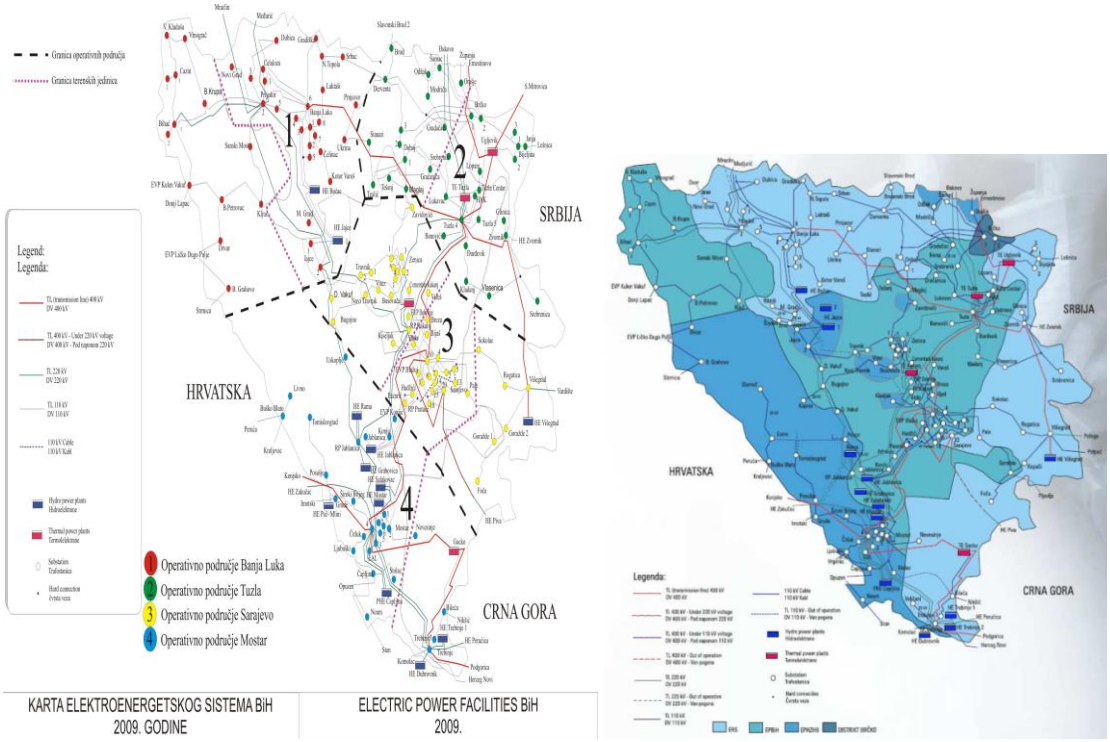


Figure 2.3.1 Maps of power system of Bosnia and Herzegovina

Figure 2.3.2 Hydrological networks in Bosnia and Herzegovina - the post-war situation

2.3.2 Hydrological networks in Bosnia and Herzegovina

2.3.3 Review of mines and thermal power plants in Bosnia and Herzegovina

Figure 2.3.3 The position of coal mines and electro in Bosnia and Herzegovina.[4]

3. Cultural and historical property[5]

Facilities of cultural and architectural resources are more in danger of natural and other disasters, according to facilities built in the twentieth century. They are especially vulnerable to earthquakes, due to the fact that due to the construction period they are not securedby measures against seismic activity. They are then threatened by armed conflict, floods, fires, landslides, mudslides and flash floods, environmental accidents and disasters or other extraordinary circumstances.

In the Federation of Bosnia and Herzegovina there is the application of the following legislation:

- Annex 8 Agreement on the Commission to Preserve National Monuments, the Dayton Agreement,
- Law on the Protection of goods that the decisions of the Commission to preserve national monuments declared as a national monument ("Official Gazette of BH", 2/02)
- Criteria for designation as a national monument ("Official Gazette", 33/02)
- Law on the Protection and Use of Cultural and Natural Heritage ("Official Gazette of SR BH", number 20/85)

[4] The study of the electricity sector in Bosnia and Herzegovina - Module 8 Coal Mines

[5] Data provided by the Federal Ministry of Education and Science / Science, the Federal Ministry of Culture and Sport / Sport.

- Cantonal laws on the protection and use of cultural, historical and natural heritage.

3.1. National monument

- Cultural property that the Decision designating the property as a national monument, was declared by the Commission to preserve national monuments,
- Cultural properties inscribed on the Provisional List of National Monuments of Bosnia and Herzegovina ("Official Gazette", 33/02),
- Cultural properties inscribed on the list of petitions to designate properties as national monuments,
- Cultural property which, under the law, individual decisions of the competent authority is registered as cultural monuments, architectural heritage, historical significance or natural heritage before April 1992, until the final decision of the Commission.

3.2. Proposed measures

For the purpose of effective implementation of preventive and operational measures to protect and / or rescue of cultural and historical resources in the Federation of Bosnia and Herzegovina, the relevant federal agencies and appropriate merits institutions must approach the implementation of preparatory activities, and above all:

- Is necessary to develop seismological map of Bosnia and Herzegovina with which all objects of cultural heritage, by zones, are updated after each declaration of a cultural monument, using information from the website of the Federal Hydro meteorological Institute,
- Create a map of flooded areas with marked reservoirs and hydropower plants which all objects of cultural heritage (bridges, archaeological sites, mills), are updated after each proclamation of the building as a cultural monument, using information from the website of the Federal Hydro meteorological Institute,
- Make a study on the state of cultural heritage by category: destroyed, partially destroyed, neglected, renewed and upgraded state annually,
- Through appropriate regulations to establish measures to prevent vaste dumping within the archaeological sites, ruins and cultural sites of all other objects of cultural heritage,
- Educate conservation and restoration experts from the aspect of application of new knowledge and technological solutions restoration of cultural heritage in the world.

Owners of cultural goods and institutions performing tasks of protection and preservation of cultural property shall, in cooperation with the competent authority, provide:

- The conditions for the protection and preservation of cultural property in the event of extraordinary circumstances (earthquakes, floods, fires, landslides, mudslides and flash floods, environmental accidents and disasters, armed conflicts or extraordinary circumstances).

Establish and engage special civil protection for the protection of cultural property of the Federation of Bosnia and Herzegovina, as well as to create programs for the evacuation of movable cultural property and the elimination of consequences caused by natural and other disasters, and their implementation.

C - SPECIAL PART OF RISK ASSESSMENT

According to the Law on protection and rescue of people and property from natural and other disasters, there are: earthquakes, floods, snow drifts and avalanches, the accumulation of ice on lakes and larger streams, rockslides and landslides, droughts, storms, hail, frost, large fires, expansion and the explosion gases, traffic accidents, damage of dams on reservoirs, epidemics (infectious diseases in humans) epizootic (disease or death of a large number of animals), plant diseases and pests, and other radioactive contamination of air, water, soil and food, mining accidents, Land subsidence due to the extraction of minerals and other mineral resources, and other similar phenomena that may endanger the health and lives of more people and cause major damage.

The most common natural disasters which cause damage to property and endanger human lives, which are registered in the territory of Bosnia and Herzegovina, and thus the Federation of Bosnia and Herzegovina, related to:

- Earthquakes,
- Severe storms with hail,
- Winds of devastating intensity,
- Powerful electric discharges,
- Blizzards,
- Rains of high intensity and short duration caused by flash floods, landslides and mudslides, floods,
- Drought,
- Early and late frosts,
- Forest fires.

In addition to the above accident, the territory of Bosnia and Herzegovina, and thus the Federation of Bosnia and Herzegovina were also exposed to the action of the nuclear accident at Chernobyl on 26 April 1986, and the proximity of nuclear power plant in Slovenia and a number of nuclear power plants in Central Europe, is located in zone of extreme risk of nuclear accidents.

Contamination of the territory of Bosnia and Herzegovina, and thus the Federation of Bosnia and Herzegovina with mines and unexploded ordnance (UXO) represents a major threat to the population, especially in areas where they conducted combat operations, or where they were drawn. In addition to the losses and injuries in humans and dangers that are directly slowed and hindered the recovery and reconstruction, organization and normalization of life and work, as well as a faster return of refugees and displaced persons and produce an unstable security environment.[6]

Bosnia and Herzegovina is a country with the biggest problem of mine contamination in the region of Southeast Europe. According to current data from the disposal of the Centre for the removal of mines in Bosnia and Herzegovina (hereinafter BH MAC) in Bosnia and Herzegovina there are about 152,000 vulnerable local communities of mines and unexploded ordnance that threaten the safety of about 540,000 citizens of Bosnia and Herzegovina.

The industrial production in Bosnia and Herzegovina - in some sectors, materials that are used in the production process is not accompanied by adequate technology health and environmental protection, and pose a direct threat to the employees and for the wider environment.

In addition, the complex natural conditions, the presence of hazardous gases (asphyxiating, flammable and explosive), aggressive flammable and explosive dust, the depth of exploitation, danger of collapsing underground rooms, fire hazard, the possibility of penetration of surface and the risk of ground water, landslides, large number of employees, are the basic characteristics of the mining operation and source of danger.

The post-war period is the period in which Bosnia and Herzegovina is intensely exposed to risks of natural as well as technical and technological accidents.
The main indicators of this are: stopped planning process; outdated and not so important plans; destroyed and not renewed infrastructure systems; and in particular meteorological, hydrological and seismological observation and communication systems, which undermined the effectiveness of

[6] Data BHMAC.

technological system of timely detection, monitoring, forecasting and early notification of natural disasters, which further increased the risk; lack of documentation (a higher degree of damage or devastation); increased sensitivity to physical structures at risk due to their destruction of war and the destruction of the system for protection against accidents; lack of financial resources; technical equipment of existing institutions; low level of awareness of the dangers; low level of education of people specialized in different sectors related to the protection of natural and technological disasters.
Certain option for listed natural disasters which are sudden, powerful and destructive manifest in the Federation of Bosnia and Herzegovina and in a short interval means great losses of people, animals, cultural and property, requires consistent implementation of the preparation for the execution of rescue, evacuation, care, interventions help, urban search and rescue, organizing logistics and so on.

Therefore it is necessary or necessarily planned capacity of hotels, sports centers, schools and other needs for evacuation and disposal of affected populations, quarantine for sick and injured animals with medical triage and care.

The records of these capacities should be run by the relevant federal and cantonal ministries and Civil protection.

1. Natural disasters

1.1. Earthquake

An earthquake or thrust are sharp, sudden and short-term movements of layers of the Earth's crust, which in the form of shock, waves, shaking and rumbling caused by earthquakes. The earthquake caused by active tectonic movements along the longitudinal and transverse fault lines, volcanic eruption, landslide of rocks in underground channels, the fall of meteorites and others. When an earthquake occurs it differs hypocenter or center as a place of earthquakes inception and initial movement and tremor in the depths of the Earth's crust up to 60 km, and less frequently, and to 700 km depth; the epicenter of the place just above the hypocenter on the surface of the Earth with the strongest impact. At the epicenter of the earthquake there are vertical hits with downdrafts and updrafts land (so-called. Sukusorno movement), and continue around strikes occur in the form of waves or wave oscillations (so-called Undulation movement). In waves of different amplitudes there is a height difference between its bottom and the top, wavelengths, which includes hill and valley of waves, wave period of time that exceeds the wavelength of the wave, and wave propagation speed. The occurrence of earthquakes consists of the previous stage with a roar and a smaller impact (the first precursor with a faster longitudinal waves and other precursor with slower transverse waves), the main stage with the strongest impact and the final stage with a lower impact, shake and rumble. These earthquakes create landforms (cracks long and more than 600 km wide by 10 m and dr.).The earthquake was divided:

1.1.1. According to the causes of the phenomenon

According to the causes of the phenomenon - tectonic (the most common and most powerful thrust caused tangential and radial tectonic movements), Vulcanic (strong and devastating earthquakes in volcanic eruptions), collapse earthquakes (weaker local thrust from demolition and fallen walls and ceilings of underground channels and caves), and meteoric (earthquake caused by the impact of meteorites - in Siberia in 1908 was felt at a distance 5200 km).

1.1.2. According to the outbreak area

According to the outbreak area - land and underwater (submarine causing sea waves up to 40 m high, cross oceans speed to 900 km / h).

1.1.3. According to the direction of propagation

According to the direction of propagation - central (circular shape of the affected areas), lateral (elliptical shape) and the linear or axial (elongated shape along the tectonic faults).

1.1.4. According to the method of observation

According to the method of observation – macro seismic the sensually perceive and micro seismic instruments. Micro seismic are divided into teleseism movements outside macro seismic field and micro seismic fluctuations weak thrusts.

1.1.5. According to the energy and size of propagation

According to the energy and size of propagation - local (notice the sensual to 200 km, and the instruments of up to 500 km away), small (the sensual feel of up to 600 km, and the instruments to 5,000 km), medium (sensual feel 300-1000 km, and instruments to 10,000 km), large (sensual feel over 500 km and instruments up to 12,000 km), and world (sensory feel up to 2000 km, and the instruments to 20,000 km).

1.1.6. According to the size of the acceleration of bumpy waves

According to the size of the acceleration of bumpy waves of international scale earthquake size ranges from I to XII degrees, according to the severity of the accident and earthquakes. The first stage is sensually invisible, and XII disastrous. He may destroy all the buildings, changing the relief, appear and disappear lakes, formed in relief huge cracks, rivers change course and others. In Bosnia and Herzegovina the earthquakes are recorded to the ninth degree. Earthquakes are widespread on Earth by area called earthquake prone areas. Seismic areas with frequent and strong earthquakes in the area of the Pacific ocean and along its western and eastern coast, then in the area of the Mediterranean Sea and along the Alpine and Himalayan mountains Pens seismic areas with rare and weak thrusts that are on the borders of the mentioned areas, and seismic areas without earthquake are horizontal old geological layers (the Canadian Shield, the Russian plate, etc.).

1.1.7. The largest and most known

Earthquakes in the last centuries were in Lisbon (1755), Calabria (1783), California (1906), Messina (1906), China (1920), Tokyo (1923), Bulgaria (1928), India (1935), Chile (1939), Romania (1940), Greece (1954), (Tsunami - 26.12.2004., the Indian Ocean) and others.
On the territory of the former Yugoslavia earthquake areas are: Dinar, Shar-pindus, Sava, Rodopi, and Carpatho-Balkan. The most common and most powerful earthquakes in the areas of Dinara, the lower Neretva River, the Bay of Kotor, Dubrovnik, the Drina valley, Sumadija, Metohija, Banja Luka and Skopje. The largest were in Skopje (1518 and 1963), Dubrovnik (1667 and 1924), in the area of the project (1911), Herzegovina (1924), in Šumadija (1927), Valandovo (1931), Debra (1967), Banja Luka (1969), Montenegro coast (15.04.1979) and others. (Ston area during the war and so on). [7]
Destructive earthquakes that periodically threaten certain parts of Bosnia and Herzegovina and the Federation of Bosnia and Herzegovina, not only are exposed to a constant potential danger of human lives and property, but also threaten the whole of human activity and its normal development in these areas.

How still in Bosnia and Herzegovina it is not possible to make accurate short-term forecast of earthquake occurrence, and at the same time to predict the time, place and intensity of its occurrence, although seismic methods of locating so advanced, with high probability it is possible to provide effective protection from the effects of the earthquake and to prevent its destructive effects. Seismological map in this framework is only the last phase of the seismic, seismic-tectonic and other relevant research with us, but not the definitive answer on the state of the seismic activity in the territory of Bosnia and Herzegovina. Therefore it is necessary, at specified time intervals or constantly upgraded and improved, on the basis of new scientific findings.
The territory of Bosnia and Herzegovina is one of the most seismically active parts of the Balkan Peninsula, which became part of the Mediterranean trans-Asian seismic belt.

According to available data in the territory of Bosnia and Herzegovina, in the past it has happened multiple devastating earthquakes in local focal zone Magnitude M ≥ 5.0; Intensity at the epicenter Io ≥ 7 ° MCS scale.

[7] ("Military Encyclopedia", Volume 10, Second Edition, Belgrade 1975, pp. 697th to 698th).

1.1.8. Destructive earthquakes on the territory of Bosnia and Herzegovina

Chronologically here are shown the devastating earthquakes that occurred on the territory of Bosnia and Herzegovina in Table 1.1.8 during the period from 1905 to 2003.

Table 1.1.8. Earthquakes in the territory of Bosnia and Herzegovina

Time	Location	Magnitude (M)	Intensity in the epicentar (Io) MCS scale
07.04.1905.	Petrovac	M = 5,0	Io = 7°
01.08.1907.	Počitelj	M = 5,7	Io = 7-8°
25.12.1908.	Vlasenica	M = 5,3	Io = 6-7°
12.03.1916.	Bihać	M = 5,0	Io = 7°
06.02.1923.	Jajce	M = 5,0	Io = 7°
14.02.1927.	Ljubinje	M = 6,0	Io = 8°
17.12.1940.	Derventa	M = 5,1	Io = 7°
31.12.1950.	Drugovići	M = 5,7	Io = 8°
11.06.1962.	Treskavica	M = 6,0	Io = 8°
07.03.1967.	Srebrenica	M = 5,1	Io = 7°
27.10.1969.	Banja Luka	M = 6,6	Io = 9°
25.08.1970.	Gacko	M = 5,0	Io = 7°
29.10.1974.	Lukavac	M = 5,0	Io = 7°
10.09.2003.	Stolac-Hutovo blato	M = 3.6	Io = 5°

By analyzing data on earthquakes that occurred in the past, and are shown in Table 1.1.8., it is evident that on the territory of Bosnia and Herzegovina happened more destructive earthquakes with intensities of the strongest focal zone Ljubinje, Treskavica and Banja Luka.
Southern and Western Herzegovina are the most vulnerable to earthquakes. The last earthquake (in Livno 2004) the strength of 3.3 degrees on the Richter scale, and several weaker, once again showed Livnjaci to live in a seismically active zone pretty. Again, the epicenter of the earthquake was in the mountain Golija, pointing to several previous in this area were not a coincidence.

In the last 104 years in Bosnia and Herzegovina has recorded 1,084 earthquakes stronger than three degrees on the Richter scale.

1.1.9. The faults of the earth's crust

Since a large fault the crust of the Himalayas via Iran, Turkey and Greece through the territory of Bosnia and Herzegovina, it is understandable that tectonic activity of the region.
Moreover, Bosnia and Herzegovina has several major regional faults such as Bugojno, Visegrad, Neretva and Banja Luka, with which they can create earthquakes devastating strength, and often cause minor tremors land. Thus, according to the data of seismographs, in Bosnia and Herzegovina annual reports about 1,100, or an average of three earthquakes a day less than three degrees per Mercallijevoj scale. These are earthquakes that record devices, that people do not feel and about a dozen earthquakes every year that the citizens of Bosnia and Herzegovina feel.

1.1.10. Return period and seismic effects

Seismographs argue that in the next 50 years on the territory of Bosnia and Herzegovina we can expect earthquakes of maximum intensity to seven degrees Mercalli scale, meaning the possible damage homes and other buildings. But, for a period of 100 years or more in the area of Banja Luka, mountain Treskavica, and Trebinje and Neum, predicts the devastating earthquake with great damage, but also human lives.

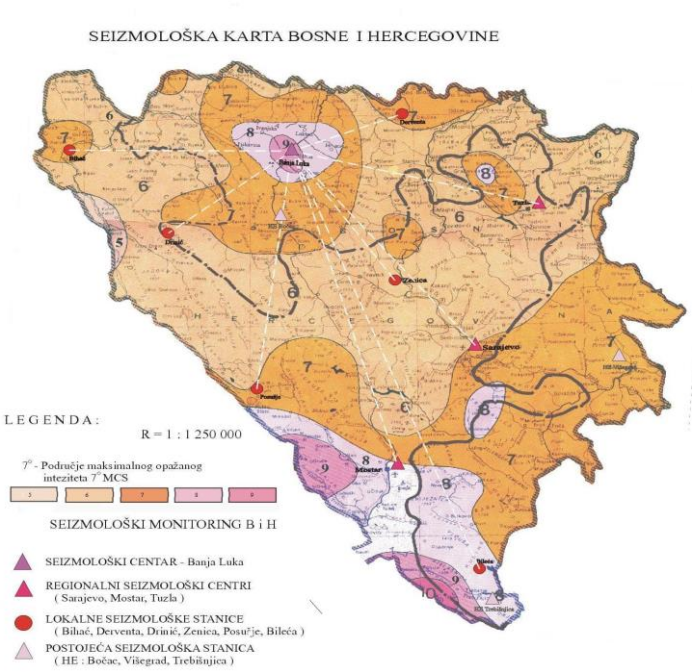


Figure 1.1.10 Seismological map of Bosnia and Herzegovina

On the seismological map of Bosnia and Herzegovina were selected zones with the maximum intensity of the earthquake, and it can be seen that most of the territory is located in zone 7, 8 and 9-th degree of seismic intensity MCS scale.
The Banja Luka seismic area, a seismic is one of the most active focus areas of Bosnia and Herzegovina and beyond. In this seismic area occurred more devastating earthquakes in the past, and the sets: 1884, 1935, 1969 and 1981.
The earthquakes of 26 and 27.10 achieved significant seismic effects on the greater Bosanska Krajina area. On an area of 9,000 square kilometers, in the municipalities of Banja Luka, Celinac, Laktasi, Prnjavor, Bosanska Gradiska, Kotor Varos, Knezevo, Srbac, Key, Jajce, Prijedor, Sanski Most, Novi Grad and Bosanska Dubica earthquakes are recorded of seismic intensity of 7 , 8 and 9 degrees MCS scale.
The earthquake struck just as all aspects of social life, its energy is destroyed or seriously damaged property in the economy, housing, health, culture, social welfare, public and social services, infrastructure, 1,117 persons harder or easier injured and 15 lost their lives. Of the total housing destroyed in the region 43.2% is urban and 56.8% in other settlements. Great damage suffered the objects of economic and social activities among which were damaged or destroyed 266 school buildings, 146 buildings of cultural institutions, 133 health facilities and 29 social institutions, building 152 public institutions and administration, a significant number of facilities of social and economic organizations.

1.1.11. Monitoring of seismic activities

Because of the random nature of earthquakes there is a need of continuous observation of seismic activity around the seismic areas and more, through a network of seismic stations. To this end, in Banja Luka after a catastrophic earthquake in 1969 built modern seismic stations for the study of seismic activity in the region.
During war operations (1992 - 1995), in the wider area of Bosnia and Herzegovina seismological stations have been destroyed, and installed instruments in the seismological center in Banja Luka, for lack of maintenance, lack of spare parts and obsolescence of equipment (30 years) are no more for quality use.

Table 1.1.11. MCS (MCS) the intensity of earthquakes

No.	Degree(MCS)	FEATURES OF OSCILATIONS AND DAMAGE THEY MAY CAUSE	ACCELERATION α (m/s^2)
1	2	3	4
1.	I	Oscillations are registered only by appliances	< 0.0025
2.	II	Oscilatiions are registered during peaceful times	0.0025 - 0.005
3.	III	Oscillations are felt only by some people or those who are familiar with explosions	0.0025 - 0.010
4.	IV	Oscillations are felt by many people, the glass is rattling	0.010 - 0.025
5.	V	Pieces of plaster falling off, there are cracks in the plaster	0.025 - 0.050
6.	VI	Tiny cracks in the plaster and damage the weak building	0.050 - 0.100
7.	VII	Damage to buildings that are in a satisfactory condition, cracks in plaster, a decline of pieces of plaster, cracks in the walls of the compounds	0.10 - 0.25
8.	VIII	Significant damage to buildings, cracks in structural walls and large cracks in walls and the like.	0.25 - 0.50
9.	IX	Demolishing buildings, open cracks in walls	0.50 - 1.00

In the former Yugoslavia the most common and most powerful earthquakes, which threaten their intensity and Bosnia and Herzegovina, have occurred along the Adriatic coast, in the vicinity of Dubrovnik, Split, then in the Sava River Basin and others.

1.1.12. Seismic intensity of the territory of Bosnia and Herzegovina

Using data from the catalog of earthquakes that have occurred in the past 100 years, with the use of mathematical and physical methods, is calculated on the basis of instrumental data, seismic intensity of the territory of Bosnia and Herzegovina.

Seismicity of the territory of Bosnia and Herzegovina, as part of Europe (Figure 1.1.12.) has so far been studied in several ways. Here it is explained and applied calculation method of seismic intensity based on instrumentally recorded seismic events.

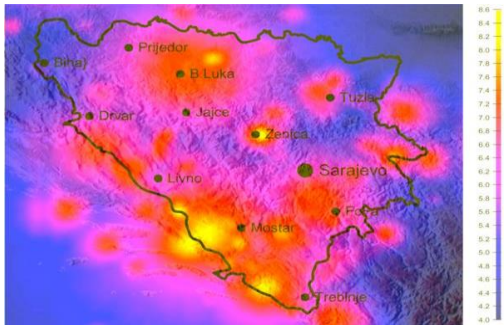


Figure 1.1.12. Forecast maps of seismic intensity for the territory of Bosnia and Herzegovina

1.1.13. The idea for a new way of presenting seismicity

The idea of a new graphical representation of seismic intensity based on the research of the impact of the earthquake that took place, from the catalog on each count a specific area. Of course, the job can be done only with the help of computers. In our case, discussed the impact of 1128 the strongest earthquake in the area between 42 ° 00' and 45 ° 50 ° north latitude and between 1 ° 5 50' and 20 ° 00' east longitude.

The next step is to divide the area into smaller areas by 0,1 °. In this way, in this case, the smaller the area of 1656 is obtained, which, given the scale of the map, it has the subsections. Now we observe

the impact of the earthquake on each of these points. Of course, this division can be done to a greater or lesser extent, depending on the seismic-tectonic, seismic, geographic or other reasons.

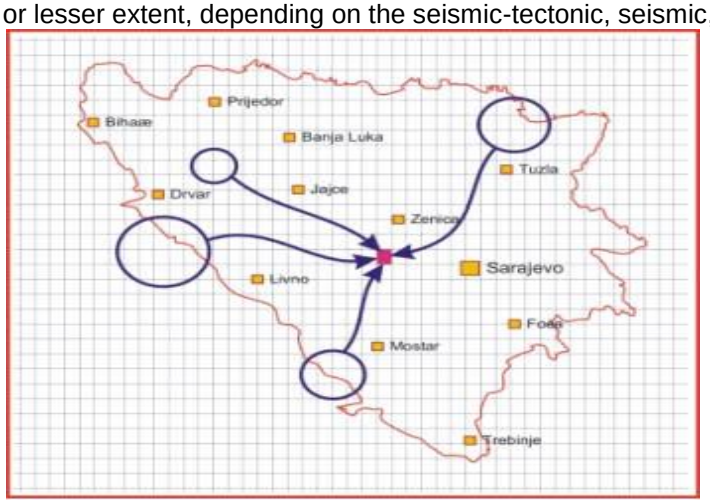


Figure 1.1.13. A new way of presenting seismicity

Schematic representation of the impact of the earthquake (blue circle) to each point of the study area (red rectangle).

1.1.14. Findings

- To achive that consequences for people and property from the occurrence of an earthquake are decreasing, it is necessary to take preventive measures that will be implemented through regional and town planning cantons and municipalities. In addition, it is necessary to apply the appropriate laws and regulations on the manner of construction of residential, commercial, industrial, infrastructure facilities (roads, railways, water and sewage networks, etc.).
- Taking into account the specific conditions of seismic areas, locations where structures are constructed and applying the basic principles of earthquake engineering in design to a large extent can be a direct impact on reducing the effects of earthquakes. Based on the current situation it can be concluded that the current structure of the housing stock and the concentration of buildings in certain areas does not provide the ability to apply effective protection against earthquakes than buildings built to modern-resistant structural systems in major cities: Sarajevo, Banja Luka, Tuzla, Mostar, Zenica, Doboj and itd.
- In the event of an earthquake larger scale in the cantons and municipalities need to take appropriate action concerning the rescue of endangered and victims of people and property, primarily to organize search and rescue buried in rubble and their disposal.
- These activities need to engage all available forces and means to protect and rescue including the Armed Forces of Bosnia and Herzegovina (hereinafter: the BH Armed Forces), as well as adequate resources and forces from the Republic of Srpska.
- Given the fact that the actions of search and rescue of buried be necessary to engage other forces and means (sniffer dogs, special instruments to detect buried, special machines to remove debris and the like.) it is needed over the plans of protection and rescue plan for seeking help from neighboring municipalities and cantons, or the wider community, including the international community.
- Given the high seismicity of the territory of Bosnia and Herzegovina, and insufficient number of existing seismic stations and obsolescence of seismological instruments, it is necessary to modernize and modernization of the network of seismic stations to performing system registration, collection, analysis and study of seismic and seismic-tectonic phenomena (natural and induced earthquakes, explosions and rock bursts), the study of seismicity, seismic activity and the frequency of earthquakes, as well as defining the seismic effects of action for local and distant earthquakes in the studied area and forecasting their impact on land, water, streams and buildings.
- With the aim of prevention, protection of people and property from natural disasters of this kind, it is necessary to make maps (epicenters of earthquakes, seismic risk, maximum

intensity), seismic, seismic-tectonic and other, necessary for spatial planning and seismic design and construction.

- To evaluate the consequences for people and property in the event of an earthquake on the territory of Bosnia and Herzegovina, it is necessary to have data on the structure of the housing stock and the entire infrastructure.

1.2. Landslides and mudslides

Bosnia and Herzegovina is famous for its litostratigraphic[8] diversity of soil, a high degree of tectonic and seismic activity, complex geological features, various relief features, different climatic characteristics, waterways with variable pitch and significant influence of man's work in the field. All of this in an appropriate volume has an impact on the engineering and geological features of the terrain.
Landslides are a particularly significant risk for property and lives in Bosnia and Herzegovina. Given the fact that 80% of Bosnia and Herzegovina is one of the hilly, mountainous or mountainous Mediterranean areas, the occurrence of landslides on steep parts of the country is very common, reinforced by a large number of underground streams and a large amount of groundwater.
Activation of the landslide in Bosnia and Herzegovina usually happens due to increased amounts of groundwater in the spring[9], but often is caused by illegal and unplanned construction.
In 2000 in the Zenica area 7 people were killed due to landslides (Mala Broda), a higher number of families remained without homes, in the same year by landslides caused the collapse of the road Sarajevo-Pale. In most parts of Bosnia and Herzegovina the landslides have not been studied, but, for example only in the Tuzla area there are more than 4.000 landslides or landslides. Rehabilitation works on landslides are negligible compared to the number of landslides or avalanches. Preventive work or works to mitigate potential accidents very rarely implemented. Due to lack of cadastre of landslides and avalanches, the citizens decide without the consent of the competent authorities of municipalities to build a family or business facilities in such areas, for example. Crvene njive, Tuzla municipality and the like.

Figure 1.2 Types of landslides

1.2.1. Findings

- The number of landslides has increased especially during and after the war as a result of uncontrolled logging, mining of mineral raw materials which affected the change in the water regime and the regime of land.

[8] stone, rock stratification - stratification, -sediment, naslaganost Earth's crust
[9] types of landslides are shown in Figure 1.2.

- Activation of the landslide was caused by the result of the intensification of illegal and unplanned construction in areas that are not tested geologically.
- It is necessary to continuously monitor and document illegal and unplanned construction of housing and other facilities, especially in the grip of roads (road and rail), and consistent implementation of regulations governing the construction conditions.
- It is necessary that the authorities making the cadastre of landslides and potential landslides and rockslides in order to monitor the situation and respond in a timely manner if needed to repair them.

1.3. Settling land

1.3.1. Tuzla phenomenon managing salt-mineral raw materials

Subsidence of land is usually caused by underground mining of mineral resources. The most affected region in the Federation of Bosnia and Herzegovina's Tuzla - as a result of exploitation of the brine, a separate landslides at individual mines, namely: brown coal mine Breza - mine "Koritnik", mine and steel mill Vares - PK "Juniper", and in other open pit mines there are small-scale landslides.
Harmful effects of land subsidence affected more than ¼ of the urban area of Tuzla.
Due to a long-standing presence and specificity of the problem in Tuzla have developed special methods of planning, with the aim of mitigating the effects of which can cause subsidence of land.
Salt Mine "Tušanj", after years of construction, began the exploitation of rock salt in 1967 and produced more than 2.7 million tons of rock salt. Due to the strain the support of the export window of the pit salt mine in 1979, there is a penetration of water into the pit, and becomes immersed lowest horizon. After closing the flow of water and performed remediation in the export window, there are pumping water from the pits and the mine continued exploitation of rock salt. The greatest exploitation of rock salt mine was achieved in 1991, in the amount of about 140,776 tons.
The rapid development of the chemical industry of the 80s led to intense uncontrolled exploitation of the salt wells and thus to increased subsidence, resulting in the need to find new resources, termination of the salt wells and finding replacement capacity for the needs of consumers of salt water.
Start of work on a new investment deposit "Tetima" heightened intensity of subsidence metropolitan area, then losing control over the process of controlled leaching is the constant threat of uncontrolled ingress of water into the pit of the mine, were reason enough for the urgent commitment to a new strategy for managing salt-mineral raw materials.

1.3.2. Strategy of salt management - mineral raw materials

It basically involves three stages of treatment:
I- planning immobilization - sinking pit of Salt Mine "Tušanj"
II - the revitalization and putting into trial production of Salt Mine "Tetima"
III - the gradual cessation of uncontrolled exploitation of the salt wells.
As the first phase of the pre-mentioned strategy was sinking pits "Tušanj". Preliminary work for the sinking of the pit began in September 2001, and the very process of planning the sinking pit began 12.03.2002.
During the planned sinking of the pit "Tušanj" five geodetic measurements were executed and on the basis of numerical analysis of vertical and horizontal movement of the terrain - geodetic control point, it was concluded the following:

- That in the period January 2003 - July 2004, decreased intensity of subsidence;
- That the average subsidence of large stones in the period III 2002 - July 2004 amounted to approximately 2 mm per month;
- Differential difference of certain periods in the vertical sense are of such a character that does not point to "an excessive behavior" large stones;
- Horizontal movements of terrain ranging in distances from 2 mm to 88 mm and even have a direction towards the ventilation or transport box.

Finally it should be noted that the analysis of numerical data surveying methods of observation were observed deformation elements that could lead to the destabilization of large stones-areas covered by geodetic observation.
Parallel with finalizing the planned sinking of the pit "Tušanj", began with the activities of the gradual closure of wells salt.

In this connection, the Assembly of Tuzla Canton adopted a Conclusion number 01-02-338-3 / 04 of 19.07.2004. year, which is the line ministry tasked to draft the OP with the pace of implementation of the suspension of the exploitation of the salt wells. At the request of the Ministry of Industry, Energy and Mining Board of Directors of Salt Mine "Tušanj" passed a decision to shut down the wells of salt.
Therefore, Stage I resource management strategies salt is practically completed, which removed the latent risk of sudden penetration of groundwater into the empty space of the pit of Salt Mine "Tušanj", and it is possible to gradually increase the level of ground water in wells of salt in the framework of implementation of phase III advance these strategies, or stopping work of well salt.[10]

1.3.3. Other land subsidence

Greater instability of land in the territory of Bosnia and Herzegovina with large landslides have occurred in:

a) The Republic of Srpska	b) Federation of Bosnia and Herzegovina
• Dubica	Kalesija
• Bosanski Novi	Olovo
• Banja Luka	Zavidovici
• Prnjavor	Sarajevo
• Derventa	Gorazde
• Doboj	Zenica
• Lopare	Tuzla
• Gacko, Čemerno, Foca (Flis) etc.	Kakanj
• Ugljevik	
• Visegrad	Sapna

1.3.4. Findings

- An important place among the causes of the instability of land have continuous and heavy rains, floods, long-term exploitation of minerals from the interior of the country and so on.
- The task of engineering geology is monitoring, studying and forecasting the development of modern geological processes, landslides, avalanches and others.
- Important activities in this area are monitoring and studying the risk of landslides, subsidence and landslides, then informing the public to be able to take effective and organized action in the event of landslides, subsidence and landslides. There must be a technically capable unit for help.
- It is necessary to continuously monitor and document and identify preventive measures and other measures for protection and rescue.

1.4. High snow and snow drifts

Heavy snowfall, high snow cover and high snow drifts may pose serious difficulties for normal daily activities. Snow cover in the country interested in many industries. Farmers snow cover serves as a protector of winter crops from winter frosts, and in addition, since it is obtained and water reserves in the soil that provides plants with water, especially in dry spring months.
Height, density and duration of snow cover interest and hydrotechnic engineers, due to the increase in river at spring melting of snow, as well as in the preparation of storage basins, whether it is used for irrigation, either for energy production.

Snow cover can bring a lot of trouble to the energy industry, primarily due to the load line, especially in situations when it really wet snow freezes on power lines and loaded it to such an extent that may cause rupture.

Construction activity also has an interest in the thickness of snow cover the heavy roofs on buildings and other facilities.

[10] Ministry of Industry, Energy and Mining TK report on the sinking of the pit of Salt Mine "Tušanj" activities around the closing wells salt "- Tuzla, November 2004

Snow cover is of great importance for traffic (local, regional and main roads) because not only is it makes it difficult, but it completely prevents. High snow cover is causing serious problems in traffic flow in cities, suburbs and rural settlements, and threatens normal life and work in these areas, which is reflected in the difficulty of supplying the population with foodstuffs, difficult access to schools, health care, business, economic and various public facilities . In such situations often lead to failures in the electrical, telecommunications, water supply and other infrastructure, leading to frequent interruptions in the supply of electric power, water and interrupted PTT connection.
It is characterized and considerable material damage. Important activities in this area are monitoring and studying the risk of snow drifts and avalanche, which includes a tour of the observations, and then inform the public, with the aim of taking the organized protection and rescue measures.

We analyzed the frequency of snow in Bosnia and Herzegovina during the year by months, the number of days with snowfall amounts to a maximum of 10.30 and ≥ 50 cm. For maximum height of snow cover is estimated the expected maximum height for a return period of 50 years.

For the analysis were used databases and climatological studies Federal Hydrometeorological Institute and the Republic Hydrometeorological Service of the Republic of Srpska were considered the available data sets (1961st to 1990th) with 31 weather stations and a number of (2000 - 2009) for the variable number of cells, depending on how the war-establishing a new series of measurements in some places.

From the available data series it is evident that cells with higher altitude increases the maximum height of snow cover, and also the frequency of days with snow depth of ≥ 10,30,50 cm. This is why there is an increased risk of high snow cover especially on mountain passes (Border, Komar, Ivan Sedlo, Rogoj etc.).

In the region of northern Bosnia as well as to the larger river valleys where the Sava prevails moderate continental climate, snow as a phenomenon is most pronounced in winter, and they are not present there from April to October.

The number of days with the appearance of snow is on average 17-41 day. January is the month with the most snow days (11). The average number of days with snow cover ≥ 10 cm upstream and is growing at 13 Derventa, Doboj 23, Banja Luka, 26 days. The most common in December, January and February. In January, the average number of days with snow cover ≥ 10 cm ranges from 10 to Banja Luka and Tuzla, up to 2 days in Gradacac and 1 day in Orasje.

The number of days with snow cover ≥ 30 cm ranges from 2 days in Derventa to 10 days in Gradiska. With snow cover ≥ 50 cm on average 0.1 days recorded in Derventa up to 1 day in Banja Luka.

The maximum height of snow cover ranges from 49 cm to 112 cm to Orasje in Gradacac, and recorded in 1963 (1961 to 1990), while in the post-war period it was in January 2005.

The area to the northwest of the country on the climatic characteristics also belongs to the zone of moderate continental climate. The specificity of this area is certainly that, as two adjacent climate (Mediterranean to the west and mountains to the south) have a major impact on climate indicators, which is particularly evident in the case of accidental penetration of warm and cold waves.
Average number of days with snow cover ≥ 10, and 30 cm ranges from 10 to 40 days per year, while the maximum height of snow cover ranges up to one meter (Bihac 105 cm in February), and depending on the terrain orography snowdrifts can reach much higher height. The average height of 105 cm recorded once in 50 years.
Valley-landscapes, hills and low mountains in the Dinarides are characterized by subalpine climate. In this climate the winters are something sharper and snow is a regular occurrence during the winter. The impact of sub-mountainous climate is felt in areas with an altitude of over 500 m. The area of central Bosnia is particularly specific in terms of rainfall. Annual precipitation are among the lowest in Bosnia and Herzegovina, as well as rainfall in the winter. The number of days with snowfall, more than 0.1 cm (appearance only registered), ranges from 34 in Jajce to 49 days a year in Sarajevo.

January is the month with the most snow days (12). The average number of days with snow cover ≥ 10 cm ranges from 11 in Zavidovici to 33 days at Butmir. The most common in December, January

and February. In January, the average number of days with snow cover ≥10 cm ranges from 11 to Butmir to 5 days in Zavidovici.

The number of days with snow cover ≥ 30 cm ranges from 2 days in Zenica to 10 days in Butmir. Average annual number of days with snow cover ≥ 30 cm happens on average 2 times in 3 years, while in Zenica region that frequency is 1 time in 3 years. The most common is in January and the average number in Butmir is 4 days.

With snow cover ≥ 50 cm on average 0.1 days recorded in Zenica to 6 days in Travnik. Average annual number of days with snow cover ≥ 50 cm happens on average 1 times in 3 years, while in Zenica region recorded just 1 day in 30 years.

The maximum height of snow cover ranges from 50 cm to 100 cm to Zenica in Butmir and was recorded in January 1967 (1961st to 1990th). It should be noted that these values are measured in cells in which it is possible to take measurements while the individual mountains of central Bosnia, depending on the terrain orography, snowdrifts can reach much higher level. According to data from weather stations Bjelasnica (2067 meters) maximum snow depth was measured in March 1986, 303 cm, while in March 2005, recorded a record amount of snow cover of 345 cm.

Mountain areas in Bosnia and Herzegovina between 1000 and 1700 m above sea level are characterized by mountain climate. Snowfalls are a regular occurrence. This is part of Bosnia has the most snow both in duration and intensity. Towards the south of the country, rainfall patterns are significantly different in some areas. Annual mean precipitation is typical of a Mediterranean climate, with rainfall more pronounced in the colder part of the year and less in summer. In areas of modified Mediterranean climate snow is rare but more common in relation to the area of Mediterranean climate.

In the south of the country snowfalls are quite rare. Average annual number of days with snow cover ≥ 10 cm related to altitude and to the south is less than 2 days, and the largest in the Ivan Sedlo 76 days.
It is most common in January: an average of 0.8 days in Mostar, and 0.6 days in the Capljina, Ivan Sedlo 19, in Konjic 4.5 days. The highest number of days with snow cover ≥ 10 cm was 10 cm and was recorded in January 1985.
The average number of days with snow cover ≥30 cm also ranges from 0 in Mostar, 2.9 in Jablanica and up to 39 days at Ivan Sedlo. The most common in January as follows: Ivan Sedlo 9, in Mostar 0 days. Otherwise, the snow cover ≥ 30 cm is very rare and occurs approximately once every 15-20 years.
The average number of days with snow cover ≥ 50 cm ranges from 0 in Mostar, Konjic 1.9 to 19 at Ivan Sedlo. The maximum height of snow cover in Mostar was 37 cm and was recorded in March 1971, and Capljina 34 cm, recorded in January 1985.
During the winter of 1999 / 2000 the heavy snowfall has blanketed much of the country, when it was declared a state of emergency in northeastern Bosnia. On this occasion they have been deployed all available forces and MTS civil protection structures, business organizations, municipal departments, cantonal administrative bodies, public services, health and other institutions of importance for protection and rescue and other entities, in order to take operational measures to protect and rescuing people and property from these natural calamities.
Comparing several years down the 1961 to 1990 with a series of 2000-2009 , noticeable is the declining trend in the number of days with snow, and the maximum height of snow cover. The exception was March 2005, when the area between Bjelasnica and Cemerna recorded extremely large snow cover, which was not the case in other years in this series.
In addition to the appearance of a high snow and ice can also lead to disruption of the normal functioning of traffic, damage to the environment and human health. It occurs in conditions of rain or snow and temperatures that fall below 0 0C or lower.
In the central part of Bosnia and Herzegovina threat of frost is higher than in other parts of the country especially at higher altitudes. Most have in the winter months from December to February. In the south of the country there is little risk of frost in the winter half of the year.
Heavy snowfall, high snow cover and high snow drifts may pose serious difficulties for normal daily activities. Snow cover in the country interested in many industries: agriculture, power industry, construction industry, transport and so on.
For the assessment of threat of high snow analyzed the incidence of snowfall, the maximum height of snow cover during the year by months, and the number of days with snow cover ≥ 10,30 and 50 cm.

The number of days with snowfall, more than 0.1 cm (appearance only registered), ranges from 4 in the Neretva River valley, the mountain tops Herzegovina 60, to a maximum of 80 days that occurs at the top of the mountains of central Bosnia.
The lowest value in a mountainous area of central Bosnia are about 30 days with snow per year. Less than 20 days of snow a year occur in the area of Banja Luka, Doboj, Ugljevik to the Sava River.
Average maximum value of snow cover in the southern Herzegovina from 5-10 cm. In the north of Herzegovina Mostar value most snow on the ground ranged from 40 cm at lower elevations to over 200 cm on the mountain tops.
These same values are in parts of central Bosnia to the plains along the river Sava, and the value is between 30 and 40 cm. The same goes for the valley of the river Vrbas, Bosna and Drina.
It is evident that the measuring stations located at high altitudes and increases the maximum height of snow cover, and also the frequency of days with snow depth of ≥ 10, 30, 50 cm.
In the major cities of the Federation of Bosnia and Herzegovina in November 1999, the following values were measured snowfall: 105 cm Bihac, Bugojno 85 cm, 83 cm Sarajevo, Tuzla, 65 cm, 64 cm Livno, Zenica, Mostar 51 cm, 37 cm.
In February 2012, the entire area of the Federation of Bosnia and Herzegovina was affected by heavy snowfalls and low temperatures, which caused major problems in the functioning of the basic living conditions of the population. As a result of these natural disasters, there has been damage to a large number of housing and ancillary facilities, greenhouses, many years now, and the damage they caused to the livestock, poultry and aquaculture. Also, due to this natural disaster caused the damage to the equipment, other property, and as a result of natural calamities were created and indirect damages.
According to the Cantonal government and municipal civil protection services estimated damage in the Federation of Bosnia and Herzegovina was more than 60,000,000.00 KM, and the highest estimated damage were recorded in the Herzegovina-Neretva, West Herzegovina, Sarajevo Canton, Zenica-Doboj, Tuzla, Central and Canton 10th
There is no set strict limit values that define the heavy precipitation of snow and their impact on traffic, power lines, etc.. It can be taken with certainty that the 50 cm of new snow caused problems in traffic flow.
For example, in Sarajevo Canton according to the assessment of the risk from natural and other disasters, the limit was 30 cm. Experience shows that 5 cm of new snow in 12 hours (in some countries 2 cm / h) was enough to publicly issue warnings, ie. declare a natural and other disasters. In the mountainous regions of the Federation of Bosnia and Herzegovina (Bjelasnica, Treskavica, Igman, John, Border, Kupres, Vlasic, Čvrsnica, Crow, Podvelež) of snow can be from 1 to 2.5 meters.
Comparing several years down the 1961 to 1990 with a series of 2000 - 2010 years, a noticeable trend of decreasing the number of days with snow and a maximum height of snow cover.

1.4.1. Findings

- Fro the tasks of rescue the victims of the snow drifts and avalanches it is necessary that the competent authorities in the municipalities, cantons and the Federation of Bosnia and Herzegovina form, put into action and technically equip the appropriate services for protection and rescue in citizens' associations (mountain associations, Mountain rescue service, cavers etc.).
- In cases where power and resources are not enough civilian structures in carrying out the tasks of protection and rescue, and to support the protection and rescue actions, it is necessary to seek the engagement of the BH Armed Forces of Bosnia and Herzegovina, in accordance with the Law on Defense of Bosnia and Herzegovina (BH Official Gazette "No. 88/05) and the Instructions for interdepartmental coordination when you receive, make and transit of international assistance in the Protection and Rescue ("Official Gazette", number 77/13)
- In order to take organized and effective protection measures and rescue important activities in this area are monitoring and studying the risk of snow drifts and avalanche, which includes a tour of the observations, and then inform the public.
- Special attention should be paid to the competent authorities of municipalities, cantons and the Federation of Bosnia and Herzegovina in a timely undertake all activities related to the engagement of business and other legal entities to snow removal and snow drifts of roads and other infrastructure.

1.5. Flooding

The flood inundation of narrower or wider complex of land, pouring water from the riverbed, lake or sea. Resulting from heavy rainfall, rapid melting of snow, strong winds and earthquakes and other natural disasters. Reduces or prevents the construction of dikes, dams, canals or large storage reservoirs which accepts most of the floodwaters. Floods can be natural or artificial.

1.5.1. Natural flooding

Natural floods usually occur in river valleys where the water poured out of the river bed, covering coastal land or flowing over it. Width flooded land strip depends on the amount of water in the river during the floods, the depth of the river bed, the slope side of the river valley and the buffer zone built along the river.

Due to the complex hydrological situation that can happen in Bosnia and Herzegovina it can get to heavy rains that can cause major damage to residential, commercial and infrastructure facilities, and thus endangering the safety of people and property.[11]

In river valleys, flood caused mainly by the hydrological conditions in the basin. Often the floods came after a relatively moderate rainfall, not related to a certain season (occurring in summer and winter), water is rapidly coming and are short-term (a few hours to 1 day).

The floods in river valleys interrupt the land transport, making it impossible for a long time the passage of pedestrians and motor vehicles, and often make it difficult for waterway traffic on the river.
Lake floods resulting in increased inflow of water from the surrounding mountains in the lake basin. These floods inflict damage to the economy, and less often endanger settlements and people's lives.

1.5.2. Artificial floods

Artificial floods from demolition embankment on river banks and dams on reservoirs. Most often such situations occur in wartime.
Floods have resulted in substantial material damage (direct or indirect) and are currently in the course of the flooding or immediately after the cessation of rainfall or with time-delayed action (subsequent land subsidence, loss of structural characteristics of individual elements in the house due to the long-term effects of surface water levels, surface or ground water, increase and decrease of the groundwater level, the occurrence of infectious diseases in humans and animals due to changes in hydrological conditions in the catchment area or locality, etc.).
Flood damages arise in economic activities, transport infrastructure, civil engineering works, and the action of erosion and flash floods occur multiple damages (destruction of land and loss of its fertility).
Under natural conditions in Bosnia and Herzegovina plain areas, river valleys and rocky fields are only favorable potential areas for settlement, industrial construction, development of economic infrastructure. Major occupation and filling these areas their usage and the total value is on the increase and its growing vulnerability and need for protection from floods.
A year in Bosnia and Herzegovina falls around 1,250 l / m2 of rain or a total of 64 x 106 m3 of rainfall. From the territory of Bosnia and Herzegovina annually swell 1,155 m3 / sec, or about 57% of total precipitation and 62.3% of the Sava River basin to the Black Sea, and 37.5% of the Danube River to the Adriatic Sea. In general, the total annual rainfall and runoff, Bosnia and Herzegovina is one of the richer areas of water and climate, geography and other relevant factors adversely affect the hydrological regime in all relationships and on most watercourses, classifying it uneven and extremely uneven, not only in space but also time. Inappropriate water management with natural unfavorable distribution of water in space and time increases the risk of flooding.

[11] Heavy rainfall, which were between 14 to 16.05.2014. was registered that in that period, the amount of water 200 - 250 l / m2 (eg. in the broader scope of the Spreča river basin for three days fell the amount in the amount of 247.8 l / m2, which is 25% of the total amount of the mean annual precipitation). These rainfalls, short duration and high intensity, caused enormous increase in water levels in all streams in the water area of the Sava River. It is estimated that in the middle and lower parts of rivers Bosna and Spreča appeared catastrophic discharges rank once in 500 years on the part of the river basin in the Federation of Bosnia and Herzegovina order of magnitude of once in 1000 years.

Hydrographic and hydrological diversity of Bosnia and Herzegovina is the result of a very complex impact each of the various components of the environment. Among the most important are: climatic characteristics that determine water body, then geological or hydrological conditions and the topography of the. The hydrological properties are influenced by other factors, including man.

1.5.3. Flood damage

The floods that occurred in June 2001, when according to the Hydrometeorological Service of the Federation of Bosnia and Herzegovina fell between 50 and 100 liters of water per 1 m2, affected the Posavina, Tuzla, Zenica-Doboj and Central Bosnia Canton and caused enormous damage to agriculture on buildings, equipment, roads and civil engineering works and infrastructure. To repair the damage caused by flooding of agricultural land and housing and facilities Government of the Federation of Bosnia and Hercegovineje allocated 6,730,178.00 KM and damage reported to the committee to assess the damage municipalities and cantons amounted to over 50,000,000.00 KM.
Due to the prolonged spring rains in the Federation of Bosnia and Herzegovina, in the spring of 2004, floods have affected all areas of the canton with something different intensity. The flood affected 13,455.95 hectares of agricultural land, and the damage caused by the flooding amounted to 23,933,792.86 KM.
The floods that occurred in 2003 and 2004 in the Federation of Bosnia and Herzegovina confirmed that these natural phenomena are inevitable and warn that we got out of the cycle of large thumbnails of water (which, fortunately, has been going on for about 20 years) and entered in the hydrological cycle and significantly larger and more frequent occurrence of high water.
According to the latest analysis reveals a more frequent occurrence of intense rainfall with large amounts of rainfall. In addition, 2009 and 2010 were extreme precipitation, but 2011 was with precipitation well below the perennial values.
Here it should be noted that the area of the Federation of Bosnia and Herzegovina in 2010, was affected by heavy floods have caused considerable material damage to property (housing, utilities and other facilities, infrastructure facilities and agricultural land, etc.) and caused damage exceeds the amount of 87,000,000.00 KM, keeping in mind, that the greatest damage was registered in Tuzla, Posavina, Bosnia-Podrinje, Zenica-Doboj and Herzegovina-Neretva Canton.
Also, in 2014, the territory of the Federation of Bosnia and Herzegovina in late April and early May, and the beginning of August 2014, was caught by a heavy storm, accompanied by rain, which caused an increase in water levels in all rivers and their tributaries, which caused great problems in the Federation of Bosnia and Herzegovina: relocated hundreds of families, flooded hundreds of buildings damaged thousands of hectares of agricultural land, problems of traffic flow, endangered or damaged or cut off many roads and bridges that connect the edge of local communities and settlements, supply of the population, as well as in terms of course of all other regular activities of citizens and legal entities and launched numerous landslides and activated new.
In this regard, the Agency for the Sava River Basin, in their reports, among other things, said that these heavy rains led to water saturation of land and a significant increase in water levels in all streams in the Federation of Bosnia and Herzegovina. Such a complex hydrological situation was followed by precipitation so far unprecedented in the period of 120 years of follow-precipitation in Bosnia and Herzegovina, which had the effect that in the period from 14 to 16.05.2014. The precipitation was in doses of 200 - 250 l / m2 (eg. in the broader scope of the Spreča river basin for three days down the amount in the amount of 247.8 l / m2, which is 25% of the total amount of the mean annual precipitation). These rainfall, short duration and high intensity, caused enormous increase in water levels in all streams in the water area of the Sava River. It is estimated that in the middle and lower parts of rivers Bosna and Spreča appeared catastrophic discharges rank once in 500 years on the part of the river basin in the Federation of Bosnia and Herzegovina order of magnitude of once in 1000 years.
Floods and landslides in the Federation of Bosnia and Herzegovina in the May and the August floods were affected area 7 cantons (Zenica-Doboj, Tuzla, Posavina, Sarajevo Canton, Una-Sana, Central and Podrinje Canton), and 45 municipalities in the areas of the canton .
The most difficult situation was in the flooded areas of Zenica-Doboj, Tuzla and Posavina Canton, where floods have caused human sacrifices.
According to reports, the relevant ministries of the Interior, the floods have killed three persons (two persons in the area of Posavina and one person in the Zenica-Doboj Canton, which is by the medical examiner concluded that the death was caused by drowning), while two persons from the area Sarajevo Canton as missing and they are still being searched.

In addition to the human toll, the flooded areas there were injured or affected 148 persons, including 50 persons in Orašje, by 40 persons in Lukavac and Sapna, 9 persons in Olovo, 4 persons in the Banovici, 2 persons in Tuzla, and 3 persons in the municipality Vogosca.
According to available data, in the Federation of Bosnia and Herzegovina, in the floods triggered a total of 5,841 mudslides and landslides in affected areas of the municipality (of which, 4137 in Tuzla Canton, 1302 in Zenica-Doboj, 258 in Central, 103 in Sarajevo Canton, 39 in the Una-Sana and 2 in Gorazde Canton).
In these floods and landslides temporarily evacuated 29,131 persons (including the areas of Posavina Canton 14102, Zenica-Doboj Canton 7,877, 5,891 Tuzla Canton, Una-Sana 1004, Sarajevo Canton 252, and from the territory of Bosnia-Podrinje Canton 5 persons).
Of this total number of temporary evacuees, 1,476 persons have been accommodated in 31 reception centers in the Federation of Bosnia and Herzegovina. Of that number, 16 reception centers were organized in Tuzla Canton (placed 498 persons), 9 in the Zenica-Doboj Canton (placed 760 persons), 3 in the Posavina Canton (placed 119 persons), 2 in Sarajevo Canton (placed 85 persons), and 1 reception center in the Una-Sana Canton (placed 14 people).
Total is in the Federation of Bosnia and Herzegovina (Posavina, Tuzla and Zenica-Doboj Canton) died 8,358 animals, 273 350 poultry, 438 beehives and 20 carcasses of wild animals, and there was also a deterioration of large quantities of fish from the refrigerated chamber of "Yimor" doo Domaljevac - Samac, as well as the deterioration of certain quantities of meat in refrigerators households.
Animal waste in the total quantity of 357 600 kg, loaded and transported to the pound "Energozelena" Indjija (Serbia), while in other municipalities, the sanitary and veterinary conditions prescribed by law, carried out by burying other dead animals in the pit of the tomb.
Also, in the flooded areas and areas affected by landslides, damaged a total of 14,415 housing units (5,034 in the Posavina Canton, 4165 in Zenica-Doboj, Tuzla Canton in 3872, 1,314 in the Una-Sana Canton, 25 in Sarajevo and 4 in Gorazde Canton), and destroyed a total of 1,030 housing units (699 in the Tuzla canton, 236 in Zenica-Doboj, 80 in the Posavina Canton, and 15 in Sarajevo Canton).
Also, the total flooded area of 30,478 ha of agricultural land (13,686 ha in the Tuzla Canton, 13,068 ha in the Posavina Canton, 2,241 ha in the Una-Sana Canton, 1,456 ha in the Zenica-Doboj, 15 ha in Gorazde and 12 ha Sarajevo Canton).
According to the reports of the competent authorities, in these cantons and municipalities have not been recorded increase in the number of infected, or deviations from regular morbidity statistics.
According to municipal and Cantonal commissions for preliminary damage estimate total damage, which caused by floods and landslides in the area of the Federation of Bosnia and Herzegovina amounted to KM 1,083,625,124.20. It should be noted that the damage caused by landslides significantly higher compared to the damage that caused the floods.
In Annex 10 of this assessment is presented an overview of the damage in the Federation of Bosnia and Herzegovina from May 2014 and it is a review of people (dead and injured), dead animals, the number of landslides, damaged and destroyed housing units, flooded farmland, evacuated population, the number of reception centers and accommodated persons and the amount of the preliminary damage, which was expressed by the municipal commission for assessment of the damage in the Federation of Bosnia and Herzegovina.

1.5.4. The development of the system and reducing the risk of floods

Risk of flooding and landslides necessitate active improvement of flood protection systems and reduce the risk of flooding in the Federation of Bosnia and Herzegovina. For the implementation of this approach requires coordination at the level of Bosnia and Herzegovina and at the international level, at the level of the common river basins, which are time and content match the obligations of the Joint Action Programme sustainable flood protection in the Danube river basin, which is in December 2004 onwards. was accepted by 13 Member States of the Danube Convention, including the Bosnia and Herzegovina.
Troubleshooting flood protection in the Federation of Bosnia and Herzegovina, which was for many years (since 1992) in stagnation, based on insurance data for building facilities for flood protection and their status, the estimated level of vulnerability to flooding river valleys, and assessment of potential damage, as well as the degree of threat to human life, technical alternatives and assessing the feasibility of investing in facilities for flood protection in some areas in the river valleys and karst fields.
Based on data collected from so far made the project documentation, assistance, and field survey and analysis of hydrological data, the study "Assessment of the current state of the level of flood protection in the Federation of Bosnia and Herzegovina and production improvement program" has identified 31 area affected by the floods in the Federation of Bosnia and Herzegovina (valley watercourses and karst fields), as shown in Table 1.5.4.

Table 1.5.4. Flood-stricken regions in the Federation of Bosnia and Herzegovina

Red. br.	Vodotok	Endangered area
1	2	3
1.	Sava	Wider area of Odžak (from Šamac to Svilaj)
2.	Sava	Wider area Orašje (from Domaljevac to Vučilovac)
3.	Una	City area Kulen Vakuf
4.	Una	Wider area Bihać (from Ripča to Pokoj)
5.	Una	City area Bosanska Krupa
6.	Una	City area Bosanska Otoka
7.	Vrbas	City area Gornji Vakuf-Uskoplje
8.	Vrbas	City area Donji Vakuf
9.	Bosna	Part of the Sarajevo Field Plandišta til Reljeva
10.	Bosna	Coastal lower course of the river downstream from Bosnia to Modrica Bosanski Samac
11.	Drina	City area Goražde
12.	Glina	Coastal Gline in FBH lower flows Glinice and Kladušnice
13.	Korana	Coastal Korane in FBH and lower flow Mutnice
14.	Spreča	Valley downstream from the reservoir Modrac (from Lukavca to Brijesnica)
15.	Spreča	Valley downstream from the reservoir Modrac (from Osmaka to Spreče in accumulation)
16.	Tinja	City area Srebrenik
17.	Tinja	Wider area of Tinja
18.	Usora	Valley Usore in Federation BH from Kaloševića to river basin Bosna
19.	Sana	Wider area Sanski Most
20.	Lašva	City Travnik and area Doca
21.	Lašva	Area Vitez
22.	Neretva	Part of the valley from the border Federation BH from Metković to Gabela
23.	Neretva	Valley Neretva from Gabela to river basin Čapljina
24.	Neretva	Valley Neretva from Čapljina to river basin Buna
25.	Trebižat	Valley Trebižat from Koćuša to Humac
26.	Trebižat	Valley Trebižat downstream of the confluence Studenac
	Kraško polje	**Endangered area**
27.	Mostarsko blato	The flat part of the whole – from Uzarić to infllirtation zones on southieast region
28.	Imotsko-Grudsko polje	The southeast part of the field - are prone to flooding because of insufficient capacity of the abyss and existing tunnel to evacuate water
29.	Duvanjsko polje	Wider area Kovači –preinflirtation zones retention Kovači on the south area
30.	Livanjsko polje	Wider area Čaprazlija and Kazanaca – preinflirtation zones retention Čaprazlija and Kazanca
31.	Glamočko polje	Wider area Mladeškovca and Pučina – preinflirtation zones retention

1.5.5. Geodetic and climate substrate, hydrologic and hydraulic analyzes

Floodplains of the Federation of Bosnia and Herzegovina are under climatic characteristics classified into four distinct groups, namely:

1) areas gravitating in Tuzla and Posavina Canton,

2) areas that are in or gravitate to Una-Sana Canton,

3) areas that are in Herzegovina,

4) areas located in Central Bosnia (Canton, Central Bosnia, Bosnia-Podrinje and Zenica-Doboj Canton).

1.5.6. The rating of the current risk in flooded areas

Present risk of flooding in the Federation of Bosnia and Herzegovina is exposed to the following areas:

- Lowland area along the Sava River,
- Areas in the valleys of major rivers - Una, Sana, Vrbas, Bosna, Drina and Neretva

- A narrow valley with minor watercourses.

1.5.7. The lowland area along the Sava River

Characteristic of the entire coastal area of the Belgrade Sava to Jasenovac is the adopted strategy of protection against floods by tape-polders, and upstream from Jasenovac applies the concept of flood protection realization of pressure relief-compensation pool.
In the Federation of Bosnia and Herzegovina, in the coastal basin, there are areas Odžačka and Central Posavina each with two separate polders. By 1992, this area successfully protected against a centennial highest water level of the rivers Sava and Bosnia. Dammed surface in this area amounts to 7,750 ha in Odžak area and 22,000 ha - in the area of Central Posavina.

The study of 1972, after which it established the system of flood protection in its current form, it envisages the construction of several large reservoirs in the Danube basin in order to improve the natural hydrological regime. Given that there is no chance to build these reservoirs in the coming years and the current state of the facilities, there is still a risk of flooding of these areas.

1.5.8. The areas in the valleys of major rivers - Una, Sana, Vrbas, Bosna, Drina and Neretva

The characteristic of these areas is that until now little was done to resolve the problems of flood valleys of major rivers in the Federation of Bosnia and Herzegovina, except:

- Minimum work on punching travertine threshold river Una in Kulen - Vakuf
- Embankment in Sana River bed in the urban area of Sanski Most,
- Regulation of the Vrbas riverbed in a narrow urban areas of Gornji Vakuf - Uskoplje and Donji Vakuf,
- Regulation of the river Bosna in the urban area of Zenica and minimal work on the watercourse in Visoko and Maglaj
- Regulation of the Drina in Gorazde, to determine the coastline.

In the upper reaches of the Una, Sana, Vrbas and Bosnia storage reservoirs are not built, so that even the least correction is not made of natural hydrological regime and the reduction of the maximum flow. The risk of flooding in the valleys of the rivers is very high. The situation in Gorazde is favorable for the upstream reservoir Mratinje on the Piva River. However ,uncoordinated management regime of water levels of hydro power plants there has been flooding downstream municipalities river Drina Foca - Ustikolina and Gorazde in the Federation of Bosnia and Herzegovina there has been a huge material damage in the coastal area of the Drina River (damage to the preliminary estimate, only in Gorazde amounted to approximately 15,000,000 , 00 KM).
On the Neretva the situation in the last 40 years has significantly improved since the construction of the reservoir reduced waves of high waters, and regulation works protected all settlements downstream. However, lack of coordinated activities of management levels of reservoirs there was a sudden release of large amounts of water that have made great damage to the citizens of Mostar and downstream of Mostar.

1.5.9. The narrow valley with minor watercourses

The characteristic of these areas is that in the narrow valleys of small streams in the Federation of Bosnia and Herzegovina are important cities, industrial headquarters, roads. The total length of the water stream and the valley is long. In these valleys for flood protection works carried out in the regulation - the channeling of watercourses, mostly in urban areas by then, and in Sarajevo (Cardak and Railways), Tuzla (Jala and Solina), Travnik (Lasva), Zenica (Babina river and Poles), Tesanj (Tešanjka), Lead (Stupčanica and Orlic), Bihac (Drobica), Gracanica (Sokoluša), Ljubuski - Vitina (Trebižat), Višići (Krupa), and second in the smaller towns.

In some places the rank of on centuries-old water is not conducted. In the meantime, there has been expansion of urban areas and significantly increased the value of goods in the affected areas. That is why today there is a high risk of flooding in the narrow valleys of small streams.

The aforementioned high risk of flooding in the most vulnerable areas on the rise for the following reasons:

- Little or no maintenance of water protection facilities in order to reduce the vulnerability of the area around such facilities,
- Wild and unplanned construction of residential and commercial properties in coastal areas and hence waterbeds which have significantly reduced the flow profiles and throughput of watercourses,
- Streams as well as space to them is attacked and a large number of illegal dumping various types of waste (municipal, construction, industrial, etc.) which are significantly deteriorated sanitary and hygienic conditions along watercourses,
- Very little is invested in the maintenance of river beds in order to allow a greater flow of water masses in the case of higher rainfall.

A special obstacle to regular maintenance of flood control facilities is the fact that the legal framework is not an adequate means by which the owner can provide the facilities management of buildings and care for their functionality.

1.5.10. General concepts of solving protection of flood affected areas

Fighting floods in the recent period has led to the development of a number of technical and institutional concepts of flood protection, which have different characteristics and applications.

In the Federation of Bosnia and Herzegovina, following topical application of strategic concepts of flood protection, as follows:

- Regulation of river beds and embankments,
- Establishment of polders,
- Regulation of the natural hydrological regime,
- Reduction of retentions in karst fields.

The choice of concept solutions for each flooded area was made on the basis of techno-economic analysis, including the environmental aspect of the decision.

Considering that the occurrence of floods, in addition to causing significant material damage and endangering people's lives, in many cases, and drastically impair the characteristics of the ambient river valleys and all other areas where they occur, the affects of the flood were considered in:

- Demolition of stream banks and destruction of vegetation on them,
- Of major landslides in the coastal areas,
- Demolition of natural cascades in the bottom of the river and a total change in the morphology of the riverbed,
- Passing the trough of large quantities of waste material - that resides long time, particularly affecting the vegetation in the riverbed,
- Demolition of bridges and other structures in the valley watercourses,
- Total destruction of the vegetation in flooded flooded areas,
- Application of mud and sediment filling in agricultural and urban areas,
- Spills of waste water in flooded flooded areas - contamination,
- Contamination of spring zones along watercourses.

1.5.11. Condition of the existing system of flood protection in the Federation of Bosnia and Herzegovina

According to the Law on Waters ("Official Gazette of BH", No. 70/06) the existing facilities of flood protection for areas along the Sava and Neretva are defined as areas of importance for the Federation of Bosnia and Herzegovina, and objects to other streams are defined as objects of importance to the cantons. Because of the international character of flood protection systems along the Sava and their investment value and complexity of their maintenance, the Federation of Bosnia and Herzegovina is defined as the owner of flood control facilities along the Sava and Neretva.

For other facilities of flood protection as well as the owners are determined cantons or municipalities for regulated river beds in the urban areas or third parties for objects that have the same built for their needs.

1.5.11.1. Water supply facilities in the Sava River Basin in the ownership of the Federation of Bosnia and Herzegovina

- Pumping stations (total capacity of 26.9 m3 / s),
- Embankments along the Sava river length 59 475 m,
- Embankments along the river Bosna length of 6,905 m,
- Circumferential channel length of 21,217 m,
- 7 coast-fortress on the river Sava length 6,119 m,
- Two centers of flood (Prud and Orašje)
- Best guard house,
- 2 embankment dams "Hazna" and "Vidar" in Gradacac.

1.5.11.2. Flood protection facilities in the Adriatic Sea basin

- Pumping station "Sjekose" Svitava with a guard house (total capacity 4 x 1 m3 / s),
- Dikes along the river Naretvu 14,692 m,
- Embankments along the river Bregava length of 3,091 m,
- Embankments along the river Krupa length of 12.212 m,
- A drainage canal Dračevo-Svitava and embankment along circumferential channel length of 4,080 m,
- Center of the flood protection within the administration building in Capljina
- Dikes along the river Tihaljina - Mlade - Trebizat, 19,822 m in length,
- Embankments along the river Vrioštica length of 7,441 m,
- A drainage canal Probojska ravine and dike along the circumferential channel length of 1300 m,
- Channel Parilo – Brza voda length 4090 m,
- Channel Grudsko Vrilo - Vrlika length of 11,264 m,
- Lock chamber in Drinovci (Grude) with associated facilities, security guard house and magazine,
- Lock chamber in Krusevo (Mostar blato) with associated facilities, security guard house and magazine,
- The main drainage channel in Mostar blato, stock channel OK 1-1 ', length 1,108 m.

Facilities near the Neretva River in function and provide protection areas to the level of their construction.

Facilities near the Sava River during the war significantly damaged and do not ensure the execution of the functions for which they were built. However, in the post-war period made the rehabilitation of water protection embankment on the Sava River in the area of Odzak and Orasje.

1.5.11.3. Facilities that are mined and used for flood protection in the area of Posavina Odžačke

- Sava embankments on the section from km 17 + 500, or on the stretch from the basin of bunding Svilaj - Potočani to the village of Kadar, the length of 9.630 m. The area of 172,970 m2 which is slated for demining mined entirely demined in accordance with the project.[12]
- Also, left Bosnian embankment on the section from km 1 + 250 to km 905 + 6 or move Down - Neteka length of 5,655 m was demined in total area of 163,700 m2. and referred to the surface of the crown dikes, water and defended embankment with a belt width of 6.0 m to the

[12] Project No. 01.36-5409 / 09 of 28.08.2009. year, Project Number: 01-36-3939 / 09 of 10.06.2009. year and project number: 01-06-6776 / 04 dated 28.12.2010. year

left and right of the foot embankment.[13] Facilities used for flood protection in the area of Central Posavina are demined through these projects.

1.5.11.4. Facilities that are mined are used for flood protection in the area of Central Posavina

Sava embankments on sections from km 13 + 970 to km 17 + 000, km 39 + 450 to km 40 + 390 and from km 42 + 100 to 43 + 150, the total length of 5,020 m was also cleared area 101,000 m2 and concerns on the surface of the water embankment with a belt 20 to him within the floodplain area of interest of the local community.
After completion of demining works all surfaces are regularly held by the LP "Posavina" Odzak, achieving a significant milestone in the advancement of flooding in this area.

1.5.12. Findings

Provide additional funds for the execution of rehabilitation and regular maintenance of the facilities built for flood control and clearly identify the degree of protection which they provide.

- Administrative measures to ensure compliance with prescribed management and use of facilities and space as a whole, and that have an impact on the emergence of flooding. The special attention to the situation in the wider catchment area (controlled deforestation and reforestation, land use and methods of processing, the establishment of appropriate conditions related to the water regime in the construction of any facilities, consistent application of the planned measures, works, procedures in the construction of facilities and itd.).
- The construction of new or reconstruction of previously constructed structures for flood protection should strive to improve the level of protection and rescue of people and property.
- In areas that remain outside the protection (areas designated to accept large water floods - inundation part of the river bed, retentions), as well as in areas that are not yet covered by flood protection it is necessary to categorize and prescribe the proper utilization. Purpose determined by the amount of damage that the use of space-time could result in the emergence of floods - natural and other disasters.
- Continuous and rigorous controls to check the condition of water protection facilities, management and use of water and water facilities.
- In cantons and municipalities immediately take action on the adoption of preventive and operational plans of flood control, in accordance with the relevant regulations governing this area and their alignment with the Federal operational plan of flood control.

1.6. Drought

Lack of water for normal settlement needs (for life and development, to carry out activities, etc.), as a rule, implies the emergence of drought. In contrast to other natural disasters, drought occurs slowly, lasts long and covers a large area, although its spatial distribution is not possible to precisely locate advance.

Before analyzing drought we must first define what is meant by the term "drought". For meteorologists there were periods with total precipitation well below average; in agriculture are periods during which soil moisture is well below average and insufficient for the growth and development of crops, and hydrologists are small flow rates in rivers and extremely low water levels in the reservoirs, which take a long time.
Basically, it can be defined as:

- Meteorological drought, when a large area for a specific area and time of year falls significantly less rainfall compared to the normal value;
- Hydrological drought, implies a fall in the water level in the water reservoirs, rivers, lakes, and groundwater level decrease, which affects not only industry but also agriculture;
- Agricultural drought occurs when the vegetative period, soil moisture and precipitation are insufficient to healthy plants come to the stage of ripening, causing damage to plants and wilting. This drought may exist even if there is no meteorological drought and vice versa.

[13] Demining projects are stored in the VP "Posavina" Odzak and RU MAC in Brcko.

A longer period without sufficient rainfall for normal development and maturation of crops which result adversely affect the yield and quality of products with significant deviation from the three-year average, considered a drought.

Each water deficit beyond convention established norms or deviations is referred to as an element that produces a natural disaster. Drought as a natural disaster occurs mainly in the area of utilization and use.

1.6.1. Water deficit as a cause of natural calamities

1. Can occur when the conditions unfavorable hydrological regime of the water sources appears extremely low water lower order of magnitude small water than anticipated for a given purpose, that is, when its abundance decreases so that in the long term can not provide even the minimum reduced specific consumption (valid for organized interventions of public water supply systems, as well as individual and group solutions).
2. Can arise when accidents happen in the system, so there is no alternative solution in the long term.
3. Can occur when an incident pollution sources or streams which it feeds through the prescribed measures over a longer period which causes the exclusion of sources of water supply system.

1.6.2. Return period and the effects of drought

In secondary (mountainous) areas of the country, in the last 50 years, there were three extremely dry period. In the northeast and southwest of the country has significantly increased risk of drought, ie. in the last 50 years, there were 7 extremely dry periods.

Damage from natural disasters may be declared and the consequences of long-term shortage of water in the system to ensure the supply of water, which occur as a constraint development, production decline, the appearance hidričkih diseases, epidemics and the like.

In crop production drought as a natural disaster occurs when an moisture deficit during the preparation for sowing, or, in certain stages of the growing cycle of the plant.

In addition, the decisive role has overall water balance plants, and it only indirectly and hydrological balance.

Requests plants define the concept of drought is not uncommon for hydrological anhydrous period and causes the occurrence of drought as a natural disaster.

Depending on the climatic characteristics of climate, crop rotation (one, two or more crops per year) drought can occur in different seasons and different intensity. He did not care whether the drought is destroying the whole planting or only reduces the yield.

Therefore, in the Mediterranean area and the period when it can occur drought lasts 5-6 months a year, and in the rocky fields and northern parts of the Federation of Bosnia and Herzegovina in the period August - October (3 months).

The total deficit of moisture depends on the climate and culture, ranging on average from 3 to 6,000 m / ha per year, and in the northern part of 1500-4000 m / ha per year.

In the overall balance regularly to a year should provide 120 to 240 million m3 of water, and the rest of the Federation of Bosnia and Herzegovina 300-600 million m3 of water.

Natural disasters would occur if the dry years do not provide 120 to 300 million m3 of water to about 230,000 ha once every 10 years or less, and more frequent cases of damage from lack of water could be manifested in reducing the yield by 5 - 30% in some cultures and the certain areas.

The intensity of the drought is usually estimated to reduce yields, provided that this did not affect other adverse factors. If the yield was reduced to 20% it is a low-dried, from 20 - 50% of high drought, and over 50% of the severe drought.

The occurrence of drought is most common in Herzegovina and in the summer months. Given the intensity and duration, is particularly pronounced in southern Herzegovina.

In the lowland part of the Federation of Bosnia and Herzegovina drought is less pronounced than in Herzegovina, while the least pronounced in hilly - mountainous part of the Federation of Bosnia and Herzegovina.

In the area of Posavina Canton recorded the month-long drought in the period of March, April and May 2003, and daytime temperatures in the first half of May exceeded and 34 °C.

Drought, which was more intense than the one recorded in 2000 when she was in the absence of precipitation in the summer of 2003 caused by the hydrological drought, which is manifested by reducing the surface and deep water reserves.

Anhydrous period has resulted in suffering of grain, forage crops and industrial crops. The estimated damage of these drought in Posavina Canton amounted to over KM 8,000,000.00.

In addition, and in the municipality of Celic, in Tuzla Canton, in 2003 were recorded drought, so that the estimated damage amounted to over KM 2,000,000.00.

It should be noted that the drought in the Federation of Bosnia and Herzegovina in the period 2010 - 2012 caused damage amounting to over 156,000,000.00 KM.[14]

1.6.3. Findings

- In order to prevent the risk of damage from drought large scale that can endanger people and property, it is necessary to ensure the reduction of losses in water supply systems, reconstruction and quicker flow through the system.
- Introduction of new technologies in production processes, reduce the need for additional supplies of water, while improving the quality of water used and discharged (large industrial consumers, irrigation).
- Provide enough water for the irrigation of arable land, which would create conditions for intensive agricultural production.
- By providing additional quantities of water available or prepared new sources of supply to improve the population already covered by public water supply systems and extending them to the greater number of settlements in which there has been a decrease in the inflow into reservoirs.
- Protect and develop existing sources and finding new, in order to secure additional water in the affected areas.
- Perform acceptance and capturing of high water, when they are present and make available in terms of needs, through the construction of artificial reservoirs, which in addition to the production of electricity and create conditions for the development of tourism, carried flood downstream areas, providing water for irrigation.
- To plan and provide transport of water tanks for the rehabilitation needs of the most vulnerable consumers, which requires the system to procure and retain a sufficient number of vehicles.
- It is necessary to provide the reserve amount of water, the construction or placement of water tanks and others. for effective fire protection (especially outdoors).

[14] In Una-Sana, Posavina and Bosnia-Podrinje droughts were in 2012.
In Tuzla, Zenica-Doboj and Central Bosnia Canton droughts were in 2011 and 2012.

1.7. Hail (ice)

Hail is atmospheric precipitation in solid state (ice) diameter of 5 mm or more that its impact causes great damage to or destruction of agricultural and forest crops, and can cause damage to the other buildings (construction, etc.).

Particular danger hail represents in those areas whose geographical location and climatic factors such as to enable the frequency, especially in areas of intensive agricultural activities, as well as densely populated areas. This is particularly the case with the area along the Sava River: Kozara and Potkozarje Lijevče polje, Posavina and Semberija and Drina.

Thunderstorms, accompanied by noisy strong windstorm, or heavy rains with hail and without it, causing traffic problems, damage to buildings and agriculture. In mountainous areas causing severe floods, floods on smaller rivers and landslides on soft soil.

In the continental part of the country hail usually occurs from April to October, when it was most dangerous to crops when they are in full vegetation and are very sensitive to the effects of this phenomenon. The emergence of hail less frequent in winter in most areas and less importance, except in Herzegovina, where it occurs in the colder part of the year.

The highest probability of occurrence of hail in May, June, July and August every two to three years.

The incidence of hail in Bosnia and Herzegovina shows the number of days with the appearance of the hail to a multi-year series (1961 to 1990).

The highest number of days with hail has a region of Sarajevo, the valley of the Neretva River to its mouth and around Trebinje up to 3 days. Closely lowlands along the Sava River has an average of two days a year, and the rest of central and eastern Bosnia has an average of one day a year.

On the territory of Bosnia and Herzegovina annually 30 to 40 days with thunderstorms, and hail as harmful phenomenon occurs once or twice a year. Average annual damage from hail amount to 30 million KM, and especially related to primary agricultural production.

Comparing perennial string (1961 to 1990) with a series (2000 - 2010) we can see the trend of increasing the number of days with hail due to an increase in mean temperature and rapid thermal amplitude (June, July 2003, 2007, August 2009 and 2010).

By 1990, it was organized by the department of defense hail which took place on the training ground anti-hail Gradacac. After this period in the Federation of Bosnia and Herzegovina carried out organized skinned hail. Although there was an initiative by the agricultural producers to establish a service for anti-hail protection, the implementation of the same has not been the attitude of the wider meteorological community regarding the economic feasibility of investing in service.
In the period 2010 - 2012, some of the municipalities in the Federation of Bosnia and Herzegovina have suffered great damage from the city. According to data provided by the Cantonal government and municipal civil defense services, in the Una-Sana Canton, in 2010, registered the damage from hail amounting to over 2 million.
In 2011, we registered damages in Citluk, over 2 million and the municipalities of West Herzegovina Canton in the amount of over 2.5 million. In June 2012, the damage from hail Gradačac municipality amounted to over 12.5 million, and the total damage of hail in the period 2010 - 2012 amounted to 19,159,739.76 KM.

Back 30 years in this area there is organized service for protection against hail. The system of protection against hail does not relieve hail-ice as a phenomenon, but reduces damage. This means that in exceptional and complex weather situations, when hail processes high intensity, can be in spite of action to protect the ice to get to the falls and ice damage. Even then, the damage significantly reduced, because the natural process of creating beats significantly reduced.

The assessment of efficiency is difficult and complicated because of the complexity of the process of creating ice in the atmosphere and its high spatial and temporal variability, and is based on data to be processed by appropriate statistical methods.

The ultimate goal of the system of protection against hail the construction system throughout Bosnia and Herzegovina - compatible systems in the region. The change in the methodology of work in the organization of protection against hail in other countries, "Hail protection" Srpska Republic has made a direct cooperation with the Hydrometeorological Service of Serbia (RHMS) and the Meteorological and Hydrological Service of the Republic of Croatia (MHS RH).

Important activities in this area are monitoring the hail clouds and study of the risk of hail (ice), and informing the public to be able to take effective and organized protection measures in the event of an accident.

1.7.1. Findings

- It is necessary to procure the weather radar to track Hydrometeorological situation over Bosnia and Herzegovina, improve technical equipment, conduct ongoing training, conduct re-test and mapping areas where hail most often.
- In case of hail clouds is important to have a specialized service forecasts, early warning and monitoring of storm clouds, in order to timely respond to emergency protective measures.
- To prevent damage caused by hail clouds, it is necessary to carry out a needs analysis, and then the hail affected areas form a unit - service anti-hail same protection and be equipped with appropriate means and equipment for anti-hail protection.
- It is necessary to develop a system of radar monitoring of storm clouds, and improve forecasting models to the instability of the atmosphere to predict the time and place at which it will occur. As a continuation of the development of monitoring and forecasts will reach nowcasting, very short-term forecasts to 3 hours in advance, which if appropriate can greatly improve the entire system of protection.

1.8. The storm and frost

Thunderstorms, accompanied by noisy strong windstorm, or heavy rain, with hail and without it, can cause traffic problems, damage to buildings and agriculture. In mountainous areas can cause severe floods, flooding the smaller rivers and landslides in the soft part.

Storm is considered a wind speed of 17.2 m / sec, or 82 km / h (volume 8 ° by Boforovoj scale or more), who break branches and trees, and should break crops, fruit shakes and fruit damages the well-maintained buildings that usually occur between April and October, and less frequently in the winter months.

On 23.07.2003. the Municipality of Maglaj, Zavidovici and Tešanj, Zenica-Doboj Canton, spread to a storm accompanied by strong winds and hail (ice) that caused significant material damage (on the roofs and windows of buildings, to crops, plantations of forest trees, cars, et al.). Estimated costs for municipalities Zavidovići and Maglaj, affected by the storm, were approximately 2,000,000.00 KM.

In 2003 the municipality of Gracanica (Tuzla Canton) was affected by a storm accompanied by strong winds and hail which caused great material damages were estimated at 900,000.00 KM.

Frost, salt and frost occurring at the air temperature lower than 0°C. Then create ice crystals that are in various aspects of catch and agree on horizontal and vertical surfaces. On the sides facing north, ice can create very thick layers. Frost, salt and frost can cause considerable damage to agricultural crops and buildings.

In the area of Herzegovina-Neretva Canton and West (municipalities: Capljina, Neum, Mostar, Stolac and Ljubuski), between 6 and 8 April 2003, due to air inversions, there have been extremely low temperatures and to -7 °C, that cause a loss in orchards, vineyards, field crops, and partly in greenhouses. The estimated damage from low temperatures in these cantons was more than

20,000,000.00 KM, and in 2012 the area of Gradačac municipality affected by extremely low temperatures, which caused damages were estimated at more than 8,000,000.00 KM.

Also, due to climate change in the Federation of Bosnia and Herzegovina and beyond in Bosnia and Herzegovina comes to gale force winds causing considerable damage to buildings and agricultural land. In addition, sudden coming to the occurrence of frost, which is damaging to farmers and crops.

1.8.1. Findings

- Improve the Hydrological Information System and develop a system of early warning and forecasts of severe weather and climate extremes appearance in order to protect against natural and other technological disasters and industrial accidents.
- Investigate the sensitivity of certain economic activities to climate change.
- Agricultural producers and other authorities suggest that within the limits of review applicable regulations of insurance companies for the purpose of the amendments to these regulations, to allow for better implementation of property and personal insurance of natural and other disasters and hazards, and therefore allow compensation caused by natural and other disasters.

In Annex 10 Risk Assessment provides an overview of the damage caused by floods and landslides, snowfall due to drought, hail, stormy wind and frost in the Federation of Bosnia and Herzegovina, for the period 2010 - 2012 and 2014.

1.9. Mass occurrence of infectious diseases of humans, animals and plants

In the previous period in Bosnia and Herzegovina, including the Federation of Bosnia and Herzegovina, in terms of epidemics and outbreaks there have not been disastrous consequences.
Some sporadic disease occurring each year, but it will significantly undermine the larger population of people and animals. However, there is a constant risk of entering certain pathogens that can lead to endangering the health and life of humans and animals and / or result in significant material damage to the state.
Following the situation, we can conclude that from year to year appear new and more dangerous infectious animal diseases that can significantly threaten human and animal health and / or undermine the economy of the Federation of Bosnia and Herzegovina. The essence of the problem is that we must be aware that the danger of this phenomenon exists and that we must save to prevent such accidents and remedy any such condition.

1.9.1. Epidemics - Infectious diseases in humans

An outbreak of infectious disease is the occfurence of infectious disease at the time and place of origin and the number of persons affected exceeds the common condition and requires urgent action. For the emergence of an epidemic there is always more conditions such as: poor general hygiene conditions (housing, inadequate nutrition, inadequate water supply, disposal of waste materials), then unplanned migration of people, especially natural disasters (floods, earthquakes, emergency and war state). In all enumerated situations distorted condition and appearance of environmental protection, in particular the pollution of drinking water, disruption of distribution of waste materials, deficient nutrition and unhygienic living conditions.

According to epidemiological estimates, during natural and other disasters, epidemics may occur ten times more often than in normal conditions.

Infectious diseases include a large number of diseases with very different symptoms, often depending on the specific cause. Symptoms of the disease can occur very quickly after infection, for a few days, months or years (eg, hepatitis and AIDS). Infectious diseases occur sporadically, in a greater or lesser number (epidemic), encompassing more countries and continents (pandemic) or occur only in certain geographic area (endemic).

Similarly, infectious diseases occur in people of all ages and both sexes, some are more common in children, some adult or older.

Routine surveillance of communicable diseases in the Federation of Bosnia and Herzegovina is based on a legal obligation. The list for registration in the Federation of Bosnia and Herzegovina of 84 infectious diseases. On the basis of reports of infectious diseases, Department of Epidemiology, Institute of Public Health Federation of Bosnia and Herzegovina continuously monitors, analyzes and evaluates epidemiological situation in the Federation of Bosnia and Herzegovina, then reports submitted to the Federal Ministry of Health and relevant international institutions.

Infectious diseases, for which the prevention and suppression of taking special measures of protection are: tuberculosis, rabies, Bril Činčera disease, brucellosis, anthrax, russet, polio, diphtheria, dysentery, hydatid disease, gonorrhea, influenza, leprosy, infectious mononucleosis, cholera, plague, Legionnaires' disease, leptospirosis, malaria, measles, meningitis menigokokni, chicken pox, typhus, relapsing fever,
Q fever, salmonellosis, syphilis, strep throat, scarlet fever, itch, tetanus, typhoid fever, trichinosis, tularemia, whooping cough, hepatitis, viral hemorrhagic fever, viral meningitis, infectious food poisoning caused by bacteria, infectious inflammation of the brain, mumps, yellow fever , borreliosis, klamidijaza, leishmaniasis, acquired immunodeficiency syndrome (AIDS) and West Nile virus.

1.9.1.1. Epidemiological situation in the Federation of Bosnia and Herzegovina

Epidemiological situation in the Federation of Bosnia and Herzegovina in recent years is relatively good. The most common infectious diseases as influenza, chicken pox, enterocolitis, TB, streptococcal angina, infectious food poisoning, with the increase of diseases from the group (zoonosis-brucellosis, Q fever, registered cases of hemorrhagic fever with renal syndrome and leptospirosis). Of epidemics are epidemics of influenza, enterocolitis, infectious food poisoning, a registered and an epidemic of hepatitis A, trichinosis, Q fever, brucellosis.

In the Federation of Bosnia and Herzegovina each year registered outbreaks of infectious diseases, which can be seen from the summary review for the period 2000 - 2004 (Attachment 3), in the period 2005 - 2010 in the Federation were registered 63 outbreaks of infectious diseases with a total of 11,119 patients (Attachment 4).
On the basis of reports of infectious diseases in 2011 the Institute of Public Health of the Federation of Bosnia and Herzegovina, in the Federation, a total of 89,731 patients, leading infectious diseases as influenza or influenza-like illness (67,107 patients), varicellae (6,733 affected), enterocolitis (4,341 patients) and tuberculosis (862 affected). Reported are two epidemics with a total of 6,084 infected person.

In 2012, according to the Institute of Public Health of the Federation of Bosnia and Herzegovina, reported the 53,878 infected with the disease, of which 33,107 of influenza or influenza-like illness and 20,771 from other communicable diseases (measles epidemic, varicellae, salmonellosis, etc.). .Among the leading infectious diseases, for high fourth place, mumps epidemic, a disease that could have been prevented by vaccination, then TB of the respiratory system in sixth place, with a lower rate of infections of people. In 2012 it was registered 51 people died from infectious and parasitic diseases, and the highest morbidity is registered in the Sarajevo Canton, and the smallest in Canton 10. Also reported are 4 epidemics with a total of 101 infected person. We have recorded two outbreaks of food poisoning, an epidemic of scarlet fever and an epidemic measles epidemic.

According to data based on reports on infectious diseases of the Institute of Public Health of the Federation of Bosnia and Herzegovina, in the Federation of Bosnia and Herzegovina for 2013 recorded a total of 47,650 patients with infectious and parasitic diseases.

Leading infectious disease are flu-like symptoms (30 401 reported cases), varicella (8,535 patients), enterocollitis acuta (3,187 patients), followed by scabies (963 sick) and streptococcal angina with 787 patients. Confirmation of the presence of West Nile virus, according to the information recorded in the summer of 2013 in Bosnia and Herzegovina, in Tuzla Canton, in two cases of disease in humans.

Given the epidemiological situation, the Federation of Bosnia and Herzegovina is still in the phase of maximum effort on limiting or delaying the spread of the virus infectious diseases in order to avoid epidemics. Of measures that remain in force: early detection, reporting, monitoring and control of communicable diseases and epidemics, activities of education and training which would include information and education for health workers, professionals in other sectors, the public.

1.9.1.2. Factors favoring epidemics

Epidemic outbreak of diseases favors a number of factors of which the most important are the following:

- In the Federation of Bosnia and Herzegovina there are serious problems in the supply of drinking water, the low water level of rivers due to increased concentration of solid waste, faeces, etc., Rivers and streams are microbiologically contaminated, causing the water to penetrate the cause of intestinal infectious diseases that may cause an epidemic of hepatitis, enterocolitis, typhoid, etc .;
- Dumps;
- In the field of food there is intense import of food, the population is increasingly feeding collectively and the consumption of finished and semi-finished forms of food, which increases the risk of compromising food safety during the production, processing and distribution, there is a risk of mass food poisoning;
- Intensive development of transport, trade and tourism, increasing the risks of introduction of new strains of pathogens flu and the spread of the disease in epidemic form, Bosnia and Herzegovina designated as the country increased risk of entry causes polio;
- Natural foci of infectious animal diseases also pose a potential risk of occurrence and spread of epidemics in humans, and rarely can lead to death, such as hemorrhagic fever with renal syndrome (murine fever);
- Most natural and other disasters (earthquakes, floods, droughts, etc..), As a rule lead to distortions of hygienic living conditions of the population, which increases the possibility of the emergence and spread of a large number of diseases in epidemic form.

Preparedness to Emergency Situations

Emergency situations may arise in the event of natural disasters (earthquakes, floods, avalanches, landslides, extreme heat and cold, drought, fire, lightning, lightning, snow blizzard) which is caused by climate change, ie. global warming of the planet or as a result of human activities which may be intentional, unintentional, including bioterrorism.

The role of public health in a situation endangering public health:

- Establishing communication with network and mobile teams of competent health institutions, public health departments, non-health services (supply, fire, police, utilities, local governments, organizations, the media).
- Rapid assessment of the situation on the basis of which services are activated, trigger action, proposing the introduction of emergency measures in the community, the municipality, the Canton and beyond.
- Identification of available resources relating to health.
- Preparation and activate a plan to prevent the spread of infectious diseases.
- Developing basic control system diseases and deaths.

1.9.1.3. General measures to protect people

1. Provide hygienic drinking water, and sanitary protection of water sources and facilities for public drinking water supply;
2. Removal of wastewater and other waste materials in a manner and under conditions that ensure the protection of water pollution from land;
3. Maintenance of sanitary and technical conditions in public buildings, public transport and public places;
4 Ensuring the health and safety of animal food items and general use.
5 Exercise of preventive disinfection, pest and rodent control.

1.9.1.4. Special measures to protect people

1.early detection of sources of infection and routes and sources of infection,
2. laboratory testing of samples,
3. reporting of infectious diseases,
4. insulation, transport and treatment of ill persons,
5. health education,
6. disinfection, fumigation and pest control,
7. immunization, serum-prophylaxis, chemo-prophylaxis,
8. quarantine, health checks and other measures prescribed by law.

1.9.1.5. Conclusion

In case of major epidemics as in the case of natural and other disasters (flood, earthquake, fire) that can lead to an epidemic, 'authorities have mobilized health workers, as well as other citizens, ensure the proper amounts of necessary medicines, vaccines and antiviral drugs, medical supplies, disinfectants, pest and rodent control, as well as blood plasma preparations. This includes:

- Strengthening and maintaining the capacity for early detection, assessment, notification and reporting of events, rapid public health response and coordination of all relevant health facilities and preventive measures to prevent the spread and reduce the burden of disease (hygienic sanitation, vaccination, therapy) ;
- Training of health workers for emergencies (for planning, resource allocation) and educate the population about the prevention of infectious diseases;
- Improve and speed up the procurement procedures of vaccines and antiviral drugs;
- Improve communication with the media and the population;
- Strengthen and maintain core capacities to respond to public health risks (strengthening of hospital capacity, training of health workers, strengthening laboratory diagnostics);
- Requires a detailed plan for the prevention of infectious diseases (enterprise resource planning), the organization of medical services (personnel, equipment, facilities) transport patients, trained and responsible personnel;
- With regard to the mode of transmission and ways of spreading the disease, plans for combating infectious diseases should be adapted and groups of infectious diseases;
- Communication and coordination of the public health sector, civil defense, police and the military (including the media);
- A plan for crisis situations in the case of public-health problem assessment and care of patients, (eg, isolation, treatment, other types of support) disinfection, decontamination, pest control, fumigation.

Non-governmental structures, which in this case include, the Red Cross / Cross of the Federation of Bosnia and Herzegovina and other humanitarian organizations in cooperation with the headquarters of civil protection.

Infectious diseases remain a major health and socioeconomic problem, especially in circumstances of social transition and a number of determinants that contribute to their emergence and spread. The preparedness of the country for the emergence of mass diseases and new diseases requires adjustment. The capacity for response and recovery are limited.

It is important to establish cooperation with veterinary institutions to timely exchange of relevant information related to zoonoses, diseases that are transferred from animals to humans. The aim of this cooperation is to be multisector and multidisciplinary in the quickest and most efficient way to prevent crises, reduce the spread of the epidemic or mitigate its consequences.

1.9.2. Outbreaks - infectious animal diseases

An outbreak, the emergence of infectious diseases, which in terms of frequency, time, place and endangered species of animals or people, exceeds the expected number of cases.
The occurrence of infectious diseases in animals other than economic damages, may present a risk to human health in the event of the occurrence of zoonoses, such as brucellosis, tuberculosis, anthrax, etc.

1.9.2.1. The main types of risk

a) The occurrence of infectious diseases from list A to the OIE code (Office of Infectious Disease in Paris)
b) The emergence of infectious diseases from list B and C according to the OIE code (Office of Infectious Disease in Paris)
c) The entry of harmful agents from animal sources that may lead to mass infections of people:

- Live agents: micro-organisms, parasites, mold,
- Heavy metals (mercury, lead, cadmium and others.)
- Carbon-chlorine pesticides and other chemicals,
- Residues of antibiotics, hormones, anabolic steroids, etc.,
- Residues of radionuclides,

d) Animal nutrition nutrients that contain harmful agents.

1.9.2.2. Infectious diseases reported in the Federation of Bosnia and Herzegovina

Based on laboratory tests of diagnostic material in the Federation of Bosnia and Herzegovina, in recent years has found 17 infectious diseases, including:

1) American plague of bee brood,
2) anthrax,
3) frenzy,
4) Bluetongue,
5) bovine brucellosis,
6) ovine,
7) enzootic abortion of sheep,
8) classical swine fever,
9) infectious anemia of horses,
10) influenza horses
11) IBR / IPV (Infectious bovine rhinotracheitis / infectious pustular vulvovaginitis)
12) leptospirosis,
13) nosemosis bees,
14) Q fever,
15) trichinosis,
16) tuberculosis,
17) varoosis.

Through the collection of monthly reports in the past five years it has been observed that regularly occur following infectious diseases: rabies, brucellosis in sheep and goats, bovine brucellosis, Q-fever, equine infectious anemia, enzootic bovine leukosis, leptospirosis, nosema, American foulbrood, trichinosis and varroasis. In addition to these diseases, it has been periodically reporting tuberculosis and respiratory and reproductive syndrome pigs, as well as arteritis and encephalitis, except that in 2009 there were no reported cases of the same.

1.9.2.3. Common causes and infectious diseases

a) Weakened controls on the importation of animals, their products and animal feed,
b) Poor financial status and disregard of basic Animal Health precautions for animal husbandry, animal transport, animal products and animal feed,
c) Insufficient number of employees in the inspection services, which causes less control in domestic traffic, the consequence of which may be the spread of infectious diseases,
d) The absence of the Veterinary Institute in Bosnia and Herzegovina, and therefore in the Federation of Bosnia and Herzegovina and the work of veterinary laboratories that have not yet been accredited,
e) The occurrence of infectious diseases can be the result of deliberate introduction of agents of disease,
f) The consciousness of people, especially in rural areas people have no knowledge about the consequences of infectious diseases.

1.9.2.4. Return period and adverse effects of infectious diseases

In the current epizootic situation, which is several years rather unstable, as the most important health issue stood out: further spread of rabies animals, the presence of brucellosis and trichinosis, regular determination of infectious diseases of bees as well as local tuberculosis and fowl cholera.

The entire livestock of the Federation of Bosnia and Herzegovina (2012 data: 215,000 cattle heads; 92,000 pigs neck sheep 517,000 units; 41,000 goats neck horse 6,000 units; 9,447,000 pieces of poultry and beehives 209,000 pieces) at risk, depending on the type of infectious diseases, as well as the health of people with zoonosis, any contact with animals or the use of meat and other animal products.

In the period from May 2009 to date carried out preventive brucellosis in sheep and goats as vaccination of these animals, and diagnostic test performance of vaccination, which rapidly reduced the number of infected animals and those people in the Federation of Bosnia and Herzegovina. During the summer of 2011 in the Canton 10 was activated anthrax (red pimple), which has not been active the last 30 years, but the cultivation of a long term anthrax spores sailed with roots of plants in the area and led to the infection of animals during grazing. Preventive vaccination of animals and the proclamation of anthrax districts were done promptly by the veterinary inspection that Canton. Also, the constant presence saliva (forest) rabies in this region is due to the geological position of Bosnia and Herzegovina, the constant risk of this disease on a larger scale. In 2011, funds were secured and successfully completed the action of oral vaccination of wild foxes, which was carried out with the veterinary services of neighboring countries, which contributed to health care to animals and humans. It should be noted that the protection afforded by vaccination only lasts a year, and that it needs to be renewed every year. Problem prevention is closely linked with the provision of available resources, but also of the material and social status and education of citizens about the consequences of contracting zoonoses.

As for zones in the Federation of Bosnia and Herzegovina in 2006 were registered 4 persons suffering from hemorrhagic fever with renal syndrome, and in 2011, 8 persons ill and from anthrax were registered one person in 2011. In the Federation of Bosnia and Herzegovina in 2000 registered 10 patients with brucellosis, in 2004 11 and 2005 32 ill persons. The most difficult situation was in 2007 when brucellosis affected 352 persons. In 2008 there were 85 patients, 70 in 2011, while in 2012 brucellosis affected 59 persons.

In 2010, were carried out diagnostic tests for 10 diseases and parasitic diseases of domestic and wild animals of which 6 were zoonoses such as: BSE, brucellosis, rabies, tuberculosis, Q fever and trichinosis.

In 2011, in the Federation of Bosnia and Herzegovina were diagnosed 38 cases of the disease brucellosis, equine infectious anemia (20 cases), rabies (7 cases), enzootic bovine leucosis (4 cases) and Q - fever (2 cases in cows).

According to the Federal Ministry of Agriculture, Water and Forestry in 2012 in the Federation of Bosnia and Herzegovina's leading infectious disease is brucellosis (127 diseased animals), infectious anemia of horses (24 horses), Frenzy (5) and tuberculosis (4 diseased animals).
1.9.2.5. Protective measures

Protection measures are preventive and immediate measures to prevent or minimize effects on animals and animal products. Veterinary Services implement measures of primary animal health care, including immunization and curative measures. Together with the veterinary inspection veterinary organizations make a defense system against infectious animal diseases. Veterinary service is organized in the entire territory of the Federation of Bosnia and Herzegovina and its purpose is animal health protection, the protection of human health, the implementation of prophylaxis and diagnostics, cleaning of and removal of bodies, the implementation of measures for disinfection, pest and rodent control, and more.

1.9.2.5.1. General measures for the protection of animals

1. through competent border authorities and inspections on the importation of food, animals, their products and animal feed, to ensure quality control;
2. ensure hygienic water supply for the animals, as well as sanitary protection of water sources;
3. Strengthen inspection services in order to prevent the trade in goods of animal origin in internal transactions that do not meet sanitary-epidemiological measures;
4th sewerage and other waste materials in a manner and under conditions that ensure the protection of pollution (water and soil (environment));
5. ensuring zoo hygienic veterinary and other health conditions the cultivation and use of animals and the preservation of health and nutrition, care and housing of animals and through educational processes that need to carry out the authorities in the cantons and municipalities;
6. in cooperation with veterinary and other institutions to secure performance of preventive disinfection, pest and rodent control;
7. Ensure sufficient amounts of immune resources;
8. enable institutions engaged in education (higher education institutions) and other institutions dealing with testing food in accordance with the applicable regulations and directives of the EU obtain appropriate accreditation, or to be accredited for testing of food by the EU.

1.9.2.5.2. Special measures for the protection of animals

1.The implementation of measures on early detection and prevention of infectious, parasitic and other diseases;
2. treatment of diseased animals;
3. laboratory testing of infectious agents and outbreaks of infectious diseases, laboratory test water, foodstuffs of animal origin, laboratory test of raw skin on anthrax;
4. disinfection, fumigation and pest control, and radiation decontamination of animals, animal products, land, buildings, equipment;
5. Protective vaccination;
6. control of animal movement and restriction or ban on the import and transport of animals and animal products.

1.9.2.6. Conclusions and discussion

Based on the assessment of the causes of the veterinary field are defined by the following conclusions:
1. The organization of veterinary service in Bosnia and Herzegovina reflects the complex structure of its institutional framework. However, significant steps were taken in order to quality of its functioning through the adoption and implementation of a series of legal acts and programs, which are harmonized with EU regulations.

2. Occurrence of infectious diseases has serious and far-reaching consequences for public and animal health, as well as the socio-economic consequences since the same impact on production and trade of live animals and animal products. In this respect, for the achievement of disease control is necessary to ensure legal basis and disease control programs, and the availability of resources for the continued implementation of the measures, as well as providing financial resources.
3. in conjunction with the above, in order to improve measures for the early detection and prevention, it is also necessary to ensure:
- Continuously raise public awareness of the risks and prevention measures, as well as procedures for rapid response and reporting, as well as carrying out constant training and education,
- Draw up plans to deal with emergencies and crisis situations and the establishment of funds for their implementation, in accordance with the provisions of the legislation in force,
- Strengthening the capacity of authorized veterinary laboratories,
- Establishing better inter-sectoral communication and cooperation,
- Provide sources of funding for recovery from crisis situations.
4. It is necessary to ensure the continuation of activities for monitoring residues in live animals and animal products in accordance with the legislation in force, and in accordance with the above findings that relate to this area.

1.9.3. Food safety

Risk assessment in the field of food safety, as well as scientifically based process, the Agency for Food Safety of Bosnia and Herzegovina in cooperation with the competent bodies of the Entities and Brcko District of Bosnia and Herzegovina and laboratories for food control in Bosnia and Herzegovina.

In the period from 1.1 - 30.06.2010., based on the processed data on laboratory analyzes of food supplied by the laboratory for food control in Bosnia and Herzegovina was sampled 74 853 samples of food, with laboratory analyzes done 8.2390.
Of this number were inadequate 3.096 or 4.14% of the samples, or 3.76% of laboratory analysis.

The food is harmful to human health is one that:

a) contain micro-organisms or tissue parasites hazardous to human health, bacterial toxins, mycotoxins, histamine and similar substances and other microorganisms or tissue parasites in larger quantities than permitted,
b) contains natural toxins or other natural toxic substances in larger quantities than permitted,
c) contains residues of pesticides, veterinary medicines, metals and metalloids and other substances harmful to human health,
d) contains food additives which may not be used in a certain type of food or if the food additives present in the food is larger than permitted,
e) contains radionuclides above the prescribed limits or if the marked above the permitted limit,
f) packaging contains microorganisms or other substances that may affect the increase of substances harmful to human health in food,
g) if it originates from dead animals or animals for which slaughterhouse processing is not allowed.

Diseases which cause / route of transmission of food are Salmonellosis, Trichinellosis, Toxiinfectio alimentaris and Enterocolitis acuta.

1.9.4. Plant diseases and pests

1.9.4.1. Health, pests, measures for protection of agricultural plants

Health condition of agricultural plants is threatened by plant diseases, pests and weeds, as well as physical and chemical abiogenic factors. Physiopatic agents (high temperatures, enormous lack of water - drought, excess water or the emergence of early spring frosts) further endangering them. Damage caused by attacks of these agents are large and reflected in the reduction of the yield of agricultural plants per unit area in poor product quality.

Looking at the issue of the protection of plants and plant products, it is estimated that it is very complex, especially in terms of the number of plant diseases and pests as they exist at the data in the world (about 10,000 species of insects, about 1,500 species of parasitic (pathogenic) fungi, around 1,500 species of nematodes mites, about 200 species of parasite (phytopathogenic) bacteria, viruses and viroid, mycoplasma, a parasitic flowering plants, weeds and dozens of species of rodents).
Thus, the vegetable production in the Federation of Bosnia and Hercegovine is endangered of a large number of harmful organisms, so the problem of crop protection complex.

On the territory of Bosnia and Herzegovina was established permanent presence of a number of plant diseases and pests, which are of importance are divided into quarantine and economically harmful.

Since food is a strategic product is an essential condition for the survival and reproduction of people, regardless of whether the conditions of peace or war, it is its production and preservation requires special attention. The experience of the recent war in Bosnia and Herzegovina are fully confirmed.

Protection and rescue of plants and plant products from radiation, chemical and biological contamination and all other forms of pollution, as well as infectious diseases and pests is of great importance in the Federation of Bosnia and Herzegovina.

Agricultural crops and even all plants, like all products from plants, which are kept by the time of use in warehouses, constantly subject to attack pathogens and pests. Damage caused by the above factors often reaching up to 30%, and there are frequent when pests and diseases and make more damage.

Some plant diseases and pests (plum pox virus, Californian aphid thyroid and gar onion, etc.) Great economic damage and represent a constant threat to the cultivation of certain crops, especially plums and seed ports in the Federation of Bosnia and Herzegovina.

Also, it should be noted that the failure to take timely and phytosanitary measures led to the spread of corn rootworm, Diabrotica virgifera virgifera Le Conte, in all cantons (slightly less in the Sarajevo and Una-Sana Canton) whose presence threatens the production of corn. The responsibility for this situation is largely borne by the Federation of Bosnia and Herzegovina and cantons, but also the state of Bosnia and Herzegovina, and the manufacturers themselves who ignore taking the recommended measures. It is important to point out that in the Federation of Bosnia and Herzegovina (in the Una-Sana Canton) established the presence of Erwinia amylovora, the cause dangerous plant diseases - bacterial mildew of apples and pears (true, as individual cases).

It is necessary to take urgent intervention measures to prevent its further spread (the best is the clearing and burning of trees, if necessary, entire plantations).

In the Federation of Bosnia and Herzegovina established a permanent presence of a number of plant diseases and pests. Are presented in the review of harmful organisms present and spread on agricultural plants in the Federation of Bosnia and Herzegovina (in the open or protected areas).

1.9.4.2. Harmful organisms that are present and spread on agricultural plants

Meteorological factors that are critical to the growth, development and dissemination cause plant diseases and pests. This refers to the height of temperature and precipitation in the most critical months of the vegetation period. For example, high value air temperature during the growing season may be unfavorable for normal growth and development of plants, especially in the summer, and at the same time very conducive to the development of pests, while on the other hand unfavorable for the development of plant diseases. This means that, apart from plant diseases and pests, agricultural crops and threaten adverse environmental conditions, and the yields of many crops and the quality of the end product can fail. Added to this is the fact and the presence of diseases and pests, the health of agricultural plants may be seriously compromised if not timely take appropriate measures crop management (as preventive) measures for the prevention and protection means as a direct measure of plant protection, Attachment no.5.

1.9.4.3. Measures to combat the dangers and consequences of plant diseases and pests

In view of the dangers and consequences of the attack of plant diseases and pests, constantly taking measures to control them. The suppression of plant diseases and pests is carried out in an organized legal entities engaged in the production and processing of plants and plant products, and in the private sector (individual farmers) these activities are occasional and not sufficiently organized.

A special problem is insufficiently organized control over the use of pesticides and other chemical and biological agents that are used in agriculture (especially in individuals).

Plant protection products are not produced in the Federation of Bosnia and Herzegovina, and all quantities are imported from the Croatia and Slovenia. Import of insecticides, fungicides, herbicides, anti-sprouting products and for regulating plant growth is carried out with the consent issued by the Federal Ministry of Agriculture, Water and Forestry, registered representative or representatives of foreign manufacturers and import licenses issued by the Ministry of Foreign Trade and Economic Relations and Herzegovina. Each import of these products follows the approval of their marketing stroke, inboard traffic.

As these products can harm human health, and can also cause water pollution or land, worrying incompetence of individual manufacturers in the selection and use of funds, failure to comply with toxicological withdrawal period, the use of funds from the previous expiration date as well as the belief in people that the crop is better protected if treated multiple times, not when a protective device can be effective.
For these reasons, the constant training of individual farmers, should be the task of the Cantonal extension services that are in daily contact with the producers. Specialized training is required for employees in agricultural pharmacies that are responsible for the issue of plant protection products.

According to the regulations, plant protection products may be sold only in specialized stores - agricultural pharmacies, except for preparation of group toxins. However, the frequent appearance of the pesticides sold in the markets or in grocery stores, along with foodstuffs. According to incomplete data from Canton, number of pharmacies in the Federation of Bosnia and Herzegovina is 163, and in all pharmacies, according to the findings were not met all requirements (conditions of accommodation, storage, manipulation, appropriate personnel, etc.).

1.9.4.4. Holders of activities for the protection of plants and plant products

Holders of activities for the protection of plants and plant products are Federal Agriculture, Water and Forestry and competent Cantonal ministries, and services for the economy in municipalities, legal entities in the field of agriculture and forestry, specialized scientific institutions (Institute of Agriculture, Faculty of Agriculture in Sarajevo, part of which is Institute for Plant Protection in Agriculture, Faculty of Forestry and others.), agricultural cooperatives and individual farmers.

As a force for the protection of plants and plant products may be formed and special civil defense units, which are formed depending on the needs that should arise from the relevant risk assessment in a particular area.

1.9.4.5. The measures and activities to improve the situation

In order to analyze the situation in the field of agricultural plants in the Federation of Bosnia and Herzegovina, Federal Ministry of Agriculture, Water and Forestry supports projects to protect plants from harmful biological agents. The main objective of the project is to determine the presence of plant diseases and pests, their distribution, and the damage caused by those on agricultural crops.
That basically is an attempt to engage all relevant institutions in the Federation of Bosnia and Herzegovina to take part in its implementation establish a reporting and forecasting service.
On the implementation of the project involved the experts of the Agricultural Faculty in Sarajevo, two agricultural experts Institute (Mostar, Sarajevo) and two agricultural institutes (Bihac,Tuzla), and it covers the whole territory of the Federation of Bosnia and Herzegovina.

The current state of protection for plants and plant products in the Federation of Bosnia and Herzegovina is also characterized by the fact that the present imbalance in certain areas, which largely depends on the nature of agricultural production. In areas dominated by intensive agricultural production, plant protection approach is much more organized, achieved certain results (Posavina, Tuzla and Herzegovina-Neretva Canton). However, in areas dominated by extensive agricultural production there are many difficulties and problems, from a lack of organized activities to personnel and material problems.

Training and training of individual farmers to carry out tasks on protection of plants and plant products is only small part of an organized and does not meet actual needs.

In addition, it is particularly important to conduct continuous surveillance and control of the introduction of harmful organisms in Bosnia and Herzegovina. The state and its entities have to build and establish the necessary instruments in the phyto-sanitary field to respond to the commitments undertaken by ratification of international conventions in the field of plant health protection, and thus protect human health and ensure food safety. Bosnia and Herzegovina, and not just the Federation of Bosnia and Herzegovina, is threatened in its entirety, pushing into the background the importance of inspection in the interior and on the border. Without a strong inspection and strong professional services in the field, laboratories, and continuous education of manufacturers and experts, there will be no significant progress has been made in plant health protection, and thus no protection of human health.

1.9.5. Condition of vulnerability of forests

Bosnia and Herzegovina is a country that is among the first countries in Europe in terms of natural resources in the forests (richer only Finland and Sweden). The real condition of our forests is much poorer in structure, strength and quality, according to a fouling in physical appearance forests are protective cover, which absorbs rain, regulate water flows, preventing floods and floods.

Forests and forest land in the Federation of Bosnia and Herzegovina, cover an area of 1,473,481 hectares, of which Bosnia and Herzegovina state-owned 1,195,793 or 81.15% of the private property of 277,304 hectares, or 18.15%.
Yet the forests in some parts of the Federation of Bosnia and Herzegovina in the period of "planned felling" (1970 to 1992) and wartime considerably devastated, but still retain the natural structure, which ensures the proper management of natural regeneration, sustainable management, and significant beneficial functions .

Because of the importance of devastation, the long production period, the economic significance of forestry, increase in requests for the use of beneficial functions of forests through the allocation of protected forests (protection of springs and watercourses, erosion, landslides, etc.) and forests of special purpose (nature reserves, national parks, monuments nature, protected landscape, etc.) in the future forests should pay special attention to all segments of society, in order to take the necessary actions and measures on improving the organization of forest management, conservation of the structure, beneficial functions of forests, environmental protection and others.

Forest Act ("Official Gazette of BH", no. 20/02, 29/03 and 37/04), (hereinafter referred to as Forest Act), the Constitutional Court of the Federation of Bosnia and Herzegovina was declared

unconstitutional, and it is thus on a force until 27.11.2009. On the expiry of the Forest Act, ceased to count and subordinate regulations adopted under that law.

According to the judgment of the Constitutional Court of the Federation of Bosnia and Herzegovina, No. U - 28/10 of 23.11.2011. ("Official Gazette of the Federation BH", No. 34/11), the date of 06.12.2011. The application is stopped and the Regulation on Forests ("Official Gazette of the Federation BH", Nos. 83/09, 26/10, 38/10 and 60/11), which was used as a substitute for that material regulation.

Given that there was a vacuum because of the lack of appropriate regulations governing the field of forestry, some cantons have adopted access and Cantonal law on forests.[15]

Department of Forestry and the Federal Forestry Administration that the Federal Ministry of Agriculture, Water and Forestry is currently no valid material regulation, bylaw, regulation or instruction, and do not have any jurisdiction to the cantons and municipalities in terms of the collection of certain data related to the updating of Risk assessment .

1.9.5.1. Indicators of the state of state forests

For a more comprehensive survey of the condition of state forests in the Federation of Bosnia and Herzegovina, based on data obtained from the forestry companies, the following indicators are given:

1.9.5.1.1. The structure of forest area and forest land

Table 1.9.5.1.1. Forest structure

The broader category of forest land	Površina ha	%
High forests with natural regeneration	539.948,5	45,17
High degraded forests	12.624,4	1,06
Forest cultures with an estimated wood mass	40.912,1	3,42
Forest cultures without an estimated wood mass	27.734,8	2,32
TOTAL high forests	621.219,8	51,97
Coppice forrest	240.960,1	20,16
Total forest land	862.179,9	72,13
Barren land fit for forestation	174.598,6	14,61
Incapable of afforestation of bare land	72.694,1	6,08
TOTAL barren forest land	247.292,7	20,69
TOTAL Waste	1.109.472,6	92,82
Mined areas (in all areas)	85.822,6	7,18
TOTAL indisputably	1.195.295,2	100,00

[15] Law on Forests Una-Sana Canton ("Official Gazette of the Una-Sana Canton", number 22/12), the Law on Forests of Sarajevo Canton ("Official Gazette of Sarajevo Canton", No. 05/13), Law on Forests of Tuzla Canton ("official Gazette of Tuzla Canton ", no. 09/12 and 17/13), Law on Forestry Zenica-Doboj Canton (" official Gazette of the Zenica-Doboj Canton ", No. 08/13), Law on Forests Podrinje Canton (" Official Gazette Podrinje Canton ", no. 04/13 and 05/13).

Disputed land (land acquisition) to resolve not to be treated, because it is a judicial authority and until the dispute is not defined by the owner (user).

From Table 1.9.5.1.1. shows that the structure of forest land is very unfavorable. A large proportion of coppice forests (20.16%) and bare land capable of afforestation (14.61%) - mainly karst region), which gives companies an obligation to manage forests, but also other segments of society, in the future to pay more attention to breeding measures in coppice forests and afforestation and rocky and barren.

Funds expanded reproduction of forests that are under the forest stand in the amount of 3% of the revenue generated from the sale of forest wood and other forest products are small for the expressed purposes, and needs to find other sources of funding. This should primarily direct the funds collected in the budget of the Federation and Cantonal budgets for, forest.

A particular problem is 86.000 ha of forests and forest lands, which are suspected to be mined. Given that mining forest is not a priority, this area is for a longer period of time is lost to waste.

Table 1.9.5.1.1.1. Condition of wooden stock

Type	Softwood m^3	Hardwood m^3	Total m^3	m^3/ha	%
All high forests	69.784.180	85.639.318	155.423.498	250,19	89,73
Coppice forest	0	17.789.386	17.789.386	73,83	10,27
TOTAL	69.784.180	103.428.704	173.212.884	324,02	100,00

Table 1.9.5.1.1.2. Status annual increment

Type	Softwood m^3	Hardwood m^3	Total m^3	m^3/ha	%
All high forests	2.086.814	2.128.385	4.197.199	6,76	85,57
Coppice forest	0	707.676	707.676	2,94	14,43
TOTAL	2.086.814	2.836.061	4.904.875	9,70	100,00

Table 1.9.5.1.1.3. Status of annual harvest

Type	Softwood m^3	Hardwood m^3	Total m^3	m^3/ha	%
All high forests	1.401.932	1.715.861	3.117.793	5,02	90,93
Coppice forest	0	310.959	310.959	1,29	9,07
TOTAL	1.401.932	103.428,704	3.428.751	6,31	100,00

Taking into account the above-mentioned period of devastation of forests, though it can be said that the average growing stock of 250.19 m3 / ha for high forests, relatively good and that in the coming visits can significantly improve. This claim is substantiated by the fact that the annual allowable cut can cut down 80.61% annual increment, and the post-war period in any year in the Federation of Bosnia and Herzegovina is not possible to realize annual allowable cut.

1.9.5.2. The vulnerability of forest from harmful activities

The vulnerability of forests is steadily increasing. Various damage annually carry large amounts of timber. These damages occur as a result of harmful activities, especially of:

- Fire;
- Plant diseases and pests;
- Other natural disasters;
- Unplanned and illegal logging;
- Occurrence of forest dying due to "acid rain".

1.9.5.3. Return period and the physical volume of damage in the wood mass

In recent years, according to reports authorized bodies for the protection of forests in the Federation of Bosnia and Herzegovina, forests, especially indigenous (native species of fir, spruce, pine, oak, beech and elm) affected by bark beetles, gypsy moth and to a lesser extent and woodwork throughout the Federation of Bosnia and Herzegovina.
In 2004, noted the vulnerability of fire and spruce by bark beetles in the Canton 10 and Una-Sana Canton, and the risk of the spread of the gypsy moth from the Srpska Republic to the Federation of Bosnia and Herzegovina, which is necessary to take preventive measures.

Ips typographus (beetle) usually occurs massively in the spruce forests that grow out of the optimum altitude zone of its natural range and usually when it is incurred disorders stronger influence of external influences (poor hygiene noise, drought, mechanical damage to trees, etc.). Then, this first-class pest beetle.
Due to the absence of systematic monitoring of the development of the bark beetle, its population density in our conditions is always near the border identification, so that the damage occurs and where the spruce at the optimum, as evidenced by research on the occurrence of previous outbreaks of bark beetles in Bosnia and Herzegovina.

The first such large-scale phenomenon of this pest in our country was recorded 1925 to 1935. On that occasion killed around 5.5 million m3 of coniferous wood, of which 79% (4.4 million m3) was spruce.
In a large mass infestation of bark beetles in coniferous forests of Bosnia and Herzegovina that took place after World War II (1945-1950) died about 3 million m3 of coniferous wood, of which 50% was spruce. During the said two mass phenomenon, died over 8 million m3 of timber sawmills, which was then more than 4 annual plan cutting softwood in Bosnia and Herzegovina.

Today in our conifer forests during a mass phenomenon bark beetle, because for it again preconditions as created. During the field research, conducted in May and June 1998, it was noted that in the forests of spruce (Picea abies) most significant damage caused by Ips typographus, normally following the bark beetle in this forest tree species and which is in Europe, often in outbreak if its population dynamics are not under control. On a white pine (Pinus. Sylvestris L.) is the most common Ips acuminatus, and the black pine (Pinus nigra Arn.) Blastophagus piniperda. On eating (Abies alba) is the most common Krivozub jelin bark beetle I curvidens, usually in succession with mistletoe (Viscum album). However, the thinner branches of fir, spruce and pine trees on, determined the attack Pityogenes spp., which are now also in the outbreak and often are found as primary pests.

1.9.5.4. Forest management

In addition to the administrative and political division of the former Republic of the municipality (before the war in the Federal Republic of Bosnia and Herzegovina was 109 municipalities), there was another division - the one related to forest management and with them. For this purpose the territory of the Republic of Bosnia and Herzegovina was divided into 44 forest management areas (hereinafter referred to as SPD, including two national parks, within which is imprisoned in a cycle of forestry and wood processing. These two divisions were not related to each other. In contrast to the administrative and political division of the municipality, a division of the forest management area is more complex, because it is conditional on many factors (natural, economic, socio-political, etc.). In addition, lower

unit internal divisions each forest economy areas (business units, divisions, departments) were established in the natural boundaries, ie, based on the topographic characteristics of the terrain and composition of forests, as this division seemed relatively stable.

New administrative and political division of Bosnia and Herzegovina ignored some professional principles of forest management, which will cause new difficulties and possible new damage in the management of this natural resource. Division into entities and cantons abruptly ends the old concept of forest management, and the new has not been determined. Strong influence has arisen in the local authorities in this area, while the weakened state power, which in the interim period, before the establishment of co-ordination across the country, can lead to errors in forest management, whose adverse consequences will not be able to correct. This state of disorganization in forestry of Bosnia and Herzegovina favors those citizens stealing wood in the forest acquire illegal profits, but more than that causes a mess in the woods with numerous accompanying negative consequences.

In terms of joint action in the implementation of measures, actions and activities to protect forests from fire, it is necessary to establish cooperation between Cantonal SPD - forestry companies, competent Cantonal ministries of forestry, or the Cantonal forestry administration and the Cantonal administration of civil protection in order to develop a unified plan of care forest fire in the area of the canton.

On the basis of the above, the joint activities are developed and implemented unique operational and technical plans for the protection of forests against fire for each municipality in the canton. In the preparation and implementation of measures for the protection of forests against fire defined tasks, organization of activities and actions to ensure the participation of all relevant institutions, bodies and departments in the protection of forests against fire with particular emphasis on the participation of:

- Cantonal forestry companies in the establishment and formation of the ways to use the available manpower and equipment in organized extinguishing forest fires,
- Cantonal forestry administrations in the development of an efficient system of monitoring, detection and notification of forest fires,
- Cantonal administration of civil protection in establishing the existence and ways to utilize the professional and volunteer fire units and determining the formation of structure and means of engagement and the use of forces and materiel Civil protection rescue fire.

Forests and land are classified as areas of high risk of forest fires. Canton forest administration should give special attention to the implementation of all the measures for fire prevention, which should be an integral part of plans for protection against forest fires. Here should be paid special attention to the organization of the service fire extinguishers, specially equipped and trained to fight forest fires and situated in forest farms, and the Companies that manage forests.

In the Herzegovina-Neretva Canton (hereinafter: -HNK) formed the SPD "Herzegovina Neretva forest" doo which is not integrated the existing forestry companies and that do not actually work in a legal way. Cantonal Forestry Administration was formed and operates a number of years within the ministry responsible for forestry Theatre. In the canton has not made an integral plan for the protection of forests against fire.

In Posavina Canton is not formed SGD, while the Cantonal forestry administration operates within the Ministry of Agriculture, Water and Forestry of Canton, which manages 458.10 ha, a relatively small part of the state forest. In the canton has not made a plan to protect forests from fire.

From the above we can conclude that these two cantons failed to comply with applicable laws and by-laws of the Federation of Bosnia and Herzegovina related to the protection of forests against fire.

1.9.5.5. Basics of Forestry Development Strategy relevant to the protection of forests

For the improvement of forestry, repairing timber production in forests and increase their ecological value, including through better health of forests, significant are the following strategic directions of development:

1. Passing general legislation on Forests (framework law) which will imply the acceptance of international conventions relating to forests and the introduction of the Fund for the protection of forests;
2. construction of a national organization of integrated forestry;
3. identify the actual stocks in forests (forest inventory);
4. introduction of the information system in forestry;
5.increase in the volume of afforestation and reconstruction of degraded forests;
6. renewal of seed and nursery production in forestry;
7. improving methods of forest management and encouragement of reforestation;
8. stop chaining process further damage, disease control and insect pests;
9. introduction of monitoring to protect forests in Bosnia and Herzegovina;
10. renewal of scientific research in forestry, especially in the protection of forests;
11.mining forest.

Each of these strategic commitments for forestry development is directly related to the protection of forests.

1.9.5.6. Findings

- The current health of forests in Bosnia and Herzegovina, is graded as bad, which is a result of many negative influences, objective and subjective nature. Objective causes are directly or indirectly related to the war (damaging trees missiles and mines, fires, logging for military and survival of citizens), which is in the process of chaining harmful factors led to the outbreak of some insects and epidemics. Subjective causes are a result of lack of organization of the state, the absence of a unified concept of forest management, strengthening the influence of local authorities using this natural resource, uncontrolled logging (theft) of wood, etc. To preserve forests, the most important natural resource in Bosnia and Herzegovina, it is necessary to establish the strategic basis for the development of forestry, bring an umbrella (general) forest law which will respect international conventions relating to forests, but more than that, it is necessary to change the understanding of forests and strongly affirm their beneficial functions.
- The forest fires each year burned a large area of forests of different categories, which is especially noticeable in the summer and drought periods. The largest number of forest fires in the past occurred in the southern parts of the Federation of Bosnia and Herzegovina (Herzegovina-Neretva, West Herzegovina Canton and others.). The occurrence of forest fires caused great economic loss as well as reducing the wood stock.
- Damage to forests directly applied human being are the result of non-implementation of laws and regulations in this area, which results in failure to establish appropriate forest order, mechanical damage to trees caused by careless use of mechanization, uncontrolled deposit of waste materials and others.
- As a result of illegal logging are recorded erosive processes (landslides), are specifically expressed on all terrains with steep slopes on the whole territory of the Federation of Bosnia and Herzegovina.
- The occurrence of noise caused by the drying and high pollution of air and called "Acid rain". Based on the analysis led to the conclusion, that the greatest number of acidic precipitation functionally linked with the appearance of precipitation coming by air masses from the northwest, ie. European acidic clouds, collecting pollution over Europe and release their contents, and over our territory.

Those performing forest protection are the Federal and Cantonal Ministries of Agriculture, Water and Forestry, and the Federal / Cantonal Forestry Administration and the Cantonal forest economic society / economy, and specialized scientific institutions, scientific and educational institutions in the field of forestry.

1.10. The risk of landmines and unexploded ordnance

Within the audit Mine Action Strategy of Bosnia and Herzegovina 2009-2019, MAC has made a general assessment of mine situation in Bosnia and Herzegovina, which has identified the following:

- In Bosnia and Herzegovina there are 1,417 endangered communities affected by landmines sites that are contaminated with mines and UXOs directly affect the safety of about 540,000 citizens of Bosnia and Herzegovina,
- Of the total number of affected communities them 136 or 10% were categorized as high impact (with about 152,000 directly vulnerable citizens), 268 or 19% as medium impact (with about 180,000 directly vulnerable citizens) and 1,013 or 71% as low impact.

General assessment of mine situation in Bosnia and Herzegovina will be updated after the official announcement of the results of the census in Bosnia and Herzegovina.
Current size of mine suspected area in Bosnia and Herzegovina is 1,253 km2 or 2.5% of the total area of Bosnia and Herzegovina. [16]Through a systematic survey defined a 9,713 suspected hazardous sites where it is estimated, is about 120,000 mines / UXO. There are 19.182 registered minefield records, which represents 60% of their total number.

According to BH MAC, in the period from 1996 to the end of 2012 from mines and unexploded ordnance were killed 1,691 people, of which a large number of children. Since 1996, 114 miners were killed, of which 46 were fatal. The most vulnerable categories of the population according to data from the International Red Cross are men aged 19 to 39 years of age (40%).

On 02 April 1998, between the Council of Ministers and the European Commission on the other, signed a Memorandum of Understanding (MOU) on "the establishment of sustainable TUN teams (hereinafter: demining teams) which is being implemented on behalf of the government Entities Federal administration of Civil protection and the Republic Administration of Civil protection of the Republic of Srpska

So far (as of 31.12.2012.) realized a total of 14 demining programs.

The duration of the contract (phase), the financial participation of the European Commission, the Government of the Federation of Bosnia and Herzegovina and other donors, is shown in Table 1.10. as follows

[16] According to the first official estimate of BHMAC in 1998, mine suspected area was 4.2 km2 or 8.20% of the total land area

Table 1.10. Phases of demining

PHASE	DURATION	PARTICIPATION OF EUROPEAN COMMISSION (EUR)	PARTICIPATION OF GOVERNMENT FBH (EUR)	OTHER DONATIONS (EUR)	NUMBER OF EMPLOYEES
1	2	3	4	5	6
I	1.11.1998. to 31.07.1999.	1.611.000,00	105.975,00	**DEK** 1.500.000,00 (Initial funds in equipment)	164
II	1.10.1999.g to 30.09.2000.g	1.330.000,00	119.185,00	-	164
III	1.10.2000.g to 29.10.2001.g	1.330.000,00	265.438,00	**UNHCR** -153.387,56 (Demining teams) **DEK** – 183.369,21 (Mechanical team for debris removal)	220
IV	29.10.2001.g to 31.10.2002.g	1.926.000,00	492.361,00	**CIDC** - 51.129,19 (team of dogs)	227
V	28.11.2002.g to 28.10.2003.g	1.526.000,00	511.291,00	**JAPAN GOVERNMENT -**143.780,90 (demining machines () **DEK –** 159.479,81 (DPPR Center for the OIV and education, engines for demining machines -)	210
VI	20.11.2003.g to 19.12.2004.g	1.000.000,00	1.478.294,00	**UNHCR -** Program development of mine awareness courses 5 110 listeners 43.549,00	187
VII	17.01.2005.g. do 16.01.2006.g.	660.000,00	1,818.284,00	**DEK** – 103.000,00 (Procurement of equipment for mining) **UNHCR -** Program development of mine awareness course 4 89 listeners 34,723.00	187
VIII	17.01.2006. to 16.01.2007.	330.000,00	1,957.656,00	-	187
IX	12.02.2007. to 31.12.2007.	-	3.156.090,76	-	184
X	21.01.2008. to 31.12.2008.	-	2.632.810,62 - 523.024,49		184
XI	01.01.2009. to 31.12.2009.	-	3.405.203,93		184
XII	01.02.2010. to 31.12.2010.g.	-	3.681.301,54		184
XIII	01.01.2011. to 31.12.2011..	-	3.204.320,93		185
XIV	01.01.2012. to 31.12.2012.	Until 30.09.2012.g.	2.307.924,00	FBH Government for renewal of equipment Program 200.039,11	178
TOTAL:		**9.713.000,00**	**24.613.111.29**	**2.572.457,78**	-

Over the past 14 demining programs (from 1 November 1998 until 31 December 2012), demining teams of the Federal administration of civil protection have achieved the following results:

- Conducted 524 demining task in which all demining methods (manual, mechanical and EDD) treated with 8,246,337 m2 of suspicious areas that are presented on the use of local communities,
- Through the demining operations were removed 2,837 pieces of PT and AP mines, 3,732 pieces of various UXO and cleaned 380 homes and other buildings,
- Teams for the removal and destruction of UXO have conducted 38,656 tasks and through their implementation remove 277,628 pieces of various UXO, and remove and destroy 25,503 pieces of PT and AP mines,
- A machine that removing the rubble is removed the ruins of 1,466 houses, of which over 90% off the minefields as a precondition for the reconstruction of houses of refugees and displaced persons.

1.10.1. General indicators

Bosnia and Herzegovina even after eighteen years after the war is facing the problem of high mine contamination. In addition to a lot of effort and significant progress in solving the mine problem in the past, the fact is that the minefields, which are spread across the country, represent a major obstacle to citizens' security and socio-economic development of the country.

According to the MAC, the current size of mine suspected areas in Bosnia and Herzegovina is 1,243 square kilometers, of which the Federation of Bosnia and Herzegovina relations area of 930.15 square kilometers, or 2.5% of the total area of Bosnia and Herzegovina. Through a systematic survey operations defined 9606 mine suspected micro location where according to estimates there are about 120,000 landmines / UXO.
Current size of mine risk area, which is defined through 4,162 projects, operations of general survey for further humanitarian demining operations, amounts to 317.74 square kilometers. Also, the MAC database, currently registered 19,183 minefield records, which represents about 60% of their total number.

Table 1.10.1. Map of current size of mine suspected area

ADMINISTRATIVE REGION	The toal of suspected area (km²)	Suspected area per priority categories (m²)		
		I category	II category	III category
Federation BH	930,15	196,70	236,69	496,76
Republic of Srpska	290,01	78,93	97,28	113,80
Distrikt Brčko	23,00	3,16	15,95	3,89
Bosnia and Herzegovina	1.243,16	278,,79	349,92	614,45

In the period from 1992 to 30.6.2013. mines and unexploded ordnance, injured a total of 8,016 persons, in the period 1992 - 1995 , there were 6,311 casualities, and in the period 1996 to 30.6.2013., 1705 casualities, of which 597 persons were killed, injured 765 persons, while 352 persons injured by UXO casualties is not known for years.

From 1996 to 06.30.2013. while performing humanitarian demining killed 115 miners, of which 46 were fatal.

In 2013, registered a 5 1 demining and mine accidents, in which 12 persons were killed, as can be seen from the attached Table 1.10.1.1.

Table 1.10.1.1. Statistics of the victims of mines

YEAR	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fatalities	9	10	51	43	42	37	26	28	24	32	28	17	33	9	6	9	9	3
Wounded	2	11	62	38	38	28	35	29	31	21	21	31	29	19	8	13	3	9
Unknown	1	99	15	12	12	8	12	4	4	3	1	0	0	1	0	0	0	0

Table 1.10.1.2. Current size of mine suspected areas in the Federation of Bosnia and Herzegovina

ADMINISTRATIVE LEVEL	The toal of suspected area (km²)	Suspected area per priority categories (m²) (km²)		
		I category	II category	III category
UNA-SANA CANTON	121,07	53,85	47,69	19,53
POSAVINA CANTON	25,14	7,02	15,99	2,13
TUZLA CANTON	92,46	23,05	24,92	44,49
ZENICA-DOBOJI CANTON	132,10	29,54	22,01	80,55
BOSNIA-PODRINJE CANTON	51,13	4,71	12,08	34,34
CENTRAL BOSNIA CANTON	157,42	27,55	46,03	83,84
HERZEGOVINA-NERETVA CANTON	170,73	19,71	31,31	119,71
WEST HERZEGOVINA CANTON	0,31	0,00	0,00	0,31
CANTON SARAJEVO	83,63	20,41	15,49	47,73
CANTON 10	96,16	10,86	21,17	64,13
FEDERATION BH	**930,15**	**196,70**	**349,92**	**614,45**

The biggest suspected area, cleared of mines , is located in the Herzegovina-Neretva Canton - 170.73 sq km; Central Bosnia Canton - 157.42 sq km; Zenica-Doboj Canton - 132.10 sq km and USC - 121.07 square kilometers.

Table 1.10.1.3. Summary of affected communities

ADMINISTRATIVE REGION	ENDANGERED COMMUNITIES [17]			
	Federation BH	Republic of Srpska	Brcko district	Bosnia and Herzegovina
Endangered communities LOW	587	434	12	1033
Endangered communities MEDIUM	182	72	14	254
Endangered communities HIGH	102	27	7	136
TOTAL	**871**	**533**	**33**	**1423**

Based on the data of BH MAC, in the Federation of Bosnia and Herzegovina, to 06.30.2013., according to the level of danger threatened the 871 communities of landmines / UXO, of which low levels of 587, 182 middle and high level of threat to 102 communities.

Table 1.10.1.4. Directly threatened citizens

ADMINISTRATIVE REGION	Directly vulnerable citizens			
	FederationBH	Republic of Srpska	Brcko district	Bosnia and Herzegovina
Directly vulnerable citizens LOW	134.289	70.344	3.250	207.883
Directly vulnerable citizens MEDIUM	134.542	34.632	10.120	179.294
Directly vulnerable citizens HIGH	112.718	30.666	8.050	151.434
TOTAL	**381.549**	**135.642**	**21.420**	**538.611**

According to BHMAC in the Federation of Bosnia and Herzegovina, according to the levels of risk, directly threatened by landmines are 381,549 citizens.
The capacity of civil protection for mining play an important role in cleaning the homes of returnees and reduce the risk of return, especially if they intend to engage in agriculture and livestock.

[17] The community (village, local communities, villages, etc.).

For these reasons, it is necessary to educate the population about the dangers of mines in what is so far worked, but not enough, and the implementation of training for the population and children in schools, through the media, as well as help develop awareness of the dangers of landmines.
MAC data show that the capacity of civil protection demining mainly worked on de-mining areas which are important for the realization of the return, which were not in the interest of commercial firms.
In the period from 1996 - 2010 in Bosnia and Herzegovina of mines / UXO destroyed a total of 1,671 people, of which 588 were fatal.

Table 1.10.1.5. Mine victims by age

Age group	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Children (0-18)	95	51	17	10	21	9	11	3	6	5	3	2	1	5	0
Adults (19-60)	383	236	86	66	59	55	53	54	49	45	33	30	46	21	10
Elderly(60-)	30	28	13	11	7	9	3	8	4	6	9	9	14	1	0
Unknown	5	10	9	3	4	1	6	0	0	0	5	7	2	1	1
Total	513	325	125	90	91	74	73	65	59	56	50	48	63	28	11

Table 1.10.1.6. Mine victims by gender

Gender	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
F	56	22	16	7	8	9	6	10	4	3	3	10	2	3	0
M	457	303	109	83	83	65	67	55	55	53	47	38	61	25	11
Total	513	325	125	90	91	74	73	65	59	56	50	48	63	28	11

Table 1.10.1.7. Overview of educated person through the MRE program in Bosnia and Herzegovina 1996-2010.

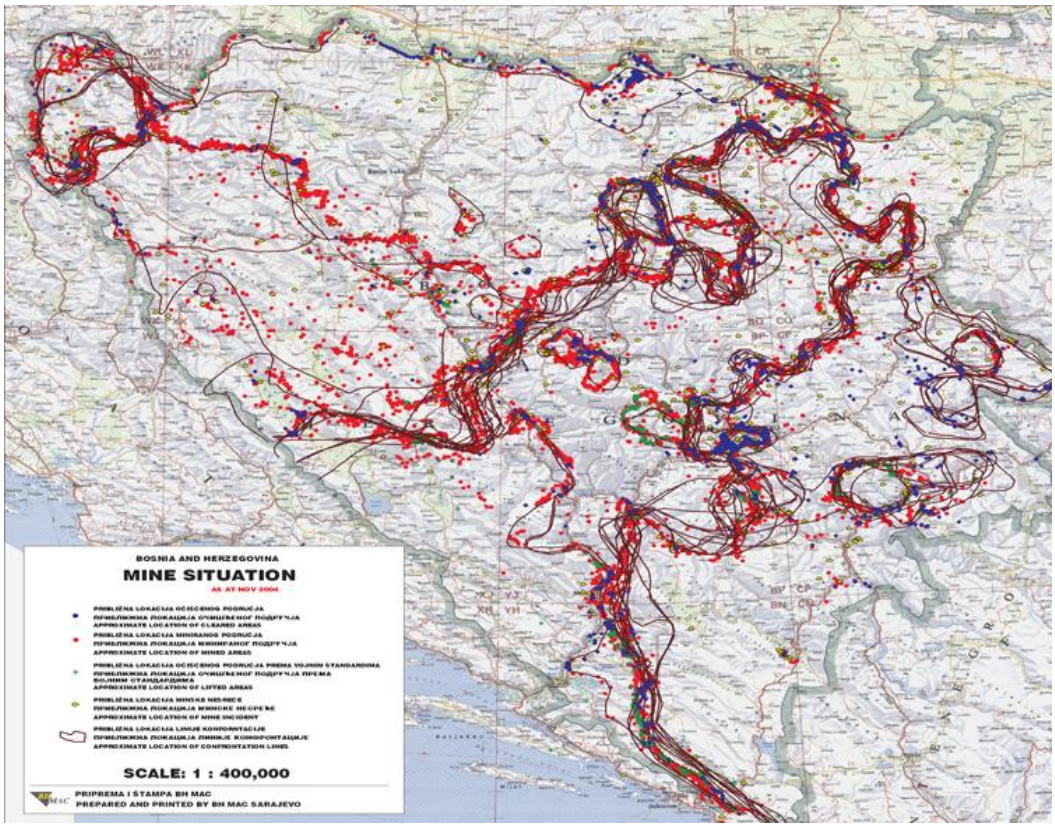
ADMINISTRATIVE REGION	Number of educated people through the UM program
Federation Bosnia and Herzegovine	186.418
Republic of Srpska	130.117
Brcko district	4.463
Bosnia and Herzegovina	320.998

The program warning on mine threat in Bosnia and Herzegovina between 1996 - 2010 trained a total of 320,998 people

Table 1.10.1.8. Operational Plan for mine action in Bosnia and Herzegovina 2000-2019

	Systematic and general survey km^2	Humanitarian demining km^2	III category survey km^2	Permanent marking (number of characters)	Urgent marking (number of characters)
Federation BH	943,8	180,54	169,8	18.000	64.800
Republic of Srpska	503,36	96,288	90,56	9.600	34.560
Brcko district	125,84	24,072	22,64	2.400	8.640
Bosnia and Herzegovina	1573	300,9	283	30.000	108.000

Reduction plan of mine suspected area in Bosnia and Herzegovina is defined by the Mine Action Strategy of Bosnia and Herzegovina from 2009 to 2019.
Minefields will be conducted through surgery systematic and general survey, humanitarian demining and reconnaissance (general and technical survey) in the third category of priority. Mine suspected / risk area will be marked with 30,000 signs for permanent marking operations and 108,000 characters through the operation of emergency marking.



1.10.2. Findings

- In order to achieve the quality and uniformity of all cleared areas during demining activities, it is necessary to consider all the possibilities that the amendments to the Law on Demining of Bosnia and Herzegovina create conditions to all resources for demining in Bosnia and Herzegovina to consolidate and ensure their capacity, with relying on its own financial resources, and management capabilities that capacity.
- Continue to implement all the activities from the Strategy for Mine Action, a means to reduce risk areas in order to enable the economic base for sustainable return and a stable security environment.
- Through various forms of education (through the Red Cross / Cross, the media, schools, etc.) To develop all forms of prevention of landmine dangers in government and awareness among the citizens.
- If there is no agreement on the pooling of demining capacity, it is necessary to examine the needs and possibilities of the Federation of Bosnia and Herzegovina to funding the existing demining teams are part of the Federal administration of civil protection.

2. Technical - technological and other disasters

2.1. Wildfires[18]

2.1.1. Fires and classification by place of origin and the extent (size)[19]

The fire is uncontrolled, self-sustaining combustion of the uncontrolled spread in space and time, and the place of origin, fires can be divided into:
a) internal or fires indoors,
b) external or fires in the open air.
A fire in an enclosed space or internal fire is considered to be a fire that develops in an enclosed space - usually in one or more rooms, the production hall, the inner parts of the construction, or within buildings for various purposes (structures of individual and collective housing, industrial and commercial facilities, public facilities, office buildings and other facilities, including fires in underground mines.
A fire in the open air or outdoor fire, it is a fire that develops in the open air, outside the establishments. The fires in the open air fires are appearing and evolving in the forests, the forest and agricultural lands, in warehouses, technological plants and facilities located in the open space, means of transport - road, rail, waterway and air traffic and other fires, including Fires in mines with surface exploitation.
According to size or the scope and amount of flammable material caught fire, fires are divided into:
a) small fires when the fire affected a small amount of combustible material (individual items, small areas), which are often at an early stage of fire development
b) medium fires, where fire affected one or more rooms, as well as fires in the open space that are limited to a smaller spatial extent, but there is always a danger for their immediate expansion,
c) large-scale fires, in which the fire affected the whole floor, the roof of the building, most of the basement area or the entire building, as well as fires in the open space where the fire-affected areas and the greater the amount of combustible materials such as: forest fires, fires spilled liquid fuel fires that affect entire blocks of buildings, neighborhoods or large complexes of open warehouse fires in the oil refineries, terminals for liquid fuels and other industrial plants and facilities in the open air.
It should be noted that none, not even a small fire cannot be underestimated, because depending on the conditions in which they develop can turn into a large-scale human sacrifice (usually due to suppression or sustained burns), or endanger human health (due to exposure to smoke and other combustion products, and high temperatures).
However, the largest number of victims at the site of the fire, as well as endangering people and property in the vicinity, are caused by a large fire or the explosion.[20]
In addition, the occurrence of large fires require hiring large numbers of basic and additional fire power to extinguish these fires (professional and volunteer fire units, fire units of legal persons, protection and rescue services and civil protection units, intervention groups and service of fire protection in forest management companies, members of the BH Armed Forces), and the engagement of a large number of fire engines, fire-fighting techniques, including the use of aircraft to put out the fire from the air.
Any presence of certain quantities of flammable, explosive or other hazardous substances,[21] indoors or outdoors (especially those hazardous substances which are self or have a very low flash point), is a fire hazard [22]and causing an increase in the risk of fire in that area.

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[18] The term technical and technological accidents include events that are out of control in the performance of certain activities or the management of certain funds to work and work with hazardous materials during their production, processing, use, storage, loading, transport or removal, the consequences of which threaten people and material good, while the notion of other accidents involve major accidents in road, rail, air or sea transport, fires, mining accidents, damage of dams, atomic, nuclear or other accidents caused by human activities, war, martial law or other forms of mass killings people and the destruction of material goods (the definition set out in Article 3 paragraphs. 2 and 3 of the Law on Protection and Rescue.

[19] "Manual for the training of fire officers and NCOs," Croatian firefighting community, Zagreb, 2006 (pp. 377 and 378).

[20] The explosion is the sudden expansion of gas that may result from the reaction rate of oxidation or falling apart, with or without an increase in temperature and that can cause fire.

[21] Hazardous substances are substances that in all forms of existence and all the terms of use of their negative characteristics, such as explosiveness, flammability, corrosivity, toxicity, radioactivity and others, can be cause

The greater the quantity of flammable and explosive hazardous materials used in technical and technological facility or installation in a particular location, increases specific and total fire load and resultant fire hazard [23]and the risk of a large fire or destructive explosion, and increase the likelihood of possible appearance technical or other disaster at the site.
Also, it is greater the building of a facility, and technical and technological plants and facilities in a specific location, the greater the number of people present at that location, which directly increases the likelihood of high casualties and damage to property in the event of large fires or the devastating explosion at the technical and technological facility or plant.
For the area of the Federation of Bosnia and Herzegovina has not been established overview of all industrial and other areas location where there are large amounts of flammable and explosive hazardous substances are used in technical and technological plants and facilities, and in manufacturing and other halls in offices and industrial buildings, terminals liquid fuels, oil refineries, thermal power plants, gas stations, gas stations, boiler rooms, storage of explosives, gas cylinders and other hazardous substances that are flammable and explosive characteristics, installations for the transport and distribution of gas, etc.), with data on the average annual amount of these substances the locations where they are, and that could be used for purposes of determining the specific and total fire load of these substances in the Federation of Bosnia and Herzegovina.
To determine the total fire load of flammable and explosive hazardous materials in the Federation of Bosnia and Herzegovina, it is necessary to first establish their average amount, specific and total fire load on the micro-locations for the municipalities / towns and cantons, when creating fire hazard assessment for the municipalities / city or cantons in the Federation of Bosnia and Herzegovina.

2.1.2. The causes of fire incidence and size of the burned areas

Generally, the causes of the phenomena that can lead to the occurrence of fires and explosions, can be varied and practically cannot be eliminated completely, and may, inter alia, be related to: construction and technical and technological defects or faults and failures in technological process in industrial and commercial facilities, in pipelines or on different types of technical installations (electrical, lightning, mechanical and others), natural phenomena (lightning strike, etc.), as well as the activities of people.
Based on the data which are included in section 2.1.3. Risk Assessment, the technical - technological and other disasters, which occur most often in the Federation of Bosnia and Herzegovina, and that the scale and intensity of action endanger people and property, are large fires in the open air - forest fires.
The analysis of available data on the spread of fire and explosion in the Federation of Bosnia and Herzegovina in the last five years it has been found:

1. that there was no fire and the explosion in technical and technological plants and facilities, as well as other technological and other disasters with large casualties or seriously injured persons, or major property damage;[24]

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various harmful effects and risks to human health, damage or destruction of material goods due to the devastating, thermal or physiological effects, and endangering the working environment and the environment .. The dangerous substances are explosives, flammable liquids, gases, flammable solids, oxidizers and organic peroxides, poisons, corrosive substances, radioactive materials and other dangerous substances. Under flammable substances imply the solid, liquid and gaseous substances that fall under the influence of sources of ignition, until the explosives podrazmjevaju gaseous, liquid and solid chemical substances, compounds or mixtures which are under the influence of certain pulse decompose in a very short time, with the release of large amounts of gases and heat.

[22] Fire danger is the possibility of injury or damage as a result of the fire, while the risk of fire the product of probability of a fire that can be expected in a given technical operation or condition and the consequences or extent of the damage that can be expected in case of fire (all the above definitions of terms have been established in Article 2, points. 4), 5), 6), 7), 8) and 10) of the Law on Fire Protection and Fire Service).

[23] Present fire load (total and specific) to određenojj location, and degree of vulnerability of space or building at the site of the fire, depending on the purpose of the building and some parts of it, the present amount of combustible material, the surface area and number of people in the building or area staying at one time. The numeric value present specific and total fire load in a particular location is determined on the basis of the performed budget in accordance with the relevant standards (JUS. U.J1.030, international standards) or in accordance with the relevant literature.

[24] Accidents related to the expansion and explosion of gas and other hazardous materials, and mining accidents are dealt with in sections 2.3., And 2.5. these estimates.

2. appeared a large number of forest fires, as well as the fire of undergrowth and grass, mostly in conditions of great drought and high summer temperatures, and as a result of lightning strikes, and most often as a result of human carelessness and negligence in terms of improper waste incineration during spring and autumn field works to clean up the plant and other waste, and the use of sources of ignition in forests and on forest land or near the forest.

According to available data, in the mentioned period was also found that the incidence of large forest fires, including fires and low-growing plants and herbs, mainly the largest in March, August and September.

Accordingly, increased exposure to the dangers of fire and explosions that can endanger human lives, property, forests and environment in the Federation of Bosnia and Herzegovina, is present at the locations - the municipalities / towns and cantons, in which there are: technical and technological plants and plants in technological process using large amounts of flammable and explosive hazardous materials, and large areas of forest and forest land, including protected areas and cultural and historical heritage.

Similarly, exposure to risks of fire and explosion, expansion and explosion of gases and other hazardous substances that could endanger human lives and property, there is also the transport infrastructure, as well as mines.

Accidents involving hazardous substances, mining accidents, dangerous events in tunnels and other accidents during road, rail and other traffic of people and goods, in particular as discussed in section 2.3., 2.5. and 3.1. Risk assessment.

2.1.2.1. Forest fires

Forest fires are uncontrolled elemental movement of fire on the forest area, and vary according to the type, origin and method of damage.

Forest fires are one of the most common causes intensive erosion processes occurring in the area of forests and woodlands, resulting in loss of fertile part of the land as well as significant changes in physical and chemical properties of fertile piece of land.

Therefore, fires and erosion classified in so-called. abiotic stress effects that damage forest ecosystems.[25]

Geographic spread of forest resources in Bosnia and Herzegovina is shown on a map - where the yellow marked subtropical dry forest, olive green temperate mountain forests and brown temperate continental forests.

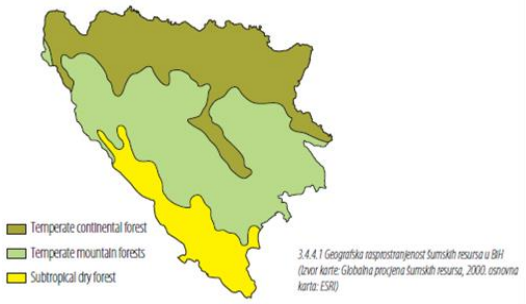

Figure 2.1.2.1 Map of the geographical distribution of forest resources in Federation Bosnia and Herzegovina

Therefore, extremely dry weather favors the development of forest fires with the help of the wind and if they occur in rough terrain or terrain that is contaminated by UXO, quickly spread, grow into large fires that cover large areas, and last for several days and very difficult to extinguish.

[25] Stress effects (factors) that damage forest ecosystems are divided into: biotic and abiotic. The biotic factors include: fungi, bacteria, viruses, mistletoe, nematodes, fitoplasme, insects, rodents, wildlife, birds, man. The abiotic factors include: pathogens (pollution pollution, drought, salt unfavorable chemical and physical structure of the soil nutrient excess and deficiency) and damage (wind, extreme temperatures and humidity, the city and freezing rain, snow, lightning, radiation, fires and erosion, plant protection products and other chemicals).

After effects of forest fires remain large surface area and significant material and other damage depending on the types of trees that had been damaged by fire.

Table number 3 which is located in the annex 6 estimates of vulnerability, expressed a review of forest fires and burned areas, as well as the estimated damage[26] in the period from 2007 to 2013.

Direct damages include loss of timber supplies, ground vegetation and other forest products, and the cost of extinguishing the fire and restoration.

Indirect damages include the negative impact on beneficial functions of forests and determined relatively.

Although fires a negative impact on all the environmental value of forest ecosystems, for this purpose are taken into account only the value of long-term or permanently disappear, but is easy to recognize.
Thus the valorization: Density type of forest, protection of forests and terrain features.
Thus, indirect damages are damages of all forms of habitat change and loss of all the diverse functions of forests, many times higher than the direct damage, but are still not accounted for in our country.[27]

Indirect damage to forest ecosystems caused by fires are much larger and global parameters reach 10 to 17 times the value in relation to the direct damage.

2.1.3. Recorded consequences to people and damage to property

2.1.3.1. According to the Federal administration of civil protection

Table No. 1, located in the Annex 6 of this assessment, present data on fires in the Federation of Bosnia and Herzegovina, in the fire season (from the first of March to the first of November of the current year) for the period from 2008 to 2012, according to data which showed Cantonal civil protection in its regular reports received by the Operational Centre of the Federal administration of civil protection.

From the data presented in the above Table 1, it is evident, that in the period from 2008 to 2013, in the Federation of Bosnia and Herzegovina recorded 12,656 fires, of which 2,556 on the buildings and 500 vehicles on fire, while 12,656 fires, either recorded in the open air where the burnt area of 49,084.34 hectares.

It should be noted that the data shown on the burnt areas of forests and forest land preliminary, and that the actual fire-affected areas as well as the resulting damage to forests and forest land, the exact parameters and calculations, determined by Federal Ministry of Agriculture Water and Forestry in accordance with its responsibilities (these data are presented in Table 3. located in the Annex 6 of this assessment). The largest number of fires in the open air was recorded: 2012 (5324), 2011 (2806), 2013 (1939), 2010 (1038), 2008 (830) and 2009 (719) .

Of these a total of 49,084.34 hectares burnt areas, 41,717.81 ha of forest, grass and low-growing plants have been recorded in 2012, followed by 2013 when affected by fire 3468.01 ha, 2011, when affected by fire 1.796.29 ha, 2008 when affected by fire 1288.64 ha in 2009, when affected by fire is 405.24 ha and 2010, when the burning surface 390.35 ha of forest, grass and low-growing plants.

[26] According to the Federal Ministry of Agriculture, Water and Forestry, which was submitted for the 2012 shelf or published on p. 60 and 61, "Information management of forests in the Federation in 2011 and forest management plans for the year 2012".
[27] Annual report on the implementation of the program of development of protection and rescue of people and material goods from natural and other disasters in the Federation of Bosnia and Herzegovina since the adoption by the end of 2008, Sarajevo, May 2009.

Aggravating factors in the localization and extinguishing forest fires in the said period were primarily mine contamination and UXO areas damaged by fire, the inaccessibility of the fire site, undeveloped fire roads and paths in forests and on forest land (as a preventive measure determined plan to protect forests from fire, which is under the jurisdiction of the Cantonal forest management companies (hereinafter: CFMC) for the area under its management, a small number of organized and equipped intervention group of workers and members of the service of fire protection in CFMC) s, and insufficient number of under-equipped professional fire units (hereinafter: PVJ) and voluntary fire units (hereinafter: DVJ) (among others, do not have adequate vehicles for extinguishing forest fires and other material and technical resources necessary for the effective extinguishing of forest fires) .
If the period from 2008 to 2013, the available data on the spread of fire and burnt areas in areas of cantons in the Federation of Bosnia and Herzegovina, then the situation is the following:

- The largest number of fires (in the open air, in buildings and in vehicles), appeared in the area of Herzegovina-Neretva Canton (3180), Tuzla Canton (3041), Zenica-Doboj (2726) and Una-Sana (2402), Canton Sarajevo (2269), of West (784), Central (633), Canton 10 (562), Bosnia-Podrinje (93), and Posavina Canton (11);[28]
- The biggest fire-affected forest area, grass and low-growing plants in areas of cantons in the Federation of Bosnia and Herzegovina, are recorded in the area of Herzegovina-Neretva Canton (40,158.00 hectares), Zenica-Doboj Canton (3584.90 ha), USC (1897.90 ha), Tuzla Canton (1499.40 ha), Central Bosnia Canton (1476.40 ha), Canton 10 (212 ha), Bosnian Podrinje Canton (97.50 ha), West Herzegovina Canton (136.90 ha), the Sarajevo Canton (20 ha) and Posavina Canton (0 ha).

If the period from 2008 to 2013, analyzed data on fatalities and injured persons in fires and explosions in the Federation of Bosnia and Herzegovina, then leads to the following condition: a result of the fire and explosion were killed a total of 36 persons (of which one child and one minor), injured 86 people (of which seriously injured two minors and slightly injured one child).

Although the Federation of Bosnia and Herzegovina in the period from 2008 to 2013, at the extinguishing of forest fires in the affected areas of the cantons and municipalities / towns were engaged all available PVJ and DVJ, forestry workers and the population, and used considerable financial and technical resources, without the assistance of the Armed Forces of Bosnia and Herzegovina and the international aid using air force, it was not possible to extinguish large forest fires which have eroded the four cantons (Canton 10, Herzegovina-Neretva, Zenica-Doboj, and West) and 13 municipalities in these cantons (Tomislavgrad , Grahovo, Glamoc, Livno, Konjic, city of Mostar, Čapljina, Jablanica, Ravno, Neum, Zavidovici, Lead, Ljubuski). It should be noted that it is still in extinguishing forest fires insufficiently are included the structures of protection and rescue organized in the Cantonal administrations and civil protection / municipality and local residents, although specified by the provisions of the Law on Protection and Rescue and the Law on Fire Protection and fire service ("Official Gazette of BH, No. 64/09) (hereinafter: the Law on Fire Protection).
These cantons or municipalities / city, requests for assistance in extinguishing large forest fires in their area by using air force to the Federal administration of Civil protection, which is through the Ministry of Security of Bosnia and Herzegovina sought that help from the Armed Forces of BH and international assistance in accordance with applicable regulations which regulate this question.

Table No. 2, located in Annex 6 of this assessment, presented an overview of the data on the involvement of air and other forces and means of OS BH and other countries (Croatia, Turkey, the Russian Federation, EUFOR and others) in extinguishing large forest fires (the use of helicopters and Canadair), in the Federation of Bosnia and Herzegovina in the period from 2008 to 2013.

[28] It should be noted that the operational center of the Civil Protection Posavina Canton, the operations center of the Federal administration of Civil Protection did not submit data on all the fires that occurred in the canton, especially fires small scale and intensity, but only information on fires in which the material damage, which explains the extremely low number of registered fires and burned areas in the Canton. Similarly, the Operations Centre of Civil Protection of Sarajevo Canton, also not complete data on the number and type of pozri appearing in this canton, which should also be taken into account in the analysis, and determined conclusion.

Therefore, it can be concluded that the cantons: the Herzegovina-Neretva Canton, Canton 10, West Herzegovina and Zenica-Doboj Canton, the most affected cantons in the Federation of Bosnia and Herzegovina, in terms of exposure to risk of the occurrence of large forest fires.

2.1.3.2. According to the Federal Ministry of Agriculture, Water and Forestry

Table No. 3, located in Annex 6 of this assessment, presented an overview of the data of the Federal Ministry of Agriculture, Water and Forestry of the number of fires and the damage caused to forests and forest land in the Federation of Bosnia and Herzegovina.

From the data we can see that:
1. In the period from 2007 to 2012, recorded 3,357 forest fires, with the burned area of 70,535.11 hectares burned 913,938.94 m3 of wood mass and 1,115,328.00 pieces of seedlings and caused damage of approximately 67,724,385.00 KM.
Of this total number of forest fires, the highest number recorded in 2007 (932), with the burnt area of 13,742.00 hectares and caused damage of 9,574,263.00 KM.
2. In the period from 2008 to 2012, a total of 2,425 forest fires recorded, with the burnt area of 56,793.11 hectares burned 873,921.94 m3 of wood mass and 1,082,684.00 pieces of seedlings, and material damage of 58,150,122.00 KM.

Of this total number of forest fires, the highest number was recorded in 2012 (1082), where the burned area of 43,317.20 hectares and caused damage of 47,753,101.00 KM.

2.1.3.3. According to the Federal Bureau of Statistics

Table 2.1.3.3. Review of forest fires in the Federation of Bosnia and Herzegovina

FOREST FIRES IN THE FEDERATION BH										
YEAR	TOTAL		HIGH		LOW		OTHER FOREST		OTHER AREAS	
	number	ha	number	ha	number	ha	number	ha	number	ha
2003	1.283	20.380	533	4.802	326	7.964	157	4.079	267	3.535
2004	206	842	85	614	46	67	44	47	31	115
2005	254	859	65	243	91	273	57	222	41	120
2006	234	2.367	79	357	90	1.052	47	278	18	680
2007	1.109	18.169	353	1.953	395	3.201	138	2.613	223	10.422
2008	543	5.386	141	677	172	783	122	707	108	3.218
2009	336	1.881	105	428	123	516	40	222	68	715
2010	207	819	57	125	72	164	26	152	52	378
2011	765	7.432	285	1.868	210	1.180	94	1.912	176	2.472
2012	1.521	38.804	528	10.321	642	10.885	185	13.534	166	4.063
TOTAL	**6.458**	**96.939**	**2.231**	**21.388**	**2.167**	**26.085**	**910**	**23.766**	**1.150**	**25.718**

According to the Federal Bureau of Statistics,[29] in the mentioned period were recorded 6,458 fires, with the burned area of 96,939 ha.
The recorded number of fires, the highest number was in 2003 - 1283; 2007 - 1104 and 2012 - 1521 fire, with the burned area of 77,353 ha

[29] Federal Statistical Office of "Statistical Yearbook / Yearbook for 2006 - 2013 years."

Table 2.1.3.3.1. Overview of damage in forests

DAMAGES IN FOREST								
CAUSES OF DAMAGES								
YEAR	Man		Insect		Natural and other disasters		Fires	
	m³	000 KM	m³	000 KM	m³	000 KM	m³	000 KM
2003	55.871	3.812	19.060	1.174	38.826	765	202.507	20.205
2004	40.580	2.329	52.224	4.961	9.078	449	5.858	1.381
2005	54.788	2.747	45.160	2.844	7.867	328	4.164	1.925
2006	39.479	2.801	56.124	3.341	-	-	14.557	2.361
2007	50.382	3.465	37.411	1.708	5.409	289	43.909	9.722
2008	60.857	3.918	21.181	1.460	9.646	409	13.025	2.790
2009	61.996	3.606	6.904	267	7.534	343	840	1.470
2010	66.632	4.403	1.207	66	8.342	444	2.368	354
2011	87.574	4.904	-	-	2.320	153	27.303	3.128
2012	82.890	6.308	602	38	4.563	232	970.974	40.991
TOTAL	**601.049**	**38.293**	**239.873**	**15.859**	**93.585**	**3.412**	**1.285.505**	**84.327**

According to statistics from 2003 to 2013, in the Federation of Bosnia and Herzegovina has caused damage to forests caused by human factors, natural and other disasters, and various pests, in the amount of 141,891,000.00 KM.

From these data, the damage to the forest farms caused by a man, destroying a variety of forest fund (cutting, piercing, various roads) in the amount of 38,293,000.00 KM (destroyed more than 600,000 m³ of wood mass).

Natural and other disasters that have occurred in the forest area of the Federation of Bosnia and Herzegovina (fires, forest diseases, insects, etc.) During 2003 - 2013, destroyed 1,618,963 m³ of timber, whose total value amounts to 103,598. 000,00 KM.

2.1.4. Normative-legal regulation, organization and functioning of the preventive fire protection

2.1.4.1. Normative regulation after the Dayton Agreement

Since the signing of the Dayton Agreement (November 1995) by 2009, operation and development of fire protection and fire-fighting in the Federation of Bosnia and Herzegovina, was difficult, primarily because of legal briefs are functional and lack of development of a uniform system of fire protection and fire-fighting in the Federation Bosnia and Herzegovina.

Federal administration of civil protection, as the proponent of the Law on Fire Protection, prior to passage of the law has taken a series of actions and implemented a public debate with the fire associations, volunteer fire companies[30] (hereinafter referred to as DVD), PVJ, a, trade union organizations in the fire brigades and the competent authorities of Civil protection Canton, municipality / city, as well as other institutions in the area of fire protection and fire service, to be brought adequate legislation regulating the area of fire protection and fire-fighting in the Federation of Bosnia and

[30] This means that the adoption of the Law on Fire Protection, DVD / J become additional power for firefighting activities, which are organized and financed as non-governmental organizations in accordance with the Law on Associations and Foundations ("Official Gazette of BH", no. 45/02 and 85/07) or financed by the municipality / city or canton, in the manner established by the Law on Fire Protection, upon a showing of need for their establishment and djelovanjm as decided by the municipality / city or canton in the area of protection from fire / municipality and Canton, on the basis of established fire risk assessment / municipality and Canton. In addition, the municipality / city or canton DVJ formed within the DVD, may declare the service of fire protection, as provided by the Law on Protection and Rescue and secondary sub regulations based on this law, no matter what in the municipality / city or canton there formed a professional fire department or other DVD / J, which also decides the municipality / city or canton in the area of protection from fire / municipality and Canton, on the basis of established fire risk assessment / municipality and Canton.

Herzegovina, where a special place is determined the significance and role of the voluntary fire service in the system of protection and rescue in the Federation of Bosnia and Herzegovina.

The Federation of Bosnia and Herzegovina, at the proposal of the Federal administration of civil protection, passed the Law on Fire Protection.

The adoption of the Law on Fire Protection, realized among others the following objectives:

1) the area of fire protection and fire service, to be regulated under a single system of protection and rescue of people and property from natural and other disasters in accordance with the Law on protection and rescue of people and property from natural and other disasters, as part of the system, as provided by the Law on Fire Protection;

2) that the fire protection and fire-fighting activities in the Federation of Bosnia and Herzegovina carried out in a unique way;

3) that the Federal administration of civil protection and Cantonal governments and municipal / city civil protection, become the main professional bodies in the field of fire protection and firefighting, with the task to ensure the implementation of the Law on Fire Protection;

4) that the main bearer of fire activity in the Federation of Bosnia and Herzegovina to become a professional fire units that form the cantons, municipalities / cities both within the Administration for Civil protection and the additional power for this activity to become: a volunteer fire brigade can be formed in the volunteer fire companies (hereinafter referred to as DL / I); the fire departments in legal entities which form a legal entity; search and rescue forces at all levels of government in the Federation of Bosnia and Herzegovina.[31]

In addition, the adoption of the Law on Fire Protection, realized the legal assumption that the area of fire protection and fire service in the entire territory of the Federation, quality and uniquely offices and to all municipalities / cities and cantons, primarily:

1) organize, plan, implement preventive protection against fire and explosion and fire-fighting activities, by the owner of fire safety in all areas of life and work, according to the planning documents (fire risk assessment, fire protection plan),
2) fire protection become a developed and recognized as a form of safety-culture of each individual through personal and mutual protection that each individual carried out in an environment where he lived and worked,
3) form a professional firefighting unit, which will be well-equipped and trained,
4) formed by the air force of the Federation of Bosnia and Herzegovina for firefighting using aircraft fire forest fires and other fires in open spaces,
5) improve and develop the field of fire protection and fire-fighting in the municipalities / cities, cantons and the Federation of Bosnia and Herzegovina, in accordance with the adopted programs of development of fire protection and fire-fighting within the development of protection and rescue of people and property from natural and other disasters / municipality, the Canton and the Federation.

Accordingly, the Law on Fire Protection, unique to the Federation of Bosnia and Herzegovina, regulates the area of fire protection and firefighting, or establishing a unique structure for the organization and functioning of fire protection and fire service throughout the Federation of Bosnia and Herzegovina - both horizontally and vertically from municipalities, cities and cantons to the Federation of Bosnia and Herzegovina.[32]

In the manner established by the Law on Fire Protection, in full fire protection and firefighting include the unique organization of protection and rescue of people and property from natural and other

[31] Units and commissioners of civil protection, emergency and rescue, civil protection authorities, civil protection staff and units for air transport and fire fighting.
[32] The annual report implementation of the program of development of protection and rescue of people and material goods from natural and other disasters in the Federation of Bosnia and Herzegovina since the adoption by the end of 2008, Sarajevo, May 2009.

disasters. These questions to its adoption were not regulated at the level of the Federation of Bosnia and Herzegovina.

Table No. 9, which is located in the Annex 6 of this assessment, presented an overview of Canton who brought Cantonal laws on fire prevention and firefighting, as well as the cantons and municipalities / cities that have developed planning documents - assessment of fire risk and protection plan Fire for your area, following the adoption of the Law on Fire Protection and by-laws regulating this issue.

As far as the determination of issues of importance to the development of programming of fire protection and fire service, in the framework of the development of protection and rescue of people property from natural and other disasters Canton, municipality / city, it was found that this document has not made any Canton, while in 10 municipalities (Bihac, Bosanska Krupa, Doboj Istok, Gracanica, Kalesija, Lukavac, Sapna, Srebrenik, Tuzla, Maglaj) the document adopted by the competent authority.
According to data presented in the above Table 9, we can conclude the following:

- Cantonal Law on Fire Protection and Fire Service brought in five of the 10 cantons in the Federation of Bosnia and Herzegovina (Tuzla, Zenica-Doboj, Una-Sana, Central Bosnia and Sarajevo Canton);
- Assessment of fire risk in their area, as part of risk assessment canton of natural and other NERECO adopted three cantons (Una-Sana, Tuzla and Sarajevo Canton), while the fire safety plan for your area brought one canton (Tuzla Canton);
- Assessment of fire risk in their own area within the risk assessment / municipality from natural and other NERECO, from 79 municipalities / towns in the Federation of Bosnia and Herzegovina, adopted the 25 municipalities (Bosanska Krupa, Domaljevac - Samac, Gracanica, Tuzla, Lancaster , Doboj Istok, Gradacac, Kalesija, Kladanj, Lukavac, Sapna, Srebrenik, Vares, Zavidovici, Zenica, Maglaj, Tesanj, Kakanj, Gorazde, Travnik, Travnik, Jablanica, Konjic, Hadzici, Stari Grad), while 12 municipalities (Bosanska Krupa, Gracanica, Tuzla, Gradacac, Kalesija, Vares, Zenica, Tesanj, Gorazde, Jablanica, Stari Grad and Hadzici) issued a fire safety plan for your area.

2.1.4.2. In the field of forestry

Forestry in the Federation of Bosnia and Herzegovina,[33] was regulated by the Law on Forests ("Official Gazette of BH", No. 20/02) and by-laws passed under this Law, of which, with respect to the protection of forests against fire, the most important Regulations on contents of the plans for the protection of forests against fire ("Official Gazette of BH", No. 21/04), and Regulations on the scope of measures on the establishment and maintenance of forest order and ways of their implementation (Official Gazette of BH No. 20/02).
However, on 27 November 2009, of a judgment of the Constitutional Court of the Federation of Bosnia and Herzegovina, these Forest Act does not apply. The Federation of Bosnia and Herzegovina after that as an interim solution adopted the Regulation on Forests ("Official Gazette of BH" no. 83/09, 26/10 and 38/10), that the judgment of the Constitutional Court ceased to apply from 6 December 2011.
The Parliament of the Federation of Bosnia and Herzegovina during the process of adopting the new law - Forest Act, which will regulate the field of forestry in the Federation of Bosnia and Herzegovina.
The said law regulates the forestry conservation and protection of forests and forest land, strengthening their ecological functions, forest planning and management of forests and forest land, economic functions, biological regeneration funding and improve forest in the Federation of Bosnia and Herzegovina.

[33] Forests and woodlands of the Federation of Bosnia and Herzegovina covers an area of approximately 1,518,600 hectares or 48% of the area. Of this, the state-owned is about 1,241,600 hectares, or 81.8%, and privately owned about 277,000 ha or 18.2%.
State forests have the following structure: High forests are at 565,657.8 ha or 45.6%, coppice to 256,868.8 ha or 20.7%, barren forest land to 288,320.4 ha or 23.2%. Mined areas in all categories amounted to 129,774.6 ha or 10.5%.

In addition, the Forest Program of the Federation of Bosnia and Herzegovina is a planning document in the field of forestry, which are brought on the basis of law. This planning document defines the general policy of forestry, forest management and forest lands, as well as the policies of the wild animals in the Federation of Bosnia and Herzegovina, and consists of the general part of which is adopted in the long term and detailed parts, which is adopted for a period of five years. In addition, forest management in a particular area of the Federation of Bosnia and Herzegovina, ruled by the provisions of: forest management plans, annual management plan and project execution.
In addition to organizing and implementing the protection of forests, in accordance with these regulations relating to forests, forest and agricultural land, Law on Fire Protection, among other things, regulate the obligation to carry out general preventive measures for fire protection in the forests, forest and agricultural lands (as set out in Article 27 of this Law), by legal and natural persons who are owners and users of forests, forest and agricultural land, as well as the administrative authority of the Federation of Bosnia and Herzegovina, the Canton, city and municipality in charge of forest, forest and agricultural land in the state and private ownership.

Until the adoption of the judgment of the Constitutional Court of the Federation of Bosnia and Herzegovina, which is the law in the field of forestry listed in Section 2.1.4.3. this assessment, revoked, the Federation of Bosnia and Herzegovina, almost completely been implemented provisions of these regulations pertaining, among others, and the overall protection of forests against fire in which is organized and carried out preventive protection of forests against fire , in the manner as follows.
Integrated protection of forests involves planning and implementation of preventive and repressive measures for the protection of forests against biotic and abiotic factors and is based on good organization and hierarchy of responsibility.

Integrated protection of forests and the preservation of forests, including the implementation of preventive protection of forests against fire, a legal obligation of Cantonal forestry administrations or Cantonal forestry companies, in which the said administration by signing the contract transferred the responsibility for forest management.

Preventive protection of forests against fire, in the framework of that integrated care is organized, planned and carried out as defined by the Ordinance on the contents of the plans for the protection of forests against fire ("Official Gazette of BH, No. 21/04).

The main instrument in the implementation of preventive protection of forests against fire is a plan to protect forests from fire, which prepare and adopt WCQD, Cantonal governments for private forest owners and legal entities managing forests and forest land in the area under its management.
The basis for developing a plan for the protection of forests against fire is to assess the vulnerability of forests against fire, which is prepared on the basis of a methodology and parameters set forth in the pre-specified rules.

In addition to the risk assessment of forest fire plan for the protection of forests against fire should include: preventive measures to protect forests from fire, means and equipment for firefighting, the roads within the zone for which it is the plan, water sources and catchment, detection and fire alarm systems, operational -tactical firefighting plan, a way of engaging their firefighting units and intervention group of forest workers, or professional or volunteer fire brigade and other forces in the event of large-scale forest fires, coordinated action on the field.
The plan for fire protection, among other things, establish preventive fire protection measures (technical, preventive-breeding and other measures set forth in regulations) that for the specific forest area under its management, must implement WCQD, ie, the holders of forest management, as well as internal supervision of the implementation of these measures.

Technical, preventive-breeding and other measures to protect forests from fire include:

1. determining the vulnerability of forest fire (I, II, III and IV level) and making transparent map on which are marked forest areas classified as I, II, III or IV level of threat,
2. establishment of an observation-reporting service, their training and equipping,
3. formation, training and equipping their own services of fire protection or entrusting the care and specialized legal entity,
4. formation, training and equipping of emergency group of forest workers, their training and equipment for felling trees and making fire-average or entrusting these tasks a specialized legal entity,

5. preventive silviculture (cutting and removal of dry branches, development and maintenance of fire with the elements of forest roads, cleaning and maintenance of marginal strips along public roads and railway lines, cleaning skirting areas of private land with woods, cleaning plant and other combustible materials railway belt, belt along public roads and on routes under power lines, etc.),
6 .functionally reflecting the external hydrant network,
7. educational measures for the population, tourists, school children, which is achieved by exploring the possible causes of causing a forest fire, the dangers, misdemeanor penalties for perpetrators of causing forest fires and the like,
8. other measures.
Determining the degree of threat of forest fires, among other things, it is very important in determining the fire risk assessment of forest areas that are preparing a plan for fire protection.
According to the risk of forest fire, all forests in the Federation of Bosnia and Herzegovina can be classified into four levels of fire risk, according to the number of points is determined by the prescribed methodology and related parameters to determine the vulnerability of forests against fire, in accordance with Table No. 5 which is found in Annex 6 of this assessment:[34]
In most EU countries and neighboring countries accepted this classification of the vulnerability of forests against fire.
Cantonal ministries responsible for forestry, through the Cantonal administration and WCQD-which are listed in Table No. 5, which is in Annex 6 of this assessment, were responsible for their areas, in accordance with the prescribed methodology in regulation, to establish the degree of vulnerability of forests fire and then make a general maps in the scale of 1: 25,000 or more, to be used to mark a corresponding color according to column 4 of the said Table No. 5, forest areas by level of fire risk for the area under its management.[35]
It is anticipated that after the assessment of forests from fire by cantons, or to determine the degree of vulnerability of forests against fire in the area of cantons, the Federal forestry administration, based on a map made transparent for the Canton area, prepare, integrate and publish an overview map of forests from fire to the entire territory of the Federation of Bosnia and Herzegovina.
Table No. 6, which is in Annex 6 of this assessment, the Federal Ministry of Agriculture, Water and Forestry, expressed that only four out of ten WCQD-and determine the degree of vulnerability of forests against fire for the area under its management.
Federal administration of civil administration of Protection did not received data from the Federal Ministry of Agriculture, Water and Forestry upon which cantons created general maps with marked areas classified on the level of vulnerability of forests from fires in their area.
In addition to the above categorization of forests from fires in stages I, II, III and IV can be made and the categorization of the danger of forest fires in Category I, II, III and IV, depending on the natural conditions as shown in Table No. 7 which is found in Annex 6 of this assessment.
Table No. 8 located in Annex 6 of this assessment, the Federal Ministry of Agriculture, Water and Forestry, which was reported by the cantons or WCQD's, have developed and adopted plans to protect forests from fire.

From Table No. 8 located in Annex 6 of this assessment, it can be concluded that eight WCQD in eight of the ten cantons in the Federation of Bosnia and Herzegovina drawn up plans to protect forests from fires in areas under its management, while two cantons were not formed WCQD, nor are areas of forests in these cantons made plans to protect forests from fire. Thus, two cantons (FC and PK) are not complied with applicable laws and by-laws of the Federation of Bosnia and Herzegovina, which regulate the area of protection of forests against fire.
In percentage terms, the situation can be expressed as follows: 80% of the canton, or Cantonal Forestry in the Federation of Bosnia and Herzegovina has adopted a plan to protect forests from fires in areas under its management, while 20% of Canton did not bring these plans.

[34] It was found in the Ordinance on the content of plans for the protection of forests against fire ("Official Gazette of BH", No. 21/04). These Rules and all laws related to forestry have been put out of force from 06.12.2011. year.

[35] The National Theatre was formed SPD "Herzegovina Neretva forest" doo which is not integrated the existing forestry companies and which actually does not function as envisaged by the Law on Forests. Cantonal Forestry Administration was formed and operates a number of years within the ministry responsible for forestry Theatre Canton. The PK is not formed KŠGD, while the Cantonal Forestry Administration, operates within the Ministry of Agriculture, Water and Forestry of Canton, which manages a relatively small area of state forests - 458.10 ha.

The conclusion of the Federal Ministry of Agriculture, Water and Forestry, is that although most WCQD developed plans to protect forests from fire to areas under its management, their content does not fully comply with the Law on Forests and the rulebook.
Therefore, in general it can be concluded that the design and implementation of plans to protect forests from fires in the Federation of Bosnia and Herzegovina is not satisfactory.
It is anticipated that the Federal Forestry Administration after the risk assessment of forest fire by cantons, prepare and consolidate all assessments and publish general maps of forests from fires in the Federation of Bosnia and Herzegovina.
Making general maps for the entire territory of the Federation of Bosnia and Herzegovina on the basis of transparent map which will make WCQD's for all the cantons, it is very important for the planning, organization and implementation of preventive measures to protect forests from fires, especially forest areas classified under I and II degree of vulnerability of forests against fire.

2.1.4.3. In the field of Environment and Tourism

Environmental management in the Federation of Bosnia and Herzegovina under the jurisdiction of the Federal Ministry of Environment and Tourism and the Cantonal ministries responsible for the environment.

Taking care of protected areas in the Federation of Bosnia and Herzegovina is regulated by the Nature Protection Act, which regulates the protection, conservation, restoration and sustainable development of nature in the Federation of Bosnia and Herzegovina.[36] The said law are covered by general and special measures of protection by establishing protected areas. So are the responsibility of the Federation of Bosnia and Herzegovina, protected areas and national parks, and in the competence of the cantons protected landscapes and monuments of nature.

Table number 4, which is in Annex 6 of this assessment, showcases four spatial categories of protected areas that are determined in accordance with the Law on Protection of Nature.

All protected areas, in the context of nature conservation, have particularly large biodiversity and one of the main ideas in making the protection framework was the overall maintenance of the existing ecological balances and mitigation of the negative anthropogenic influence, in order to protect natural resources, which also include surface and groundwater.

In the Federation of Bosnia and Herzegovina have so far established the following protected areas:

Most of the first sub-basin of the river Una was declared "area of significance for the Federation of Bosnia and Herzegovina " and placed under the protection of the Law on the National Park Una.
2. In the scope of "the areas of importance for the Federation ", separated the area of 19.800 ha, which has a category of" national park ", and an area of 13,500 ha will be in the category of "highly protected space ", while 6,300 hectares to be categorized as "controlled development ".
3. As areas of importance for the Federation of Bosnia and Herzegovina declared the Igman-Treskavica and Visocica. The scope of the Herzegovina-Neretva Canton and Sarajevo.
4. Natural Monument "Grasshopper" in the Sarajevo Canton, covering 1,430 ha-important from the hydrological point of view, and is characterized by a high degree of biological diversity.
5. natural monument "Spring of Bosnia" in Sarajevo Canton area of 603 ha.
6 Natural Monument "Tajan" in the Zenica-Doboj Canton. The surface of this protected area is 3,510 hectares and covers the municipalities of Zavidovici and Kakanj.
7. Natural Monument "Prokoško Lake", in the area of Central Bosnia Canton, on an area of 2,225 ha.
8. The protected landscape "Bijambare" covers an area of 367.36 hectares and is characterized by geomorphological and vegetation characteristics. The protected area "Bijambare" declared a category IV or 'protected landscape' ', dedicated to the conservation, scientific research, environmental education, and recreation and tourism.
9. The protected landscape "Konjuh" covers an area of 8,000 ha portion of the mountain Konjuh, with part of the catchment area of the upper river Oskova and declared a category IV or 'protected

[36] "Official Gazette of BH", number 33/03.

landscape' ', dedicated to the conservation, scientific research, environmental education, and recreation and tourism.
10. Recreation center "Duga Luka" near Bihac, was declared a protected area of "special-purpose forests", whose area covers 118.2 hectares.

Special significance for the Federation of Bosnia and Herzegovina have two nature parks, established in 1995, "Hutovo blato" and "Blidinje".

1. "Hutovo blato" is, for now, the only area in the Federation of Bosnia and Herzegovina which is listed (2002) in the list of Wetlands of International Importance (Ramsar Convention of 1971).
2. Nature Park "Blidinje" is located on a Čvrsnica, at about 2,000 m above sea level. Floral elements of this park and its neighboring areas Prenj, Čabulje and Vrana, who this circuit mountains in phytogeography inclusion in the so-called. "Endemic Herzegovina's development center", rich in endemic species that are present only in the mountains or in the zone of the Dinarides.

In addition to organizing and carrying out protection in protected areas in the manner determined by the said Act on the Protection of Nature, Law on Fire Protection also regulates the obligation of organizing and conducting preventive fire protection of natural, cultural and historical heritage, in accordance with the fire protection plan, which produces competent authority, legal person or other institutions which are given on the use and management of protected areas and cultural and historical heritage and who are responsible for the implementation and protection.

2.1.4.4. The conclusions of the proposed measures for overcoming the situation in the field of fire protection

1) Condition of organization and functioning of preventive fire protection, and ensuring conditions for development of preventive fire protection and fire-fighting in the municipalities / towns and cantons in the Federation of Bosnia and Herzegovina, can be assessed as unsatisfactory, primarily because it is very small number of cantons, municipalities / towns in the Federation of Bosnia and Herzegovina, for their area developed and adopted planning documents:

- Assessment of fire risk within the risk assessment of natural and other disasters Canton, municipalities / towns (three cantons[37] and 25 municipalities [38])
- Fire safety plan (one canton[39] and 12 municipalities[40])
- Development of plan of fire protection and fire-fighting within the development of protection and rescue of people property from natural and other disasters Canton / municipality (no Canton and 10 municipalities).

2) Application of the Law on Fire Protection, may generally be assessed as unsatisfactory, especially in the part relating to:

- The obligation of the subordinate legislation under this law (of a total of 52 pieces of subordinate legislation, the authorities have so far adopted 28 by-laws, which means that it is still 24 pieces of subordinate legislation required to bring);
- Obligation to adopt legislation in this area within the competence of the cantons, municipalities / cities (5 cantons adopted the laws, while the decision on the organization and functioning of fire protection and fire service brought 41 municipalities in the Federation of Bosnia and Herzegovina);
- Carrying out inspection in the field of fire protection and fire fighting (in the Federation of Bosnia and Herzegovina, as well as the cantons in the relevant ministries of Interior and administrations of civil protection, the majority have not completed inspection (inspectors, fire protection and fire-fighting inspectors).

[37] Una-Sana Canton, Canton Sarajevo and Tuzla Canton.
[38] Bosanska Krupa, Domaljevac- Samac, Gracanica, Lancaster, Doboj East, Gradacac, Kalesija, Kladanj, Lukavac, Sapna, Srebrenik, Vares, Zavidovici, Zenica, Maglaj, Tesanj, Kakanj, Gorazde, Travnik, Travnik, Jablanica, Konjic, Hadzici, Stari Grad.
[39] Tuzla canton.
[40] Bosanska Krupa, Gracanica, Gradacac, Kalesija, Vares, Zenica, Tesanj, Gorazde, Jablanica, Stari Grad and Hadzici.

3) Responsible holders fire protection municipality / city and Canton, and especially the rights of the holders of forest management and forest land, in order to reduce the number of killed and injured people from the effects of fire and explosion, the number of fires, burned areas and damage caused by those in property, it is necessary to make maximum efforts for more efficient organization and implementation of preventive measures for fire protection in closed, especially in open areas in the Federation of Bosnia and Herzegovina, in accordance with the applicable regulations in the field of fire protection and forestry.

The following indicators, reported in spreadsheets Annex No. 6 of this assessment, the best show how important it is in the Federation of Bosnia and Herzegovina, efficient organization and implementation of preventive fire protection measures to reduce exposure to risks of fire and explosions in the buildings and outdoors:

a) from the effects of fire and explosion, in the period from 2008 to 2013, were killed a total of 36 persons (out of which one child and one minor), injured 86 people (of which seriously injured two minors and one slightly injured child);
b) the consequences of the occurrence of 2,425 forest fires during the period from 2008 to 2013, according to data from the Federal Ministry of Agriculture, Water and Forestry, the total is in the Federation of Bosnia and Herzegovina, burnt surface of 56,793.11 hectares burned 873,921.94 m3 of wood mass and 1,082,684.00 pieces of seedlings, as well as material damage of 58,150,122.00 KM;
c) area of the Federation of Bosnia Herzegovina every year, especially in the period of 1.3. to 1.11., exposed to the high risk of the occurrence of large forest fires in the open air (the most endangered areas canton 7, 10, 8 and 4 - Herzegovina-Neretva Canton 10, West Herzegovina and Zenica-Doboj Canton, whose fire is, through the Ministry of Security of Bosnia Herzegovina, BH Armed Forces or assistance sought international assistance, and the use of aircraft for fire fighting from the air);

d) areas of Canton 7, 3, 4, 1:09 (Herzegovina-Neretva, Tuzla, Zenica-Doboj, Una-Sana and Sarajevo Canton), the most affected are at risk from the frequent occurrence of fires in the open space (the largest number of fires in the open air recorded in the listed cantons);
e) in the areas of Canton 7, 4, 1, 3 and 6 (Herzegovina-Neretva Canton, Zenica-Doboj, Una-Sana, Tuzla and Central Bosnia Canton), recorded the highest fire-affected areas.

4) the law that regulates the transportation of hazardous materials, has not been adopted or at the state level, nor for the Federation of Bosnia and Herzegovina,[41] which can affect the organization and implementation of all the necessary preventive measures to protect against fire and explosion during transport of hazardous substances (which includes the purchase, distribution, rental, sale and use in warehouses, warehouses and stores) and lead to increased exposure of people and property, the dangers and risks of fire and explosions and other accidents during transportation of hazardous materials in the Federation of Bosnia and Herzegovina (pollution and the like).

5) in order to ensure that the Federal administration of civil protection, the Federal Ministry of Agriculture, Water and Forestry, the Federal Statistical Office and other relevant authorities have the same or similar, not completely different data on the number of recorded fire in the open air and burnt areas in the Federation Bosnia and Herzegovina, as well as other data relevant to the field of fire protection, which are used for the appropriate statistical research, analysis, etc., it is urgent adoption of subordinate legislation in the Federation of Bosnia and Herzegovina, which will regulate this issue . These regulations should ensure the construction of a unified information system in the field of fire protection in the Federation of Bosnia and Herzegovina, which will provide a unique database in this area, and to be used by all those authorities as well as other bodies and institutions in accordance with its responsibilities .

6) in order to prevent the emergence of technological and other accidents, especially fires and explosions on the technical and technological plants and installations in indoor and outdoor spaces, as well as accidents involving hazardous substances that may endanger people and property, as well as

[41] The regulations in the field of transport and traffic of dangerous substances in the former Yugoslavia, that the Federal Republic of Bosnia and Herzegovina, 2012, the Federal Ministry of Interior carried out a draft law on the transport of dangerous goods.

facilities and areas in the vicinity of these facilities and space, it is essential that all holders of fire protection defined by the Law on Fire Protection in municipalities / cities and cantons in the Federation of Bosnia and Herzegovina:

a)make the necessary documents, plans and other documents in the field of fire protection (Regulations on fire protection, fire risk assessment, fire safety plan, programming development of fire protection and fire-fighting)
b) for design and construction, consistently applied regulations providing adequate fire protection of buildings and spaces,
c)organize, plan and implement appropriate continuous consistently implemented preventive measures for fire protection in buildings and spaces, which are established in these regulations, planning documents, technical and other regulations in the field of fire protection,
d)establish internal control and supervision of the implementation of executed preventive measures for fire protection in buildings and spaces.

This means that it is necessary that public authorities and institutions, companies, legal entities, owners and users of forests and forest lands in private and state-owned, commercial properties and space where there is flammable, explosive and other dangerous substances, and other structures space for various purposes, continuously organize, plan and implement appropriate:

a) organizational, technical, technological and other preventive measures for fire protection, especially the strict prohibition of introduction or use sources of ignition (open fire, electric spark, mechanical spark, unquenched butt and others), which prevents (off) each contact flammable and explosives with a source of ignition,
b) internal control and supervision of the implementation of the above preventive measures for fire protection,
c) professional training in the field of fire protection[42], through which the employees of the legal entity / business organization, the administrative body or other institution, learn about the physical and chemical properties of flammable, explosive and other dangerous substances, which are used in certain technical and technological process and with all the necessary preventive measures for fire protection that need to be applied when working with such substances in buildings and spaces,
d) educational activities to increase awareness about the development of personal and reciprocal protection of the danger of fire and explosion in citizens, in places and spaces where they live and work,
e) other prescribed preventive measures for fire protection.[43]
7) the lack of legislation in the field of forestry in the Federation of Bosnia and Herzegovina which, inter alia, should be regulated in the conservation of forests and forest lands, including the protection of forests from fires, adversely affect the organization and implementation of all the necessary preventive measures to protect forests from fire, and conduct inspection in this area, that directly results in an increase in exposure to the dangers of fire in forests and on forest land in the Federation of Bosnia and Herzegovina.
The following figures confirm the importance of the Federation of Bosnia and Herzegovina to organize and carry out the necessary preventive measures to protect forests from fire, as well as carry out inspections in this area:
a) the most common cause of occurrence of forest fires are human negligence actions during the incineration of waste, and when spring and autumn cleaning of arable land;
b) individual forest fires had been caused by intentional, in order to conceal illegal acts appropriate in terms of harvesting and use of forests;
c) the documented footage from one of the fire endangered forest areas found it incomprehensible behavior of the competent Cantonal Forestry, because she did not stop felling and removal of forest range during the fire fighting activities in the area (that has involved the fire departments from other municipalities, even when is a danger to the life of people who just put out fires);
d) in the Federation of Bosnia and Herzegovina, are evident phenomenon of forest fires, which are not detected and report at an early stage, localized or not shutting down our own efforts and resources within WCQD's;

[42] The regulations in the field of transport and traffic of dangerous substances in the former Yugoslavia, that the Federal Republic of Bosnia and Herzegovina, 2012, the Federal Ministry of Interior carried out a draft law on the transport of dangerous goods.
[43] at least once every two years in accordance with Article 128 of the Law on Fire Protection

e) the perpetrators of arson usually are not detected and prosecuted, and their lack of or non-maintained forest roads and paths, as well as insufficient enforcement of preventive measures for fire protection as specified in the plans for the protection of forests against fire, as well as the Law on the Protection of fire, a small forest fires usually result in large fires that can not be brought under control without deploying large forces and means at their disposal PVJ and DVJ in the affected area, and finally, the use of air power provided by the Armed Forces of BH or other countries of Bosnia and Herzegovina provide international help in extinguishing large forest fires.
8) Although most WCQD a developed and adopted plans to protect forests from fires in their area (in accordance with the regulations in the field of forestry, which were not in force), the state organization and implementation of all the necessary preventive measures for fire protection[44] accordingly plans is insufficient and unsatisfactory.
9) Risk assessment of the Federation of large forest fires (identifying areas of cantons that are the most vulnerable, that is most exposed to the dangers of fire in the open air), it is still not possible to fully ascertain the reason, which is indicated, in addition to parameters such as the number and size of fires burned areas, it is necessary to take into account the established level of forests from fire and environmental value of forest ecosystems, or the parameters used for assessing and determining the direct and indirect damage to the areas affected by the cantons (desolate) the consequences of the fire.

This will be possible after the competent authorities in the field of forestry, in the area of Canton and the Federation of Bosnia and Herzegovina, determine the degree of vulnerability of forests against fire that will appear in the overview map, on which to make an overview map of forests from fires in the area of the Federation of Bosnia and Herzegovina.

10) Considering that the occurrence of forest fires in Bosnia and Herzegovina, ie the Federation of Bosnia and Herzegovina brings tremendous damage, there is a need for their evaluation. Economic evaluation of damage related to the forest is an essential element for their protection and sustainable management. The vision of sustainable management is possible to build and correct ecological standpoint aimed at reducing the cost of reconstruction and maximizing the benefits derived from the natural flow of services, through the activities of preventive protection of forest ecosystems.

11) At the organization and functioning of preventive fire protection in protected areas and cultural heritage in making this assessment could not be determined because of the competent Federal Ministry are not submitted the data on which it is possible to determine whether the competent authorities in the field environmental protection, and developed plans for the fire protection of protected natural areas and cultural heritage, such as the degree of organization and implementation of preventive measures for fire protection in these areas, whether they formed their own forces for fire fighting, and that you spend more protection measures.

To overcome the established situation in the field of fire protection and fire service is needed:

1. What urgent to implement activities which the Government of the Federation, the Federal administration of civil protection and relevant ministries to ensure the development and adoption of those implementing regulations established by the Law on Fire Protection, which have not been adopted.
2. As soon as possible to pass a law that would regulate the transportation of hazardous materials in the Federation of Bosnia and Herzegovina.

3. As soon as possible carry out activities aimed at deployment of inspectors, fire protection and fire-fighting inspectors in the Federal administration of civil protection and Cantonal administrations of civil protection and fire protection inspectors in the Federal Ministry of Internal Affairs and Cantonal ministries of interior, in order to implement inspection supervision to ensure that all holders of fire

[44] Technical, preventive-breeding and other measures prescribed by the Ordinance on the content of the plans for the protection of forests against fire ("Official Gazette of BH", No. 21/04), which in particular forest area under its management, must implement WCQD and supervision of the implementation of these measures .

protection intensively conducted all necessary activities in the implementation of the Law on Fire Protection.
4. In the framework of the Program of development of protection and rescue from natural and other disasters in the Federation of Bosnia and Herzegovina for the next period, which passed by the Parliament of the Federation of Bosnia and Herzegovina on the basis of the Law on Protection and Rescue, to determine issues relating to the Development Planning of fire protection and Fire Service in the Federation of Bosnia and Herzegovina.

5. When making assessment of fire risk within the risk assessment of natural and other disasters and fire protection plans for the municipalities / towns and cantons, among other things, to determine the required number of professional firefighters in PVJ but DVJ and volunteer firefighter in areas municipalities / towns and cantons, in addition to the status of professional firefighters dealt with the status DVJ and volunteer firefighters, in accordance with the law.
6. For filling PVJ professional firefighters in the cantons, municipalities / city, take account of the need of rejuvenation composition PVJ in those jurisdictions where the age structure is unfavorable. The same applies to the filling personnel who have completed level VII.
7. In cooperation with the Federal Ministry of Education and Science / Science and Cantonal ministries responsible for education appropriate to regulate the issue of schooling for the "interest firefighter" in the Federation of Bosnia and Herzegovina. This means that it is necessary to determine a number of secondary schools in the Federation of Bosnia and Herzegovina in which the third and fourth year students performed the education of "occupation firefighter" or allow retraining persons with secondary education in the technical field for the "occupation fireman" . In this way long term to establish a system of vocational training of young people for fire-fighting in the Federation of Bosnia and Herzegovina, ensuring their employment and rejuvenation of the age structure in PVJ's.
8. Implement activities on amendments to the Law on Fire Protection, including in the part relating to the effective provision of additional financial resources for the needs of the fire service, to ensure the necessary conditions for the efficient collection of these funds, which will, with funds provide in the budgets, cantons and municipalities / city will be sufficient for high-quality furnishing PVJ and DVJ's vehicles and other necessary equipment.
9. Implement activities on amendments to the Law on Fire Protection, including in the part referring to the obligation to WCQD-and create their own fire-fighting units for the areas under its management.
10. intensify activities on the implementation of the by-laws established by the Law on Fire Protection, referring to the obligation of continuous professional training, training and conditioning of professional firefighters in PVJ in the Federation of Bosnia and Herzegovina.
11. Conduct follow-up activities on the implementation of the Conclusion[45] of the Government of the Federation of Bosnia and Herzegovina adopted at the session held on 14.06.2011. year, after accepting the study "Fire fighting open spaces of the Federation of Bosnia and Herzegovina using the air force," in which, among other things, established the required number and type of aircraft (Air Tractor AT-820F version of the Fire Boss, helicopter), for the Federation Bosnia and Herzegovina, which will be used for extinguishing large forest and other fires in the open air, or transport-transport firefighters and evacuation of endangered people and property in the rescue operations.
12. Implement appropriate training for the training of the competent authorities of municipalities / towns and cantons and civil defense, which will be achieved through consistent application of the provisions of the Fire Protection and by-laws, which is determined by the mechanism of action and the competent authorities in terms of the increased risk of major forest and other fires, especially when making a request for assistance in extinguishing the fire, by the competent authorities within Bosnia and Herzegovina, the Federation of Bosnia and Herzegovina, BH Armed Forces or international assistance (search for international assistance through the Federal administration of Civil protection administration and the Ministry of Security of Bosnia and Herzegovina).

[45] To send a proposal to the Council of Ministers through the Ministry of Security, the Government of the Republic of Srpska, the Government of Brcko District of BH and entity governments civil protection, to analyze and upgrade of studies, with the aim of extinguishing the open space of Bosnia and Herzegovina and after that, negotiations procurement of six airplanes ,, Air Tractor, version AT-820F Fire Boss "for extinguishing open spaces and a helicopter for transport-transport firefighters and evacuation of endangered people and property in the next three years. These amounts would be ceded OSBH with adequate infrastructure for maintenance and disposal of the same, as well as trained flight crews, which would be re-qualified management and these aircrafts.

13. To overcome the established situation in the protection of forests against fire is necessary that the competent authorities in the field of forestry:
- Intensify the urgent adoption of the Law on Forestry in the Federation of Bosnia and Herzegovina and regulations in the field of forestry and then spend an intensive inspection of the application of these regulations;[46]

- Determine the degree of vulnerability of forests against fire in the area of each canton, making general maps of forests from fire for each canton, on which to make an overview map of forests from fires in the area of the Federation of Bosnia and Herzegovina, for the purposes of determining integrated assessment of fire risk areas Federation of Bosnia and Herzegovina;
- Organize, plan and continuously implement appropriate preventive measures to protect forests from fire, especially the strict prohibition of introduction or use of ignition sources in the forests or near forests (which also applies to protected areas and cultural and historical heritage), as well as internal control and supervision of the implementation of the above measures for fire protection;
- Through print, electronic and other media continuously inform citizens about the prescribed preventive measures to protect the forest from fire hazards associated with the occurrence of forest fires and the consequences for people and property, as well as the criminal provisions applicable to non-compliance and the perpetrators of arson;
- Appropriately, continuously indicate the forest areas of appropriate markings ban burning open fire and other actions are prohibited in forests and on forest land in order to protect forests against fire;
- In cooperation with the competent authorities in the field of education, jointly carry out the necessary optimization of curricula in secondary forestry schools and colleges, and incorporated into forestry education system, and the importance of prevention measures against forest fires, because forest fires as one of the most important problems in forestry in Bosnia and Herzegovina, ie the Federation of Bosnia and Herzegovina, and they do not have adequate treatment in forestry education in Bosnia and Herzegovina, ie the Federation of Bosnia and Herzegovina;
- In cooperation with the competent authorities of civil protection (Cantonal administrations and civil protection municipality / city), carry out activities on the harmonization of risk assessment and fire protection plans that are made for individual cantons, municipalities / towns with the assessment of threat and plan for the protection of forest Fire that prepare and adopt WCQD for area under its management, to ensure the necessary coordination of all holders of fire protection in terms of extinguishing large forest fires;
- Continuing to implement appropriate technical and other activities that will point to the importance of quality to draw up annual plans for the protection of forests against fire, and the consistent implementation of all the necessary preventive measures to protect forests from fires set forth in these plans;
- Plan and provide funds for the purchase of the necessary software and equipment for monitoring forest fires in Bosnia and Herzegovina, with the aim of introducing the latest technologies for the early detection of smoke in the open air (FIRE WATCH system) which has already been tested in some countries of Western Europe. This system allows the daily monitoring of the occurrence of forest fires for quick action in terms of stopping the further spread;
- Carry out breeding technical and other protective measures when erecting new forest plantations - culture, where it is necessary to take into account the resistance of some kind to fires, to plan the construction of roads and average build trap, the pool water and the other;
- In cooperation with the competent authorities of civil protection (Cantonal administrations and civil protection municipality / city), carry out activities aimed to provide funds for the purchase of specialized fire-fighting vehicles for extinguishing forest fires in PVJ or DVJ in the municipality / city or canton, and determine the actual need for an adequate number of

[46]Substantive law and subordinate legislation in the field of forestry ruling by the Constitutional Court of the Federation, from the end of 2011 were put out of force making it impossible legal basis and mechanism to implement preventive measures to protect forests from fire, emergency equipment group of workers and protection services Fire, conduct inspection and penal provisions, which greatly contributes to increasing fire risk when it comes to forest fires, and increase the risk of occurrence of a fire in the open air.

professional and volunteer firefighters professionally trained for fighting forest fires, especially in cantons, municipalities / city in which large areas of forests and forest lands that are classified in the I or II degree of vulnerability of forests against fire.

14. For the reasons which proved that WCQD are not efficient that its own efforts to extinguish the fire in the areas under its management, it is necessary to amend the existing provisions of the Law on Fire Protection, or to determine the obligation to WCQD must establish its own fire brigade for extinguishing forest fires in the area under its management.
15. To overcome the established situation in the area of protected natural areas and cultural and historical heritage of the fire, it is necessary that the competent authorities in the field of environment and tourism, access to emergency preparation and adoption of plans for fire protection of protected natural areas and cultural heritage organize and implement preventive measures for fire protection in these areas, the establishment of internal control over the implementation of these measures and create their own power for firefighting.

2.2. Demolition or overflow dams on reservoirs

2.2.1. The possibility of dam failure and the question of risk

Dam demolition can happen in cases of catastrophic earthquakes (in seismically unstable areas), then the other, estimates of the unstudied cases (subsequent subsidence, losing constructive and load-bearing properties of the soil (in the area of dams and reservoirs) in the war.

Specifics of large dams as objects of general interest and of whose lives depend safety of people and the economy of the entire downstream area, demand that the construction of these facilities must be carried out with complete certainty to the exclusion of any risk. The issue of the safety of high dams and reservoirs is gaining increasing importance and because of the psychological moment, which is specifically expressed in the population downstream regions of large water reservoirs.

Tidal wave generated dam failures grows gradually. Demolition may not be current width of the entire dam (whether it is clay, concrete, or facilitated massive, monolithic or in blocks - segments), but gradually, piece by piece, so that the total amount and the volume of water flowing out through the openings gradually increases. Since the beginning of leaks to the maximum pass some time, mainly, long enough that it can alert people to evacuate downstream.

In the calculation of the dam required to be counted and the consequences arising as dam demolition. Similar or even more serious consequences can occur if the use and management of reservoirs does not take place strictly according to plan and organized (the Neretva valley, December 1999). Such cases arise when you do not know the forecasting hydrological regimes of the process of accumulation and it does not adjust the discharge plan. In these cases, the water level in the reservoir should be such that it can be promptly and smoothly accept the waves of high waters or execute the transformation of water waves.

If management (discharge) accumulation is not in line with the emergence of large water catchment reservoirs or used in accordance with downstream capacity of riverbeds, may be forced overflow of excess water and creating a flood wave downstream, which can have unfavorable effects than those caused by demolition dam.

In high dams that exist in Bosnia and Herzegovina: Bočac, Visegrad, Grnčarevo, so far there were no major incidents to suggest significant danger. In the Federation of Bosnia and Herzegovina have been two cases of damage to the HPP Mostar (1995) and Jajce II (1996).

2.2.2. Application of regulations, rules and technical norms regarding the dams

However, bearing in mind that in the time to build more dams on the river basins: Vrbas, Drina, Trebisnjica, it poses a risk of dam. In view of the seriousness of the problems in the application of the relevant regulations:

- Technical regulations for projection and dams;
- Guidelines for technical surveillance of high dams;
- Regulation on technical norms for seismic observation of high dams.

In order to protect the population and property, particularly downstream of large dams and reservoirs for which there is a potential threat, requires a consistent application of the applicable: "Technical regulations", "instructions" and "Regulations" that define:

- Physical (reconnaissance: visual and optical instruments) observation;
- Geodetic observations;
- Seismological observation.

For the area of the reservoir and the area immediately around the future needs before the dam design and construction define the conditions and phenomena related to all types of dams, as follows:

- Climatological phenomena;
- Hydrological phenomena;
- Seismic phenomena.

In order to timely intervention of the possible incidental risk of dams and reservoirs is necessary to organize continuous physical, surveying, seismic, climatological, hydrological observations and measurements and carry out permanent analysis and interpretation of the results and compare with the design parameters.

2.3. Accidents involving hazardous substances

Wildfires, expansion of toxic gases, spills of toxic substances, the explosion of explosive mixtures that produce gases, flammable liquids or combustible dust particles and the like, are the accidents that may occur when working with hazardous materials or during transportation of hazardous substances, in certain circumstances suddenly and in a very short time, can grow into a technical-technological or other disaster.

Hazardous substances due to their combustible, flammable, explosive, radioactive, corrosive , poisonous or other negative characteristics, depending on the type of dangerous substance that is present in a certain area, always a potential threat to the lives and health of people and damage or destruction of property, and threats to the environment, due to the devastating, thermal or physiological effects.

If there is regular implementation by appropriate preventive safety measures when working with hazardous materials or during their transport, to achieve an appropriate assumption that exposure to the above risks greatly reduce, but never in its entirety can not eliminate all potential causes, which in certain circumstances can lead to the occurrence of the above accidents that can grow into a technical-technological or other disaster.

The consequences of which would cause in the case of an uncontrolled expansion of gases, spills of toxic substances and other accidents with fenced substances, could endanger the lives and health of employees at the site of the accident, but also the local population, cause damage to or destruction of tangible goods in the wider area, and certain environmental contamination (earth, water, air). Number of killed and injured people, damage to material assets and the environment would depend on many factors (intensity of the accident, the type of dangerous goods, number of employees, population density, strength building, etc.).

In the past five years, there were no accidents involving hazardous substances large scale and intensity, which grew into a large technical-technological and other accidents in which people have, killed or injured many people, cause major damage to property or the environment.

However, in locations where there are hazardous materials always an increased risk of exposure to the danger of possible accidents involving hazardous substances that are to be and prepare for possible intervention in the protection and rescue of people, property and the environment.

Currently in Bosnia and Herzegovina there is no single database of all areas of sites that contain hazardous substances (Class I hazardous substances[47] and their amounts), nor the fire departments and other emergency and rescue formed in the Federation of Bosnia and Herzegovina, qualified for intervention to neutralize the harmful characteristics of the dangerous substances in the event of an accident or technical, technological and other disasters.

Accidents which may occur during the expansion toxic gases or uncontrolled spillage of certain classes of dangerous substances, may be caused by fires, traffic accidents, earthquakes and other natural disasters (floods, fire, demolition or overflow dams on streams and reservoirs, landslides and landslides, snow applied and avalanches). It should be noted the so-called. The human factor as one of the potential causes of the aforementioned accidents (ignorance, negligence, failure to implement the prescribed measures of protection when working with hazardous substances as a result of acquired routines, etc.).

Important activities in this field have the appropriate risk assessment and getting to know the kind of potential risk in the event of an accident with dangerous goods in a certain area, the establishment of an appropriate system for informing the public in order to be able to implement appropriate and effective measures to protect the lives and health of people and property in the event of accidents , establishment and equipping of the forces that could be used for the protection and rescue of people and property, and were trained to neutralize hazardous substances.

2.3.1. Pipeline natural gas transportation system of Bosnia and Herzegovina[48]

Bosnia and Herzegovina does not have its own deposits of natural gas, and all quantities imported from Russia via transportation systems of Ukraine, Hungary and Serbia. Currently there is only one entrance of gas to Bosnia and Herzegovina and in Sepak near Zvornik.

The first consumer of natural gas was Alumina Factory "Birac" Zvornik, 1979. That same year completed the construction of a gas pipeline Zvornik - Sarajevo, and the city of Sarajevo is connected to the gas network. Then, in 1983, built the pipeline Semizovac - Zenica, and started natural gas consumption in the Steel Zenica.

The main features of natural gas transportation system in Bosnia and Herzegovina are:

Designed pressure:
The designed capacity of the system:
Transport capacity:
The division of capacity between the RS / FBH:
Length of the pipeline:
Diameter pipeline:
The wall thickness of the pipe:
The quality of the material pipes 50 bars
1.25 billion Sm3 / year.
750 million Sm3 / year.
40/60
195 km
406.4 mm (Ø16 ")
6.35 mm

[47] Class 1 - explosives and items containing explosive substances, Class 2 - Gases, Class 3 - flammable liquid, Class 4 - oxidants and organic peroxides, Class 5 - flammable solids, Class 6 - toxic and infectious substances, Class 7 - radioactive substances, Class 8 - corrosive substances and Class 9 - Other dangerous substances.
[48] Information of the Federal Ministry of Energy, Mining and Industry

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The pipeline was designed and built to ANSI B31.8 regulation; steel pipes are factory pre-insulated with polyethylene, and the whole system is covered by cathodic protection. BH Gas (in the Federation of Bosnia and Herzegovina) controls the length of the gas pipeline of 135 km.

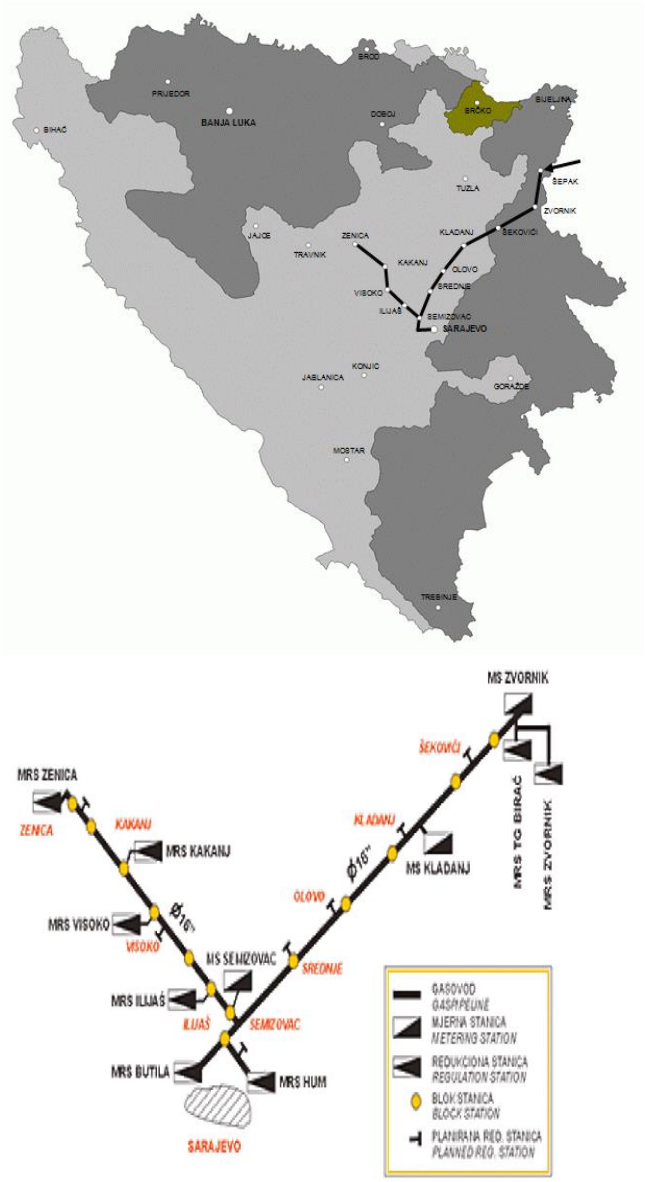


Figure 2.3.1. The scheme of gas pipeline transport system of Bosnia and Herzegovina

2.3.2. Natural gas consumption

In 1990 natural gas consumption in Bosnia and Herzegovina was approximately 610 million m3 with a constant growth trend. In the years immediately after the war, the consumption ranged from 150 -200 million m3, which is mainly a result of failure of the war-ravaged industry. In recent years, consumption has grown significantly and ranges from 300D 380 million m3.

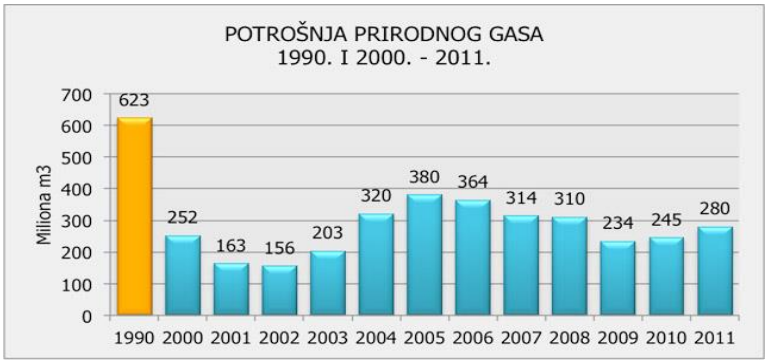


Figure 2.3.2. Natural gas consumption

Figure 2.3.2.1. The percentage share of the industrial sector and consumer

2.3.3. The structure of consumption

In the pre-war period, the structure of the natural gas consumption of Bosnia and Herzegovina industry was represented by approximately 85%. After the war, this ratio has changed in favor of a distinct sector of consumer and central heating systems, while the industrial consumption is very unstable due to frequent delays in production and an increase in gas prices.

2.3.4. Seasonal variations in natural gas consumption in Bosnia and Herzegovina

Changes in consumption patterns in Bosnia and Herzegovina, i.e lower consumption in the industrial, and the rise in the consumer sector, has led to the emergence of pronounced seasonal variations.

The change in consumption structure, ie lower consumption in the industrial and growth in the residential sector has created strong seasonal disparity. Need to be smoothed fluctuations through the obligation to pay for the unused capacity in the summer, or to purchase additional quantities in winter.

Seasonal demand is given as the average value of consumption in the period of last five years, that would have nullified the impact of changing consumption of industrial consumers, due to frequent delays in their production processes.

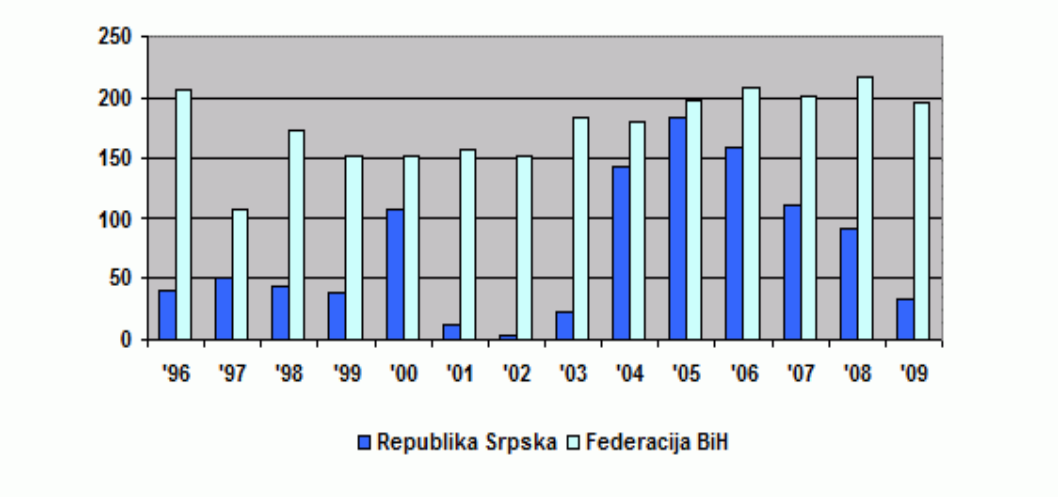


Figure 2.3.4. Seasonal variations in natural gas consumption in Bosnia and Herzegovina

2.3.5. History of using natural gas in Bosnia and Herzegovina

The initiative for the introduction of natural gas in Bosnia and Herzegovina launched a strategic decision of the city authorities of Sarajevo on gasification of urban areas in order to improve air quality. The rapid industrialization, air pollution in the city of Sarajevo sixties and seventies took on a very dramatic dimensions, with the possibility of severe consequences.

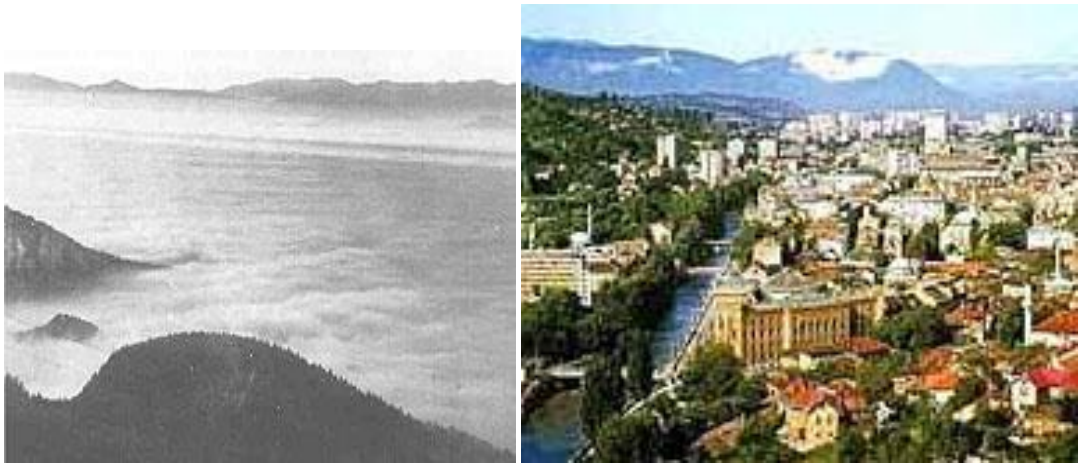


Figure 2.3.5.1. Sarajevo before gasification **Figure 2.3.5.2. Sarajevo after gasification**

Bosnia and Herzegovina does not have its own deposits of natural gas, and is dependent on imports of energy. At the time the decision is an optimal solution which was to completely supply with imports from Russia.
The decision on the construction of "Energoinvest" Factory Birac in Zvornik, that is, the commitment of the plant to use gas in the production process in this direction of ensured supply is another major consumer.
The project was funded by the World Bank, and the gas pipeline from Batajnica to Sarajevo as well as the distribution network in the city.
First the activities on realization of the project led by the company "Energoinvest Sarajevo "and" Petrolinvest "so, that " Energoinvest "led the main gas pipeline to Sarajevo. "Petrolinvest" was the main architect, and the Dutch company "HAK" contractor.

"Unioninvest Sarajevo" was the leader of all the works on the realization of the city's distribution network and all related facilities.
The creditor had already since 1976 conditioned the presence of foreign consultants from Western European countries, so the task of the main gas pipeline company performed the company "Sofregaz" in Paris, and the city distribution network "Netherlands Gas Union".
The first consumer of natural gas was the factory "Birac" Zvornik in 1979. That same year the construction of a gas pipeline was completed Zvornik - Sarajevo, and the city of Sarajevo is connected to the gas network.
Then, in 1983, built the pipeline Semizovac - Zenica, and started natural gas consumption in the Steel Zenica.
The path of natural gas from large natural gas deposits in the far Siberia in northern Russia to the end users of the approximately 5,000 kilometers long, and goes through Ukraine, Hungary and Serbia and Montenegro, and Bosnia and Herzegovina and enters in Sepak near Zvornik.

Figure 2.3.5.3. Path of gas from Siberia to Bosnia and Herzegovina

2.3.6 Summary of natural gas

Natural gas is a naturally occurring mixture of hydrocarbons and other gases in the porous formations of the earth's crust is often found together with crude oil. The main components of most natural gas as methane and other hydrocarbons, and lower content of chemical elements consisting of the compounds such as N2, CO2, H2S, Hg and O, and H2O.

Commercial natural gas generally contains 80 - 95% methane, and is often called methane, chemical formula CH4. Also in daily use name natural gas is used.
Free natural gas is produced from gas and gas-oil deposits, drilling in the bowels of the earth to the depth usually greater than 1,000 meters, where there are old deposits of hundreds of thousands of years.

2.3.7. Prescribed quality of natural gas

After pumping leads to the earth's surface, natural gas is cleaned of impurities such as water, other gases, residues of oil and mechanical impurities, to give the boundaries of the prescribed quality.

After purification, natural gas is transported by pipelines of large diameter consisting of compressor stations, storage, metering and regulating stations to radio stations and then transported to distribution systems to end users.
Purified natural gas is lighter than air, colorless, odorless and tasteless. For safety reasons, before it actually reaches the end user, especially in the distribution system, odorization of natural gas is done, a process in which natural gas is added to certain additives in order to have a distinctive smell.

Depending on its quality, the basic characteristics of the thermal energy of natural gas range within the following limits:

- Wobbe index W = 44.6 to 54.0 MJ / m3
- Upper heating value Hg = 30.2 to 47.2 MJ / m3
- Calorific value Hd = 27.2 to 42.5 MJ / m3
- Relative density d = 0.55 to 0.75 kg / m3 N
- Ignition temperature T = 595-640 ° C

In the field of the use of gas as a fuel in the protection system are evident certain legal ambiguities that must be upgraded, in order to implement measures to protect people and property.

2.3.7.1. The combustion of natural gas

For complete combustion of a unit volume (1m3) of natural gas should be approximately 2m3 of oxygen.

Natural gas burns without smoke, without any soot and ash created. Also, the combustion products no sulfur dioxide or carbon monoxide, and combustion does not cause air pollution.

2.3.8. Findings

- Gas appliances must be serviced, or serve only service technicians authorized by the manufacturer built-in gas equipment.
- Replacement of defective parts must be made with new original parts for which it has been awarded the certificate.
- It is necessary to urgently introduce the service at least once a year inspection of gas water heaters and consumer spending not only significant gas boiler. During the service inspection in compliance with the Law which regulates air quality, it is necessary to carry out measurements of pollutants and combustion in order to preventively could intervene to "contaminants" were implementing regulation or parts replacement appliances plant.
- In addition to the required annual service inspections of boilers it is necessary to carry out and control the buoyancy of the flue gas system.
- All inspections and preventative work must be accompanied by certain records and documents on evaluation of condition and measures to be taken.
- Provide the necessary conditions and measures for the safe handling of hazardous materials in the manufacturing and transport, storage or depositing and destroying hazardous materials in the Federation of Bosnia and Herzegovina.
- Provide professional staff and equipping of all objects chemical, petrochemical, pharmaceutical industry and others., Technical means for automatic fire alarm, detectors for explosion, stable fire extinguishing installations, means of personal and collective protection.

2.4. Radioactive and other contamination of air, water and land

The system of control over the sources of ionizing radiation, protection of the people present and future generations and the environment from exposure or potential exposure regulated by the Law on

Radiation and Nuclear Safety in Bosnia and Herzegovina ("Official Gazette", No. 88/07) (hereinafter: the Law the Radiation and Nuclear Safety in Bosnia and Herzegovina) and the regulations issued on the basis of this law.

The law provides protection against ionizing radiation-radiation and nuclear safety of the citizens of Bosnia and Herzegovina by:

- The establishment and implementation of a system that will enable the development and use of ionizing radiation in accordance with the requirements for protection of human health and safety,
- The establishment and maintenance of a regulatory program for sources of ionizing radiation and thus ensure compatibility with international standards on the safety of radiation sources and for protection from ionizing radiation,
- The establishment of national regulatory bodies for Radiation and Nuclear Safety with the corresponding series of functions and responsibilities, and resources needed to establish regulatory control.

The law prohibits the possession of radiation sources and carrying out activities with radiation sources without having the approval of the competent state body subject to prior approval for the purchase of the radiation source from the national regulatory body.

The primary responsibility for the safety of radiation sources borne by the licensee and registrant. The licensee is responsible for the safe management of radioactive waste generated in the performance of activities using radioactive sources. The licensee and registrants at the request of a regulatory body or on its own initiative submitted information related to activities with sources of ionizing radiation.

On the basis of the said Act for administrative and technical tasks in the field of ionizing radiation formed the State Regulatory Agency for Radiation and Nuclear Safety (hereinafter: the Agency). Agency performs regulatory control of the safety of radiation sources, radioactive waste safety and security of transportation, defines a set of measures to mitigate the consequences of a nuclear accident in the region that may have an impact on Bosnia and Herzegovina. The set of measures entails plans of evacuation and accommodation of population, decontamination and other measures of intervention.

In accordance with the law, the Agency is authorized to define the exposure radiation is excluded from the scope of the regulations on the basis that it is not subject to regulatory control; establish and implement a procedure for notification, authorization, inspection and enforcing regulatory requirements; take appropriate measures in the event of radiological emergencies and nuclear incidents; establish and maintain the State Register of sources of ionizing radiation and persons exposed to ionizing radiation, as well as the licenses issued; to take the necessary measures for the security of radioactive and nuclear materials in cooperation with relevant government agencies and to seek out other competent authorities to carry out continuous control within the state in order to detect sources that are not under regulatory control.

Pursuant to the Regulations on the categorization of radiation threats ("Official Gazette", number 102/11) in Bosnia and Herzegovina are categorized radiation threat in five categories in accordance with international standards:

Table 2.4. Radiation threats

Radiation threat categories	**radiation facilities**
I	in which the formation of the radiation emergency can lead to severe deterministic effects to individuals outside the scene
II	in which the formation of the radiation emergency could result in doses that require taking urgent protective measures outside the scene
III	in which the formation of the radiation emergency could result in doses or contamination that it requires urgent protective measures at the scene
IV	facilities, activities with sources of ionizing radiation and ionizing radiation, which can cause a nuclear or radiological emergency resulting demand and take immediate protective measures in the unpredictable place
V	activities that do not involve ionizing radiation sources, but whose products are likely to be contaminated as a result of radiation accidents in the facilities of the radiation threat categories I and II

I and II category of radiation threats

According to this categorization in Bosnia and Herzegovina there is no threat of radiation from the categories I and II, and in Bosnia and Herzegovina has no facilities and has not carried out activities which are likely to severe deterministic effects in individuals outside of the scene, or that cause dose in individuals outside of events that require urgent conservation measures, according to the regulations for protection against ionizing radiation and radiation safety.
Although Bosnia-Herzegovina does not have any nuclear power reactors on its territory, in the region are located at a distance of between 400 and 600 km three power plants: plant in Slovenia, Paks in Hungary and Kozloduy in Bulgaria. In case of damage or any other excessive releases of radioactive materials to the environment from these nuclear power plants, but also more distant, there is a vulnerability of public health and contamination of food and water.

Public Health Institute of the Federation of Bosnia and Herzegovina and the Institute of Public Health of the Republic of Srpska perform regular measurements of ambient gamma dose and by 11 MFM gamma probe. Also assess the effective dose to the population from entering the radioisotope cesium-137 and strontium-90.
Monitoring includes the measurement of radioactive isotopes in the soil, drinking water, river water, human and animal food. Measurement of the absorbed dose in the air are regularly measured and TL dosimeters.
Results of monitoring and recording any changes in both natural and artificial radioactivity in the environment shows that the current situation is unsatisfactory.

Category III radiation threats

In Bosnia and Herzegovina there are objects in carrying out activities with radioactive sources from category 1 to 5 radioactive sources, with possible occurrence of dose in individuals at the scene or contamination of events that require the taking of urgent measures to protect the scene.
For example, in Bosnia and Herzegovina, there are departments for radiotherapy using sources from Category 1, 3, 4 radioactive sources, although such units are available for carrying out activities with radioactive sources youngest competitors, 1 there is no likelihood of severe deterministic effects outside the scene (outside the establishment).
Through a system of licensing and inspections checked the safety of sources of ionizing radiation and the measures to be taken in the event of hazards through detailed plans in the event of extraordinary danger and regular training of personnel at home and abroad.

Category IV radiation threats

In Bosnia and Herzegovina there are activities that use sources from categories 2, 3, 4 and 5 of radioactive sources, in addition to this category include the following threats: satellites with dangerous

sources of ionizing radiation, transport of radioactive materials in quantities that could be dangerous if not controlled, the existence of more than 300 lightning rods with installed radioactive source in Bosnia and Herzegovina. Radiological hazards of radioactive sources that are not located in one place can cause vulnerability of both individuals and communities. Radioactive sources that are licensed are unlikely threat, even those in transportation, as opposed to those that do not know the owner or have been deliberately or accidentally introduced into the country through illegal transport.
Accordingly, in this category are facilities where there is a significant likelihood of a serious sources that are not under control, such as facilities for processing metal waste and granite transitions, and the possibility of terrorist threats or criminal activity with radioactive material in the territory of and Herzegovina, for example the use of devices for dispersing radioactive material.
For example, stationary detectors at the entrance of the old iron "ArcelorMittal in" Zenica prevented that in the processing of scrap metal found radioactive source, but in Bosnia and Herzegovina have not yet installed detectors at railway border crossings, so there is a real possibility to find and what is happening, radioactive material in scrap metal coming from the outside.

To mitigate the effects of the presence of radioactive material of unknown origin is necessary equipment of adequate equipment which handlers trained employees and continuous training of all employees at border crossings, warehouses, transport.

In the category V of radiation threats
In category C radition threats is one of the threat of radioactive contamination resulting from transboundary release of radioactive material as a result of a nuclear accident in another country and the possible import of contaminated food and other products in the territory of Bosnia and Herzegovina.
The present state of organization and realization of these, especially preventive care in the field of protection against ionizing radiation is not appropriate, or at the level of real possibilities. The Agency is in the process of drawing up the national action plan on emergency health protection against ionizing radiation in the event of emergency, nuclear accident or occurrence of nuclear damage.

The said plan shall be determined by measures of protection and rescue of the population and the holders of these measures and operating procedures, in order to establish a basis for preparedness and effective response of the state and its institutions at all levels of the organization to radiative extraordinary event. The plan is complementary to and compatible with the plans of protection and rescue entities and Brcko District, as well as the plans of other institutions and bodies in Bosnia and Herzegovina that are important for radiation protection and nuclear safety.

The absence of this plan and its manifestation in the event of an accident would lead to severe consequences for the population and property.

Present problems in the functioning of ionizing radiation is reflected in insufficient adequate and incomplete information to the public about the activities and effects of ionizing radiation and the protective measures that can be undertaken in case of accidents. A significant problem is the lack of coordination between entities that have to implement protection measures, starting with the line ministries (Health, Agriculture, Water and Forestry, Spatial Planning and Environment), and inadequate equipment in structures that are formed in response to radiative extraordinary event.

The causes of the phenomena that can lead to vulnerability the Federation of Bosnia and Herzegovina to ionizing radiation:

1. peacetime and war damage to nuclear reactors, power plants and other nuclear installations;
2. the use of nuclear weapons in a possible war.

2.0.1 Peacetime and war damage nuclear installations

Possible damage to nuclear facilities in the individual countries would have an impact on endangering the environment and in other countries. Safety of nuclear power plants is to take great care, and the risks to try to reduce to the smallest possible measure. However, past experience has shown that the irregularities and incidents and accidents in nuclear power plants still occur.
For the environment to have any consequences happen it is necessary to arrive to the releases of radioactive substances from nuclear power plants, and it can be discharged into the atmosphere, surface water and land.
Weather conditions and other factors that could at that point ruled, and the geographical location of Bosnia and Herzegovina and the Federation of Bosnia and Herzegovina, regardless of where this accident occurred, leading to the risk that our territory is affected by fallout.

Roughly it can be assumed that the concentration of radionuclides in the terrestrial atmosphere to decline proportionally away from nuclear power.
However, the accident at the Chernobyl nuclear plant (1986) definitely has warned that they can expect a comprehensive pollution by radioactive substances continental scale.[49]

As a result of the Chernobyl accident the Cs 137 is present across the globe. Gamma-spectrometrical analysis of the Institute of Public Health of the Federation of Bosnia and Herzegovina, it was found that in all samples of the country in the Federation of Bosnia and Herzegovina it is present artificial radionuclide Cs 137 and Cs 134 some.
The assays of the Portuguese scientific mission (17 April 2001) indicate that the concentrations of Cs137 found in air, water and food are significantly increased, and that there is no increased radiological risk to human health due to the presence of this element.

In case of failure on nuclear power plants in our neighborhood, Plant - the Republic of Slovenia and others depending on the fault, similar to Chernobyl, from particles of radioactive material would form a cloud that carried is by air currents swept our country and many countries of Europe. The speed with which will be released radioactive material deposited on the land depends on the characteristics of materials, weather conditions and soil characteristics.

Established monitoring gamma radiation (at 10 locations in Bosnia and Herzegovina), the measurements to show that the fear of radioactive contamination of the water streams, unprotected wells for drinking water supply, meadows and pastures. Contaminated make the above-ground parts of various types of vegetables, fruits, etc., which are used in human nutrition.

Depending on the level of radioactivity and the impact of radiation on humans, measures of protection from radiations would be implemented.

2.4.2. The Balkan syndrome

In recent years, the world's defense industry was marked by the use of accumulated nuclear waste which is generated in nuclear power plants, uranium depleted in the isotope uranium-235 in a variety of applications. So today, among other things, the depleted uranium in modern armies found the application and is used as an effective ammunition against armored combat means.

In September 1995, the territory of Bosnia and Herzegovina air force of NATO in certain situations for disabling war techniques of the Army of the Republic of Srpska used ammunition containing depleted uranium.
When increased mortality suddenly appeared in SFOR who served in our (Balkan syndrome), the international community has alerted the public that in Bosnia and Herzegovina there is a risk of a large radiation without stating the source of that danger.

[49] In late April 1986, there has been an accident at a nuclear power plant, not far from Kiev. On that occasion, freed a large amount of radioactivity. In addition to radiation several hundred people, of which a number died, contaminating vast areas of arable land, and the level of contamination was such that several thousand people had to be evacuated from the contaminated area. Cloud over Chernobyl carried by air currents spread to many countries of Europe and other continents, which caused an increase in the level of radioactivity in our country.

Between 12 to 24 October in 2002 at the request of the Council of Ministers of Bosnia and Herzegovina, Bosnia and Herzegovina paid a team of experts of the United Nations Environment Programme (hereinafter referred to as UNEP) to determine the presence of radioactive materials in the areas and locations in Bosnia and Herzegovina in which the combat as NATO forces in the mentioned period.[50]

Based on the measurement of radiation in TRZ Hadzici, UNEP experts have found a total of 233 points with increased radiation from depleted uranium dust that was created at the time of impact or fragments or entire radioactive seeds near or below ground. These locations have repeatedly visited and experts from the Institute of Public Health of the Federation of Bosnia and Herzegovina confirmed the state of contamination established by UNEP.

Decontamination reduced radioactivity on the surface of the affected areas, while larger amounts of radioactive ammunition and parts remained deep in the earth, and they will continue to pose certain risks for human health, especially for the heavy metal toxicity.

2.4.2.1. Potential risks found contamination on human health

- Internal contamination of the uptake corrosive uranium into the body by ingestion.
- Significant dose aerosol inhalation of depleted uranium (more than 1mSv)
- External radiation skin beta radiation, continuous exposure of the skin,
- Contamination of groundwater and drinking water.

For these reasons, experts UNEP recommended removal of radioactive seeds that are still lying on the areas that are not mined, that all marked points are cleaned of contamination and that the recesses in the hard surfaces covered with a new layer of concrete and asphalt, which was done on site TRZ Hadzici to implement the Programme of the European Commission for Demining and decontamination of the said premises and conclusions of the Government of the Federation of Bosnia and Herzegovina on approval of funds.

On the concrete runway was registered about 640 point of contamination, from the recesses are removed 32 penetrators or part. The largest number of penetrators could not be removed because it broke through a concrete (20-25 cm) and is located deep in the ground. In these recesses was its visible trace. In a few dents mark was funnel-shaped, indicating the entry of a penetrator and its exit from the recess.
On concrete plateau-runway for the used tanks, instruments for detection were performed measurements of radioactivity contamination-point depressions formed in the concrete covered with sand and larger pieces of concrete, formed by the action of depleted uranium.
In the yards near large workshop on cobblestone surface was found 71 item contamination. Here is found 40 penetrators, which were mainly in parts and corroded the, coated with distinctive yellow powder pitchblende, which was located in the recess and which is set with the earth removed.

[50] During the mission in BH, UNEP investigated the following locations, in the Federation of Bosnia and Herzegovina: the former facility for the repair of tanks in the Hadzici barracks in Hadzici ammunition depot in Hadzici, a former facility for the production of ammunition in Vogosca, the location for the destruction of ammunition on Bjelasnica plateau; in the Republic of Srpska Lukavica, a hill near Pjelugovića barracks in Han Pijesak, a warehouse in the Han Pijesak barracks Koran in Pale, the location of the barracks in Ustikolina, the bridge in the town of Foca, the location of water reservoirs in Kalinovik, the location for the destruction of ammunition in Kalinovik.

Figure 2.4.2.1. A place where the penetrator is found

Figure 2.4.2.1.1. Appearance of found penetrators

During this period it was measured radioactivity of all dents made the said ammunition, even though most of them were not previously marked, which proved to be justified. The measurements proved that any depression formed above munitions contaminated by radiation (beta and gamma).

2.4.3. The use of nuclear weapons in a possible war

Nuclear ordnance have very destructive and devastating power. The great energy that is released during an explosion in a short period of time causes very serious consequences uninformed and vulnerable populations. The released energy is manifested in the form of the shock wave, and thermal effects of nuclear radiation. Number of the people affected in the nuclear effect, as well as weight and degree of injury depends on the strength and type of nuclear explosion, composition and land cover, meteorological conditions, and awareness of protection of personnel.

The frequency of occurrence, intensity of activity, duration, peace and the possible consequences are difficult to predict. An increasing number of countries in the world that are developing programs to produce nuclear weapons, and those that have them work on systems with greater range and capabilities of ballistic missiles and expanding the production technology.

The intensity of the action, duration, as well as the possible consequences to people and property would in any case far exceeded the limits of the possible conflict only on the warring parties.
Due to weather conditions and other factors, which could at that time ruled and geographical location of Bosnia and Herzegovina and the Federation of Bosnia and Herzegovina, regardless of where the accident occurs, there is a danger that the territory of Bosnia and Herzegovina to be included fallout.

Disposal of materials suitable for making nuclear weapons and the availability of other countries that do not possess, indicates that in the world increases the risk of weapons of mass destruction, that nuclear weapons, as well as deliberate attacks on nuclear facilities for the purpose of psychological pressure and achieve the objectives of the otherwise. No matter where it happens that accident and how it was created, there is a danger that the territory of our country to be affected by fallout.
In case of imminent danger of radioactive contamination of the Federation of Bosnia and Herzegovina, the most important property that should protect the crops and livestock due to the need to ensure radiation-chemically safe food for human and animal nutrition. Removal of the open space of crops and livestock prior to the arrival of the radioactive cloud must be in the first days and realistically feasible, as long as you make the assessment of the radiation situation and on the basis of it not propose further measures.
Measurements would show that there was a radiation contamination of water streams, unprotected wells for drinking water supply, meadows and pastures. Contaminated make the above-ground parts of various types of vegetables, fruits and others which are used in human nutrition.

Condition of organization and qualification holders radiation, chemical and biological (hereinafter: RHB) protection in the Federation of Bosnia and Herzegovina is particularly viewed in the context of new forms of terrorism in the world, as well as the various accidents which cause serious damage to the state of the environment "Balkan syndrome" (radiation radiation), terrorist attacks with chemical and biological agents, contamination of soil and atmospheric disposal of liquid and solid waste, traffic accidents with the participation of tanks with flammable or toxic fluids, etc., with the aim of taking appropriate measures and procedures of security and protection and rescue of people and property of these and other risks.

RHB protection of the Federation of Bosnia and Herzegovina, in the context of legislation, includes measures and procedures which are organized implemented to prevent, mitigate and eliminate consequences of RHB effects on the population, fauna, flora, property, as well as the mitigation and elimination of consequences of technological accidents and other accidents from RHB agents in peace.

The material and technical basis for the functioning and operation unit RHB protection, created by the cantons and municipalities, is weak or non-existent, mainly influenced by the consequences of war, the expiration of terms of equipment and MTS, the impossibility of servicing equipment and the like. This statement applies to personal protection that is achieved by using certain personal protective equipment.

All laboratories (radiological, chemical, microbiological) in the Federation of Bosnia and Herzegovina lacks more modern equipment, in particular kits for sampling (water, air, earth) and certain protective equipment, which is required for handling hazardous (toxic) substances, because the lack of adequate protection means a risk of infection of staff and the environment.

Only in Sarajevo Canton there are laboratories that are equipped and trained to quantitatively and qualitatively determine the presence of natural and artificial radio-nuclide in all parts of environment Veterinary Faculty in Sarajevo has this laboratory is staffed and financially very well equipped, as well as the laboratories of the Institute for Public Health of the Federation of Bosnia and Herzegovina which is October 1999. Regulation of the Government of the Federation of Bosnia and Herzegovina formed Department for radiation, chemical and biological protection of the Federation of Bosnia and Herzegovina. Service was formed by staff experts of the Institute of Public Health of the Federation of Bosnia and Herzegovina, whose regular activity for reference adapted to the needs RCB protection.

2.4.3.1. Findings

- According to the Law on Radiation and Nuclear Safety in Bosnia and Herzegovina ("Official Gazette" No. 88/07), at the proposal of the State regulatory agency for nuclear safety and the radiative Council of Ministers of Bosnia and Herzegovina should be made on an emergency plan to protect the population from ionizing radiation in case of an emergency, nuclear accident or occurrence of nuclear damage in accordance with international conventions. In addition, in accordance with international conventions, as well as the Vienna Convention on Civil liability for nuclear damage, the agency is required to do national plan for nuclear safety in the event of an accident at the nuclear facilities of other countries in the region.
- State regulatory agency for nuclear and radiative safety should adopt all bylaws arising from the Law on Radiation and Nuclear Safety in Bosnia and Herzegovina.
- Organized structures for protection and rescue, first response, organize furnishing specialized equipment and conduct personnel training.
- It is necessary to remove the lightning rods with radioactive isotopes that threaten the environment and continuously monitor lightning rods in the function.
- Radiation detectors M-3, which are located in the municipal civil protection and that could be repaired, would serve Cantonal teams for the first triage measurements. If this can not be implemented through the Cantonal civil defense, initiate the Cantonal governments provide funds and purchasing at least one radiation detector unit for RCB protection.
- Radiological, chemical and other laboratories in the Federation of Bosnia and Herzegovina dealing with sampling of water, air, soil, etc., To provide sophisticated equipment and funds to equip laboratories, as well as some staff who will deal with these matters.

2.4.4. Air pollution[51]

Air quality in the Federation of Bosnia and Herzegovina is conditioned by the density and character of the sources of emission of substances polluting and natural factors (meteorological, climatological, orographic). Territorial in most of the Federation of Bosnia and Herzegovina, these factors are such that do not cause a significant deterioration of air quality.

Air pollution is especially present in industrial areas and larger urban areas as a result of transmission of harmful substances from industrial and heating plants, motor vehicles, heating plants, district heating, households to burn fossil fuels and others.

All large thermal power plants using coal as the main energy source of the Federation of Bosnia and Herzegovina, whose characteristics are: low calorific value, great content Incombustible element and a high percentage of sulfur.

Although these facilities are normally located close to the mines, equipped with modern filters for purification of exhaust gases supplied with electric power and high chimneys, but they emit considerable amounts of pollutants to be measured, controlled and monitored, and monitoring of emissions was introduced in thermal power plants "Kakanj" and "Tuzla".

The causes of excessive air pollution (emission of the combustion process), among others, are:

- The character of the industry (large energy and metallurgy capacities for the needs of most of the former Yugoslavia - Bosnia and Herzegovina with 18% of the Yugoslav population participated in the Yugoslav gross domestic product only with 13%, and in the Yugoslav sulfur dioxide emissions to 28%);
- Inadequate structures furnaces (stoves and boilers of low power are mostly made by western European license, designed for other types of coal and did not allow for the efficient and low polluting burning domestic coal);
- The lack of guidance on coal consumption, depending on the quality of coal and the local environmental conditions;
- Lack of refining coal for the needs of small furnaces;
- Large sulfur dioxide (SO2) and coal ash, and lower calorific value of coal produced in the Federation of Bosnia and Herzegovina, in relation to the European;
- Poor maintenance of power and industrial plants, particularly those of equipment upon which the emission of substances polluting;
- Irrational use of energy.

Basic measures for protection against excessive air pollution is the rational use of energy, and the efficient combustion of fuel in the combustion chamber. If these conditions are not met, reported the occurrence of soot, our carbon and other products of incomplete combustion. In a world with a high-power boilers (power plants) implanted devices that are allocated most of the sulfur oxides and nitrogen oxides from flue gas.

Due to the general economic recession (the consequences of war) industrial buildings in the Federation of Bosnia and Herzegovina are working reduced capacity or are completely out of operation. The result of this condition is to reduce harmful air emissions and air quality from the standpoint of certain pollutants to even improve.
In contrast, the traffic is in very poor condition. Railway, therefore, electrified transport is in the initial phase of recovery, and all local and commercial and personal traffic is carried by roads.
A particular problem is the increased emissions from mobile sources - cars which Europe got rid of, (approximately 380,000 in the Federation of Bosnia and Herzegovina, mostly older vintages), bad and unmonitored fuel quality and the like.
Transport, especially in smaller cities and towns, is an important air pollutant in the Federation of Bosnia and Herzegovina (especially the traffic intersections in big cities) because the traffic insufficiently regulated; small speeds and frequent stops, which pose a threat to human health because of the high emission of pollutants.
Federal Hydro meteorological Institute of Bosnia and Herzegovina (hereinafter: FHMZ) continuously monitors air quality at stations in Sarajevo, Tuzla and Ivan Sedlo under the jurisdiction FHMZ, as part

[51] data Federal Hydrometeorological Institute

of the Federation of Bosnia and Herzegovina there are a number of stations for measuring air quality in the competence of the cantons, Municipalities and production facilities with which FHMZ in more or less achieved good cooperation and collects data from them. Also, cooperation has been established with the Republic Hydro meteorological Service of the Republic of Srpska with which compiles data annually for Bosnia and Herzegovina, and sent in the form of reports to the relevant European environmental institutions.
The next significant sources of SO2 emission in the Federation of Bosnia and Herzegovina are the steel industry, and the production and processing of iron and steel, and pulp.
According to data on emissions and pollution and air quality in the Federation of Bosnia and Herzegovina, the highest SO2 emissions (in ascending sequence) is in Kakanj, Tuzla, Zenica, Mostar. In these cities, along with Lukach and Jajce, the most common and the largest emissions of particulate matter pollutants.
Emissions of polluting substances in the Federation of Bosnia and Herzegovina is spatially very uneven. The greatest load suffers the central and northeastern parts of the Federation of Bosnia and Herzegovina, while the southern parts of the load considerably less. The northern and western parts of the Federation of Bosnia and Herzegovina is the purest part due to relatively low emissions of major pollutants of air.
Some of the gases act on wider areas (atmosphere), such as SO2 and nitrogen oxides, which in the process of cleaning the atmosphere causing acid rain which adversely affects the soil, forests and crops. Some gases have a harmful effect on the ozone layer (halons) or cause a temperature increase (carbon dioxide and other multi-atomic gases) which leads to climate change.

In addition to the threat to polluted air is exposed to the population of major urban centers, in some industrial centers in the Federation of Bosnia and Herzegovina is constantly present and potential danger of excessive pollution of the atmosphere caused by potential breakdowns in technological facilities. These include the cities of Tuzla (possible contamination with chlorine and organic compounds from polyurethane chemistry), Gorazde (ammonia contamination from the factory "Pobjeda"), Zenica (pollution from "BH Steel" steel), Lukavac (pollution from "Koksara" and " Fabrika sode"), and some other cities.

2.4.4.1. Air quality management

Table 2.4.4.1. Average daily value of air quality

Automatic station Sarajevo - Bjelave						
Average daily value of air quality for the day:: 18.10.2004						
Pollutant:	sulfur dioxide (SO_2)	carbon monoxide (CO)	nitrogen oxides (NO_x)	nitrogen monoxide (NO)	nitrogen dioxide (NO_2)	Black smoke
	19	219	29	15	18	43
	The values of ionizing radiation		0.17		mSv/h	

Starting points for air quality management include the establishment of control and measurements in places where occurring gas emissions released into the atmosphere. In the Federation of Bosnia and Herzegovina that are mostly stationary sources, which include thermal power plants and industry, as well as mobile sources where the traffic is a major producer of emissions.
Caring for the air protection began in Bosnia and Herzegovina began to take seriously after a series of accidents conditions and protests in large industrial centers and Sarajevo until the early 70s.
Application of tools in air quality management in the Federation of Bosnia and Herzegovina is insufficiently known. Spatial and urban planners do not use emission cadasters and atmospheric distribution models. Use of only methods for balancing emissions for reporting purposes by international agencies: use the methodology developed in Bosnia and Herzegovina before the war, that take into account local specificities (fuel quality, the possibility of data collection), and shall be adopted and the methodology prescribed by international organizations (CORINAIR, IPCC).

The institution of the Federation of Bosnia and Herzegovina, and the whole of Bosnia and Herzegovina, using the tools of the European Union (EU) for estimating an emissions inventory is FHMZ.
Activity FHMZ to track the state of air quality is as follows:

- Inclusion of the Federation of Bosnia and Herzegovina in the information system on the state of air quality in Europe. These tasks are performed using software DEM, which was adopted by the European Environment Agency and which is used by all EU countries, as well as the PHARE countries. Reports for each year through FTP server, via the Internet sent to the middle European server - secondary European database (hereinafter: AIRBASE).
- Also on a daily basis to inform the public on the state of air quality. Current data can be found on the website of the Institute and the website server -BH- EIONET AIRBASE the EIONET portal of the European Environment Agency (hereinafter: EEA).
- FHMZ follows air quality at five stations and they are involved in this exchange with the EEA.

2.4.4.2. Monitoring of air quality

Monitoring of air quality in the Federation of Bosnia and Herzegovina, FHMZ continuously performed since 1967 Establishing qualitative and quantitative characteristics of air and precipitation FHMZ operated in the core network of meteorological stations.
There was conducted pooling and analyzing all the data collected relating to air pollution emissions and pollution in the air-emissions, and regularly provide information to the relevant institutions.
In the previous period, in terms of air there was conducted regular monitoring of pollution - emissions in Sarajevo and Tuzla.
The analysis of these data show that after the war, again leading to a gradual growth of concentrations of sulfur dioxide in the atmosphere of the city of Sarajevo, in the period of 1995 - 2004, and in the course of 2001 there was a slight decrease in the concentration of sulfur dioxide and smoke, which can be seen at accompanying figure 2.4.4.2. Slightly lower values of these substances can be explained by favorable weather conditions. In the winter of 2001 there were long periods of temperature inversions, and temperatures were on average higher, so that certainly expended less energy to heat, and therefore the emission of polluting substances in the atmosphere was lower. Statistical data show that the air after the war "clean" in comparison to the norms on the condition of pollution, as well as the state of the contamination before the war, when Sarajevo was rated among the most polluted cities in Europe. Furthermore, by comparing the statistical indicators for sulfur dioxide and smoke from the air quality limit values (hereinafter referred to as LV) smoke concentration exceeds LV for high values.

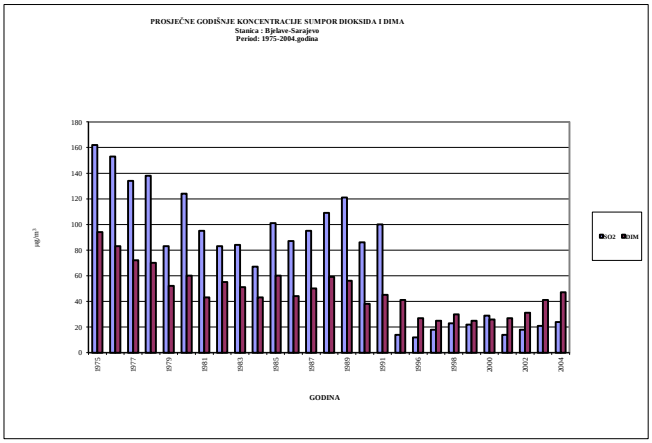


Figure 2.4.4.2. The average annual concentration of sulfur dioxide and smoke in Sarajevo

Monitoring of the concentration of sulfur dioxide and smoke in the air of the city of Tuzla has begun again in 2002. Comparing the results of measurements in the period 2002 - 2011 with the measurements 1990 - 1991, the concentration of sulfur dioxide were slightly lower while higher concentrations of smoke and exceed GV for high value

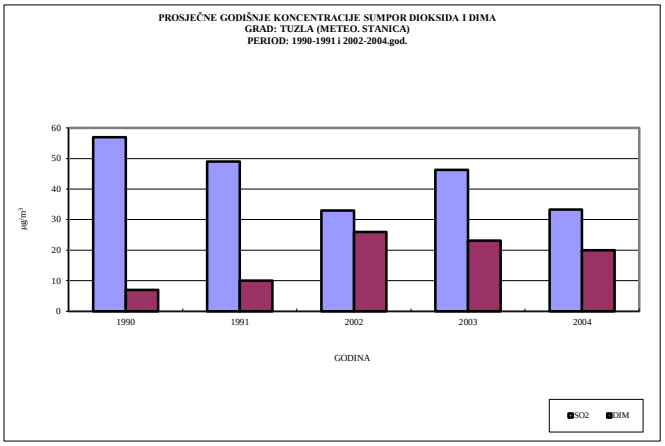


Figure 2.4.4.2.1. The average annual concentration of sulfur dioxide and smoke in Tuzla

The novelty is also that FHMZ has automatic stations for monitoring air quality, which measures the current concentration of five parameters of air pollution.

Acid precipitation appear throughout the year. During the summer period there was a 4% to 8% of the total annual number of acid precipitation, and the months with the most frequent occurrences of acid precipitation are December and January (from 12 to 14%) as seen in the figure 2.4.4.2.1.

The largest number of occurrences of acid rain can be explained by the already known fact remote transport frontal air masses. Analyzing the directions of the wind and the occurrence of acid rain can conclude that over 70% comes from the air masses coming from the northwest and west-northwest in relation to Sarajevo. This confirms the fact that local air pollution in the territory of Bosnia and Herzegovina does not significantly affect the incidence of acid rain. In fact, it is a consequence of frontal masses is moving across Western and Central Europe.

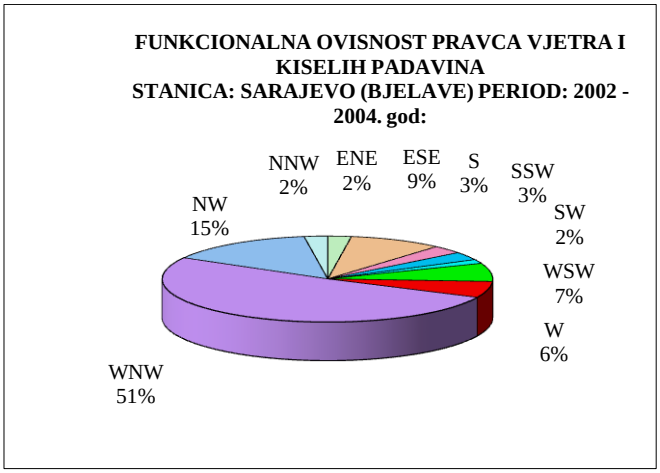


Figure 2.4.4.2.2. The functional dependence of wind direction and acid precipitation Sarajevo

In accordance with European conventions listed Sector is applying European DEM software (software package for resource inputs), which is installed in our country, performed statistical processing of the value of pollution data directly over the Internet sent to: ftp://info.rivm.nl/pub / llo / pub / upload / etcaq / dem, as well as other European countries. This information can be found in the EIONET AIRBASE portal EEA (European Environment Agency).

Here we must point out that Bosnia and Herzegovina in terms of exchange of information on air quality with EEA fulfill its obligations in accordance with the laws in this field in our country, and in accordance with EU directives in the field of monitoring and analyzing air quality.

Calculation of the emission of harmful substances into the air in Bosnia and Herzegovina Institute performs for many years. By applying the European Convention Bureau shall submit this data as well as other European countries.

For these purposes, as well as for the compatibility of emission data, the European Community has adopted computer software packages, which is done using the full budget of all the components that pollute the air in one area. These packages also the approach to data processing is known as CORINAIR methodology.

There are particular to the following software packages:
- Collecter - complete processing of emission sources of air pollutants,

- Reporter - complete tabulation of knowledge of pollution in accordance with the conventions,

- Importer - package for connecting with other software,

- Copert - complete processing of pollution of the atmosphere by vehicles.

Given that this is very complex software, to these packages have long analyzed and studied. Was realized and international cooperation regarding this software over the European Centre ETC / AE, which operates within the European Environment Agency (EEA).
It is now possible to perform calculations emissions from vehicles, as well as emissions from major sources of air pollution -Thermal power plants.

At Cantonal level air quality is monitored in Tuzla (five automatic station-new network), Sarajevo, Zenica and Kakanj. We are currently working on making the network station in the Federation of Bosnia and Herzegovina further modernize, personnel and technical equipment in a way that their measurements cover the entire territory of the Federation of Bosnia and Herzegovina.

This process is expensive and slow, but in the foreseeable future is expected to establish a modern and respectable network of stations that will allow the timely measurements that will provide a sufficient number of data and materials for analysis and preparation of various documents, reports, studies and other papers that will be essential in building healthy development of the Federation on the basic principles of sustainable development in the function of preserving human health, natural and property.

2.4.4.3. Monitoring of radioactivity in the atmosphere

FHMZ as institutions of interest to the Federation of Bosnia and Herzegovina daily monitors and measures the absorbed dose of ionizing radiation. According to many years of continuous measurement and test measurements in the Central Bosnia and Herzegovina area processing of annual dose, absorbed dose of ionizing radiation is 0.8 to 1.1 millisieverts per year (mSv / y). Certainly from this information citizens can assess the size of the radiation, so we will try a popular way to explain some of the terms and norms of ionizing radiation.

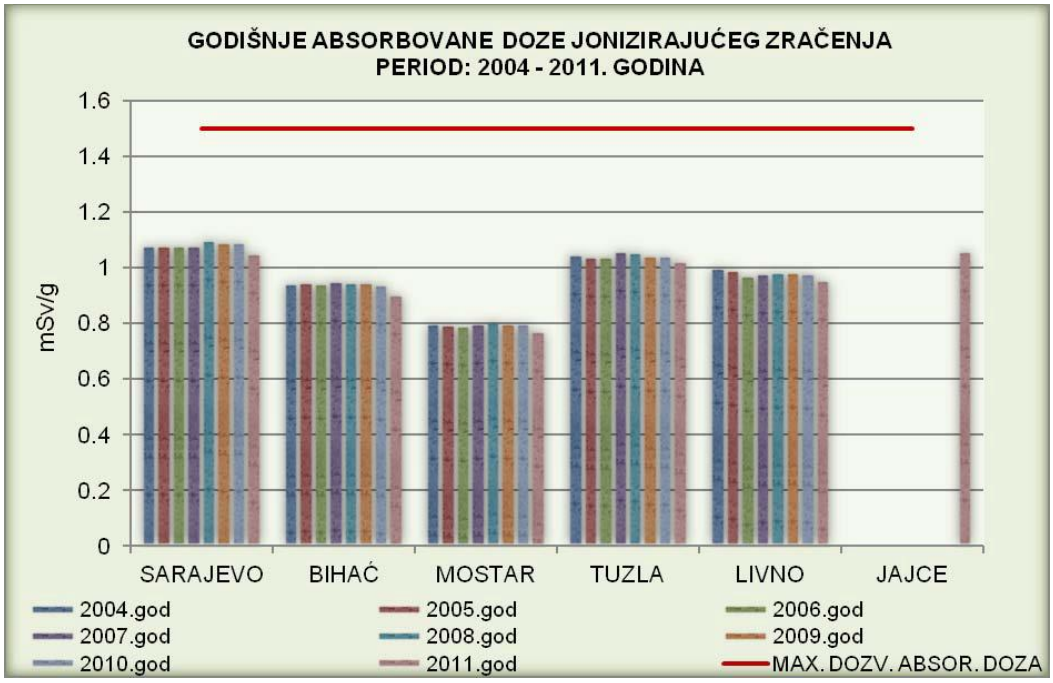


Figure 2.4.4.3. Annual absorbed dose of ionizing radiation

According to international research and standards of natural radiation of the Earth is 1.2 mSv / y and the natural cosmic radiation is 0.3 mSv / y, so that the total natural radiation is 1.5 mSv / y.
You can tell that the measured value of absorbed dose by us under standard world norms.
Although not a popular technical detail, it should be noted the difference between the various types of radiation. The absorbed dose of radiation is measured in units of Grey / year (Gy / s). Biological effects of the absorbed dose of ionizing radiation on organisms are expressed in units of Sievert / year (Sv / y). The fact is that the biological effects of radiation depend on the type of radiation, i.e., the energy of the particles that cause ionizing radiation.
At least biological effects have X-rays, gamma and electron irradiation, while a major adverse biological effect caused by fast neutrons, protons and alpha particles, and the largest heavy nuclei.
As an illustration, we give details comparative radiation doses of natural radiation.
Natural radiation in Australia is 2 mSv / y, 3 in North America and higher in relation to the measured with us (about 1.4 move / y).
A very dangerous dose for example 5,000 mSv absorbed during one month, a lethal dose of 10,000 mSv absorbed during the day or week.
Comparing this data with measured with us certain that there is no room for any panic or to some speculation about the vulnerability of cities in Bosnia and Herzegovina.
Certainly not here included is consideration of the question of the existence of areas with possibly the remains of materials with depleted uranium.
These problems are certainly current, but certainly, if any, narrowly local character and can be isolated so that it does not affect the general situation in Bosnia and Herzegovina.
Experience from an incident like "Chernobyl" shows that the nuclear "cloud" can be overlooked by several countries and primarily endanger human lives.
Early warning primary adverse health effects can be significantly reduced.
We should also point out the lack of registers of pollutants, lack of a unified system of detection and measurement of basic indicators, lack of modern equipment for the detection of pollutants and others.

2.4.4.4. Findings

- Set up an inventory of pollutant emission and pollutants into the atmosphere according to the international methodology CORINAIR, with the application of the PRTR Protocol and software packages COLECTER and SELECTER, including information on the types and quantity of emissions and transboundary movement of hazardous substances;
- Organize registers of industrial pollutants with information on the type of contamination and potential environmental hazards, as well as continuous monitoring;

- Establish standards for the amount of pollutants discharged into the air;
- Establish a system of control efficiency of combustion of fossil fuels;
- Establish control over the emission and emission of pollutants and studies their impact on the health of the population; implement a national program to eliminate ODS substances that deplete the ozone layer,
- The monitoring system of air introduces the following parameters: CO, NO, NO2, ozone and respirable particles with the introduction of automatic measuring stations;
- Establish control harmful causes of the diseases in workplaces where employees are exposed to inhalation of harmful gases and dust, with systematic reporting of morbidity and mortality related to these jobs;
- Appropriate rules to regulate the use and import of environmental friendly vehicles;
- Implement a national program to eliminate ODS substances that deplete the ozone layer;
- Develop and implement ISO 14000 standard and other international standards and methodologies concerning the atmosphere (climate change and air quality);
- Existing networks of stations for monitoring radioactivity spread to all major urban centers in the Federation of Bosnia and Herzegovina;
- Problems of procurement of equipment for the detection of air pollutants with the development of projects which will be aimed at the acquisition of modern equipment and the training of appropriate personnel.

2.4.5. Water pollution

Chemical pollution from industry is more dangerous than bacteriological, as lasting and cause adverse consequences for years after contamination.
In assessing water quality is important to determine the amount of pollutants that have a toxic effect, consume oxygen from the water, causing eutrophication and other unwanted consequences.
Specifically, we will note that there are synthetic surfactants branched chain, chore-hydrocarbons, aromatic compounds containing a heterocyclic ring or condensed ethers and other organic compounds. If these compounds are present in water, the most useful way of determining the level of pollution is by determining the concentration of total carbon (TOC).
FHMZ continued to operate and monitor the pollution of surface water streams under different weather conditions.
On this occasion we will show the level of pollution of the river Bosnia, to the extremely low and high water.
Pollution of surface water courses is a very complex process, and may in some cases be very dangerous.

The development of industry and the cities in the last 50 years that are concentrated along the rivers and the inadequate treatment of waste water have led to some rivers to high degradation of the quality of surface water courses.
According to the analyzes, the rivers are taxed equally organic and inorganic contaminants. Organic pollution coming from urban sewage, farm and food industry. It is important to emphasize that polluters rarely have or use their systems for treatment.
The waters of Bosnia and Herzegovina, according to analyzes FHMZ, significantly polluted. The main indicator of water quality, dissolved oxygen, and without oxygen there is no life either in water. Changes of oxygen occur with increasing temperature in the water as well as the events of biochemical processes that use oxygen.

2.4.5.1. Findings

- Establish uniform registers of water facilities and adopt measures to improve the water supply system;
- Identify potential risks due to the lack of regulation or lack of sanitary protection zones in the local water supply facilities and outdated procedures chlorination in most watercourses;
- Trained and equipped laboratories in the Federation of Bosnia and Herzegovina for testing important indicators of hygienic quality of water;
- Regulated areas of sanitary zones around water intake urban water supply and rehabilitation of these areas to the sanitary-hygienic principles and regulations;
- Reconstruction of the existing sewerage system and training facilities for the treatment of urban waste water, and begin planning the construction of new ones, in line with the policy of sustainable development and the obligations of Bosnia and Herzegovina under international conventions on water;

- Provide adequate apparatus for the continuous disinfection of city water;
- Problems of detection of pollutants in water (heavy metals, pesticides and radioactive materials) with the development of projects which will be aimed at the procurement of uniform equipment, and training of appropriate personnel.

2.4.6. Soil contamination

Soil or land may be polluted by direct disposal of waste materials on the surface or deposit of pollution from the atmosphere. In the first case there are uncontrolled landfill of municipal and industrial waste which is in each municipality , and in the second pickling environment as a result of the deposit of dry and wet acidic depositions from the atmosphere. While the problem of contamination of soil waste materials can be successfully dealt with collection, transportation, recycling and disposal of sanitary waste according to the rules of technical profession, soil pollution acidification, or the deposit of other chemical substances in the event of accidents (e.g., chlorine, ammonia, acids or bases), is much more serious, because a large area of intervention. This type of soil contamination is often imperceptible, and is revealed only by detailed analysis of soil samples. The problem of pollution of land by the deposit in the atmosphere is long present in Europe because of the existence of cross-border transport of air pollution. Solutions are found only in the immediate and effective international cooperation in protecting the atmosphere from pollution, which already makes and what is included and our country.

The dynamic development of cities had a great influence on the increase in the volume of various types of waste. The quantities of various types of hazardous waste increase with the growth of industrialization, urbanization and land reclamation. A particular problem is the so-called present. special (special) waste from a number of industrial plants: metal, metal processing, chemical, specific and industry of transport equipment, which, if not properly stored and preserved, can cause harmful effects on the environment, which are treated as natural calamities.

It should also be noted that during a war (1992 - 1995) significant number of transformer and capacitor cells were damaged , and there were spills of hazardous substances, such as polychlorinated biphenyls which are toxic and carcinogenic. In this regard it is to project the impact of the war damage caused by the damage and destruction of substations with oil with polychlorinated biphenyls in the environment, in which Bosnia and Herzegovina is included. The aim is to test the vulnerability and protection of groundwater and ecosystems at locations substation where there has been a spill of the oil.
The land is in the Federation of Bosnia and Herzegovina, which is degraded due to various circumstances such as the degradation of the land due to underground and open pit mines of sand and coal, land subsidence due to salt exploitation (over 560 hectares), disposal of slag and ash from power plants, depositing municipal waste (public landfills), creation of illegal dumps of various wastes, soil erosion as a result of uncontrolled deforestation, landslides, mines, safety belt on the roads, power lines and other infrastructure systems, uncontrolled use of artificial fertilizers and pesticides, overturning the tank with various types fuel and others.

2.4.6.1. Waste management problems

Waste is one of the priority environmental problems in Bosnia and Herzegovina and the Federation of Bosnia and Herzegovina. Problems regarding waste management encourage, among other things, the social attitude towards waste and management, lack of horizontal and vertical control professional harmonization and organization, the lack of legal regulations and economic measures. The problem of migration of the population caused by the war has further worsened the situation.

Practically, in Bosnia and Herzegovina as the only possible location for the municipal and hazardous waste (industrial, medical and other hazardous waste) offers disposal of existing local (municipal) landfill, where most of these landfills in unfavorable locations and / or technically unequipped . This means that existing landfills and landfill without proper design solutions, unfenced, degasified, do not cover the inert material, unsolved problems of leachate and the necessary infrastructure facilities, etc.

In Bosnia and Herzegovina there are very few landfills that, with a few shortcomings, ca be included as sanitary landfills. These are large landfill Smiljevici near Sarajevo, Uborak near Mostar, Krivodol near Bosanska Krupa and small landfill in Tešanj.

In Bosnia and Herzegovina there is no controlled system of hazardous waste, which means that there is no registry of hazardous waste generators in Bosnia and Herzegovina, there are no records of hazardous waste generated, the physical and chemical properties, physical state, the amount of hazardous waste, etc., except in Sarajevo Canton, where the cadastre hazardous waste is made as part of cadastre for municipal waste. The state of Bosnia and Herzegovina does not have the capacity to process and treatment of specific types of hazardous waste, nor has the economic power to itself build thermal treatment of this type of waste. It should be noted that medical waste has a significant share in the total amount of hazardous waste.[52]

However, the process of establishing order in this area was initiated so that the document adopted at the state level, "Strategy of solid waste management in Bosnia and Herzegovina", as well as a law on the management of solid waste with a series of implementing regulations, and accepted variant creation of 16 regional sanitary landfills municipal waste throughout the territory of Bosnia and Herzegovina.

Current activities on the construction of sanitary landfills in the region of Tuzla, Banja Luka, Zenica, Sarajevo, Bihac, Bijeljina and Mostar, and funded by the World Bank and government entities. It also prepared the projects to be financed by the European Union.

Adopted legislation in this field should establish order in the treatment of new regional sanitary landfills and illegal dumps of old. However, legal provisions are not implemented, both at local and at higher levels of organization in the Federation of Bosnia and Herzegovina, as indicated by the fact of the existence of approximately 4,000 larger and smaller illegal dumps in the Federation of Bosnia and Herzegovina. Slow to address this problem is the lack of understanding of the importance of accepting and building regional sanitary landfills by locals.

Those performing for soil protection are the Federal Ministry of Physical Planning and the Ministry of Environment and Tourism, Cantonal ministries, competent services to municipalities, legal entities that are potential polluters of land, public utility companies, the Federal Institute for Agropedology, Federal Bureau of Geology in Sarajevo and scientific institutions et al.

According to the Directive EU91 / 689 / EEC, waste that is not separated is considered a hazardous waste.

2.4.6.2. Findings

- Oblige the authorities to the existing legal provisions on the collection, transportation and disposal of municipal and industrial waste materials into line with EU standards;
- Immediately at all levels to draw up a register of landfills, ie. establish continuous supervision of special waste;
- In order to protect the population and environment start activities for the creation of joint or regional landfills;
- The problem of destruction of specific wastes is addressed by acquiring mobile incineration plants which could, if necessary, it moved from one location to another.

2.5. Mining accidents

Mining includes the extraction of minerals (minerals) that are found in nature as: solid (coal and other ores), liquids (petroleum) or gas (natural gas).

[52] According to the Directive EU91 / 689 / EEC, waste is not separated, is considered a hazardous waste.

Exploitation of minerals (minerals) can be performed underground or surface mode or drilling. This section includes supplementary activities on the preparation of raw materials for the market: milling, crushing, refining and desalination.

Due to the high concentration of explosive substances (methane, coal dust) fires are common in mines with underground exploitation, accompanied by strong explosions.
All mine facilities in coal mines, especially mine openings, separation, waste coal and tailings, storage of explosive devices, fuels and lubricants, are threatened by the fire.

All mines with methane and dangerous coal dust are subject to explosions. Also, the mines in which had used explosives are endangered by an explosion in storage areas and explosive devices.

All electrical facilities are to some extent exposed to risk of fire or explosion, and in this respect, are most susceptible to thermal power plants "Tuzla" and "Kakanj".

The Federation of Bosnia and Herzegovina has several types of mineral deposits whose exploitation is done at several locations. The exploitation of the significant technical means used by a large number of employees (more than 10,000).

Character exploitation of mineral resources and disrupting the natural relationships in the Earth's crust to the complex tectonic and geomorphic principles, can be causes of mining accidents with major consequences for people and property.
The complex geological and hydrological conditions in mines with underground exploitation, often comes to a sudden influx of water to pit shafts, causing significant material damage to these facilities. In some cases it can lead to casualties in these areas.

Predictions of mining accidents are possible, but the fact that in all the mines with the presence of methane and coal dust may cause mining major accidents.
Most accidents in mines with underground mining resulted in an explosion of methane, the penetration of gases (carbon dioxide) and products of burning gas and coal after the explosion of methane and coal dust and carbon monoxide, which appears as a product of pit fire can be seen from this review of mining accidents on the territory of the Federation of Bosnia and Herzegovina.

Table 2.5. Overview of mining accidents in the Federation of Bosnia and Herzegovina

Red. Br.	Mine	Pit	Date	Category endangered	Cause	Consequences
1	2	3	4	5	6	7
1.	RMU Banovići	Radina	27.02.1962	non-methane	Inflammation Expl. sr.	54 killed
		Omazići	02.03.1972	methane	Gas poisoning	2 killed
2.	ZD RMU „Abid Lolić Bila“	Pit III	1958	methane	Explosion methane	Grave injuries 6
3.	ZD RMU Breza	Založje	1947.	methane	Explosion methane	-
		Sretno	14.03.1970	Methane	Explosion methane	Deceased 50
		Kamenice	05.08.1976	methane	Explosion methane	Deceased 17
4.	ZD RMU Đurđevik	Đurđevik	31.01.1973	non-methane	self-combustion of coal	Deceased 4
5.	ZD RMU Kakanj	Stara jama	1909.	methane	Explosion methane	Deceased 2
		Stara jama	1916	methane	Explosion methane	Deceased 21
		Stara jama	1928	methane	Explosion methane	Substantial injuries8
		Stara jama	21.04.1934	methane	Roof caving, discharge , Explosion methane	Deceased 127
		Orasi	07.06.1965	methane	Explosion methane	Deceased 128
		Seoce	1986.	methane	Explosion methane	Deceased 5
6.	ZD Mine Kreka	Bukinje	19.04.1967	methane	Entering of surface water	Deceased 2
		Dobrnja	14.05.1983	methane	Mininig	Deceased 1
		Mramor	07.11.1983	methane	Explosion methane u akciji spašavanja	Deceased 5
		Mramor	03.04.1987	non-methane	Entering of surface water	Deceased 2
		Lipnica	22.08.1987	non-methane	Entering of crawls	Closed 6, action 27 hours
		Dobrnja	26.8.1990	non-methane	Explosion of coal dust	Deceased 180
		From 1965 to 2010, buried in a chamber excavated and removed 72 alive and four dead				
7.	ZD RMU Zenica	Stara jama	08.05.1905	methane	Explosion methane	Deceased 14
		Stara jama	20.03.1914	methane	Explosion methane	Deceased 5
		Stara jama	19.12.1921	methane	Explosion methane	Deceased 9
		Stara jama	1939.	methane	Explosion methane	Grave injuries 21 Minor injuries 47
		Raspotočje	11.07.1954	methane	Explosion methane	Deceased 8
		Stara jama	1962.	methane	Attack	Deceased 3
		Stara jama	1964.	methane	Attack	Deceased 5
		Raspotočje	12.05.1982	methane	Explosion methane	Deceased 39
		Raspotočje	04.09.2014.	non-methane	Attack	Deceased 5
8.	Mine Mostar	Mostar	15.03.1926	non-methane	The penetration of water into the pit	Deceased 8

2.5.1. Natural and potential dangers in coal mines

Natural characteristics of the exploitation of mineral deposits have been defined and the term "mining - geological factors exploitation ".

The natural characteristics of mineral deposits that affect the technical and economic ergonomically-security operating conditions are:

- Conditions of occurrence prospecting mineral resources,
- Physical and mechanical characteristics of the work environment,
- The occurrence of dangerous gases in the bay or the surrounding rocks,
- The tendency of mineral raw materials and rock to spontaneous combustion,
- Harmful and toxic properties of mineral dust,
- Water deposits and occurrences of liquid sands,
- Radioactive characteristics of the working environment and so on.

Each of these characteristics is manifested differently in different reservoirs. Under the terms of the occurrence of deposits is perceived influence depth, burial manner, the mightiest and tectonic relations in the tray. Some characteristics significantly influence the choice of technology and techniques exploitation of deposits, ergonomics and safety and economics of excavation.

Depending on the particular manifestation of the natural characteristics of the deposit, ergonomically-security features work on production of mineral resources will be better or worse, and the operation of the mine will take place under less favorable conditions in relation to work in other industries.

Natural characteristics of the layers cannot be changed, but the design exploitation of deposits should be selected on technical solutions that will enable the reservoir exploitation and safety under such conditions. If technical solutions are not adjusted to natural conditions then their characteristics emerge as influential factors on ergonomic safety features-exploitation of deposits, but they can change and adapt.
Knowing the source and severity of natural hazards and the rational application of ergonomic - in security, mining work in conditions can approach other economic activities.

Natural characteristics of exploitation of deposits have the greatest impact on ergonomic safety features-mining operation, and therefore the impact should be qualitatively express certain physical mechanical size. There is still no recognized and legally adopted the methodology for classification of certain natural characteristics of exploitation of deposits in general to certain categories or assessment of ergonomic and security conditions under which they will be made or of exploitation of deposits of mineral raw materials.

In one bearing there may be one or more sources of different natural hazards. "The weight, which is a source claims should be expressed in measurable physical mechanical parameters. In the literature (0, 1, 2, 3) in the field of security work, given the proposals for evaluation or categorization of sources of danger, although often only descriptive, not numerically. For a variety of sources and weight of a natural hazard classification is proposed in three, four or more categories. Due to the different approach to the assessment, there are also different evaluation criteria. It should be agreed, in a unique way, will assess the impact of natural and technical characteristics of the deposit exploitation on ergonomic work-safety characteristics, classification of work, sorting weight highlighting their influence into four categories, ie by giving scores from 0 to third

The introduction of zero category, or zero-rating, it is because some natural and technical characteristics in some reservoirs, not only they do not stand out, but they do not exist. The categorization or rating of natural and technical characteristics of the exploitation of deposits which affect the ergonomic security features work can be done in the following way.

- Weight of occurrence of a natural or technical sources of danger in underground or surface mining is classified in the category of zero or marked with the grade of zero, if the risk does not cause particular difficulties, that does not affect the ergonomic - security conditions.
- If there is a natural source of danger in the deposit of mineral raw materials or in the wider area of the reservoir in the course of surface or underground mining could affect the ergonomic features-security work, then such natural source of danger to be, classified in the first category and the judges with '1'.
- When existing natural source of danger significantly affected or may significantly, affect the ergonomic-safety features work in the mining of deposits, then such a source of work should be classified in a different category and evaluated with "2".
- If the expression of the weight of natural sources of danger in the course of research works on the tray or exploitation of deposits such as to require the application of specific measures to ensure the safety of labor, technologies, techniques and people, then the expression of the weight of such a risk is classified in the third category, that is evaluated with "3 '.
- The data on the severity of manifestation of certain natural hazards can be reached in the course of research of mineral deposits. In the study all the natural factors should be informed and to express them numerical indicator that is used for classification of some hazards in one of the categories, or for the assessment of severity of natural hazards.
- Many natural, especially technical risk cannot be identified during the survey, but are discovered during the exploitation of deposits, because the expression of the danger influence

and technical conditions of exploitation, such as the opening and development of mineral deposits, applied excavation method, mine ventilation, the applied technique and organization of work and so on.

- The task of mining experts is that the application of technical measures to suppress and not emphasize the danger. Combating risk and ensuring good ergonomic and security conditions require investments that are significant, if the expression of higher risk. Based on the categorization of the tray toward demonstration of natural and technical hazards can be accessed design work to meet the ergonomic - the security requirements of the system man - machine - working environment and working conditions in the mining industry closer to the conditions in the rest of the economy.

The biggest disaster in the coal mines in the world, including ours, are mostly a result of the explosion of methane, coal dust, often shared the explosion of methane and coal dust, after which in some cases leads to the development of pit fire of enormous proportions. "[53]
In addition to these natural hazards, danger in underground mining work and represent rock bursts, sudden demolishing accompanying rocks, bursts of gases, penetration of water and liquid sand. In this project will be presented in tabular form of natural hazards, which may occur as a cause of major mining accidents in underground mines coal in the Federation of Bosnia and Herzegovina. There will be greater attention paid to the explosions of methane,[54] coal dust, bursts and fires, as well as discharge gas and caving surrounding rock. Special attention was paid to the so-called risks arising from a common (associated risks, risks interdependent), which today represent the biggest threat to the emergence of mining disasters in mines of the Federation of Bosnia and Herzegovina.

Table 2.5.1. Natural risks at mines

Mine	Risk						
	methane,	Coal dust	Rock burst	discharge gas	penetration of liquid sand	demolishing accompanying rocks	Water leak
1	2	3	4	5	6	7	8
RMU Banovići	+	+	-	+	-	+	+
ZD RMU „Abid Lolić Bila“	+	+	-	+	-	+	+
ZD RMU Breza	+	+	-	+	-	+	-
ZD RMU Đurđevik	+	+	-	+	-	+	+
ZD RU Gračanica	-	-	-	-	-	+	+
ZD RMU Kakanj	+	+	-	+	-	+	-
ZD Rudnici Kreka	-	+	-	+	+	+	+
ZD RMU Zenica	+	+	+	+	-	+	-
Mine Tušnica	-	-	-	-	-	+	-
RMU Kamengrad	-	-	-	-	-	+	+
G.D.mines bauxite Jajce	-	-	-	-	-	+	+

5.2. Risks of explosion of methane in coal mines

Inflammation mixture of methane and air cave occurs when the air in the underground mining of adequate amounts of methane and oxygen, as well as the source of infection. The dynamics of the explosion has a decisive influence of volume explosive mixtures. On the broad foreheads, and access the premises wide forehead, explosive methane concentration (4.5 to 14.0%), at which may cause inflammation or explosion of methane, occur most frequently at the intersection of broad forehead with ventilation corridor, near gas faults, the local caverns coal seam, as well as in areas of strong bursts of

[53] " The mines in which there is a great concentration of methane mine brown coal - (Kakanj, Lancaster, Zenica, Breza), lignite mines (Marble, Dobrinja, Bukinje, Leibnitz), Kamengrad - Sanski Most, Đurđevik mine, salt mine Tetima.
[54] Safety and protection in mining" - Hamdi Uljić; Tuzla 1998 Ref.1.

methane from the cracked walls of a wide forehead or the result of a discharge of methane generated as a result of shock rock, as well as the premises for removal of air from these places.

In the excavated area behind the broad forehead pile up explosive concentrations of methane due to a disturbance in ventilation, slow dynamics of progression broad forehead, self-heating and self-combustion of coal and the emergence of mechanical sparks poses a serious threat potentially explosive methane. Also,especially poorly ventilated and enclosed underground rooms in the neighborhood of saturated methane mining areas, the places where it may cause an explosion of methane. Inflammation usually occurs because of methane:

- The occurrence of mechanical sparks,
- Improperly performed blasting,
- The appearance of an open flame,
- Faulty electrical equipment,
- Static discharge.

Most of inflammation or explosion of methane, due to the appearance of mechanical sparks coming from grinding metal on solid rock (cutting combine hard rock in the ceiling, the floor or solid bands into the coal seam), metals from metal (e.g. a knife combines the beam thyroid roof supports or steel framework, which is supported by roof cave rooms) and the friction of the rock wall (eg. during the demolitions accompanying rocks with silica sand content in the space behind the forehead).

Inflammation methane performing blasting occurs mainly due to: improper use of explosive materials, the use of inappropriate types of explosives, the use of electric detonators with inadequate time delays and improper equipment for mining.

The most common cause of inflammation due to methane, the appearance of an open flame, the fire in the place of the endogenous caved excavated areas behind the forehead and wide use of equipment for drilling. Inflammation of methane faulty electrical system or the emergence of static electricity arises mainly: the advent of the electric arc, the appearance of sparks, which is the result of faulty equipment, the use of devices that do not meet the explosion protection and use material in electrostatic equipment and devices.
The reasons which caused a number of mining accidents are mainly based on non-compliance and non-compliance with stipulated safety measures in the mines.
To avoid these kind of accidents, in all mines to conduct a proper assessment of the threat, based on which they are made appropriate normative acts that regulate the issues of security-security mine during operation, in order to avoid any improvisation that may cause any accident and endanger people and property and lead to the death or disappearance of the miners and cause major damage.
Even after such extensive actions, through the negligence of the people and the lack of funds for modernization of the mine pit roof supports, foreheads, strips for export ore, measuring instruments with a large amount of combustible and explosive gases in the pits, etc., ,may cause or has already caused accidents mines.

2.5.3. Relationship between civil protection and mines

All principles and commitments, as well as decades of experience, mostly in favor of that because of the nature of the mining activities in major accidents in mines should, in addition to mining resources protection and rescue, count and other necessary structures and units of protection and rescue, including international assistance.

Also, rescue services - the central stationof mine Federation of Bosnia and Herzegovina, and other specialized forces and mining equipment that is found to be rational, it is necessary to organize, equip and train for other similar purposes and complex actions in natural and other disasters in where such assistance is required, including a major accident outside of Bosnia and Herzegovina.

Coal mines of the Federation of Bosnia and Herzegovina are among major corporate customers that previously have well educated and trained units, and have not yet performed greater changes the structure of its elements of protection and rescue. Guest competence of mine protection and rescue system are different, ranging from predominantly negative and positive, for example: "In all the coal mines in Tuzla Canton and the salt mine formed armies to rescue people and property in case of mining accidents of all kinds, which are fully equipped with all the material and technical means for protection and rescue. Training of members of the company was at a high level, so that they can operate successfully in the case of mining and other disasters in Tuzla Canton, and if necessary, to other cantons. [55]" Different assessment is a review of the situation, it is necessary to objectify and reasons in favor of the unsatisfactory situation, after analysis, eliminated.
Currently, Bosnia and Herzegovina, a candidate country in meeting the conditions for joining the European Union, due to objective conditionality build government structures, fragmented sees the need for protection and rescue, sector forecasts, the model of full integration of elements of protection and rescue.
However, the importance of the interdisciplinary nature of the problems require changes in the current institutional arrangements, and the involvement of human and financial resources to the extent in which they can ensure the long-term by directing the strategic directions and careful planning.

The lack of civil protection (general and specialized applications), as a result of weak economic development, points to the essential establishment of protection and rescue services at all levels, a review of the state of resources and assessment of potential resources, which may be a function of protection and rescue.
In the process of establishing these services at all levels in the Federation of Bosnia and Herzegovina, it is important knowledge of the role, training and equipment of existing ones, including the mining of protection and rescue, as well as a threat, which is due to natural and technological risks, present in a certain area. Proportion of these risks, as well as the extent of possible accidents, must be rational planning and operational use, available resources rescue.
It is certain that at least one central station, there is a need to regulate it with additional qualification in the equipment and used as a unit - heritage protection and rescue. Similarly, all other specialized mining units, as well as any central station, can count cantonal and municipal civil protection. It shows the current practice, but it is evident that, after the risk assessment made necessary careful planning and needs analysis, spatial coverage, equipment and rational use of these forces. Only after completion of regulating this area, it will be possible a more detailed elaboration of the same principles and the place of mining resources in the system of protection and rescue, but it is possible, at each level, as practice shows, to establish operational cooperation and coordination within the structures of protection and rescue.
Options for responding to major mining accidents and to perform essential functions of the central rescue stations, as well as possible specific tasks within the structure of protection and rescue, will be analyzed in other documents, and the general scheme of the central position of rescue station Zenica and Tuzla, as well as mine armies, in comparison to other forces and structures for protection and rescue in the Federation of Bosnia and Herzegovina, will give the concluding remarks of the Project "Massive mine accidents."

2.5.4. Assessment in mines

Mining is one of the economic sectors with a number of potential hazards that can threaten the lives of more people and cause extensive damage. These dangers are especially: the explosion of methane and coal dust, an uncontrolled explosion of explosives, an inrush of water and gas, rock bursts, fires in the pits and wells and outdoor fires.
Protection and rescuing in mines consists of specific protection measures and rescue and salvage program in the Federation of Bosnia and Herzegovina in particular, the following specific actions:

- Consideration of the state of equipment for troop rescue in all mines,
- Retrofitting troop rescue modern equipment,
- Make fully operational the central stations in the mines,
- Equipping of the central station in the mines with modern equipment.

In the mines, "Zenica", "Kreka" and the "Lancaster" exist central station which in the event of an accident should be operational emergency.

[55] The statement of the Program of protection and rescue of Tuzla Canton.

Some of the statements are out of date, but the general assessment of the state, as well as with the necessary specific measures should be put together.

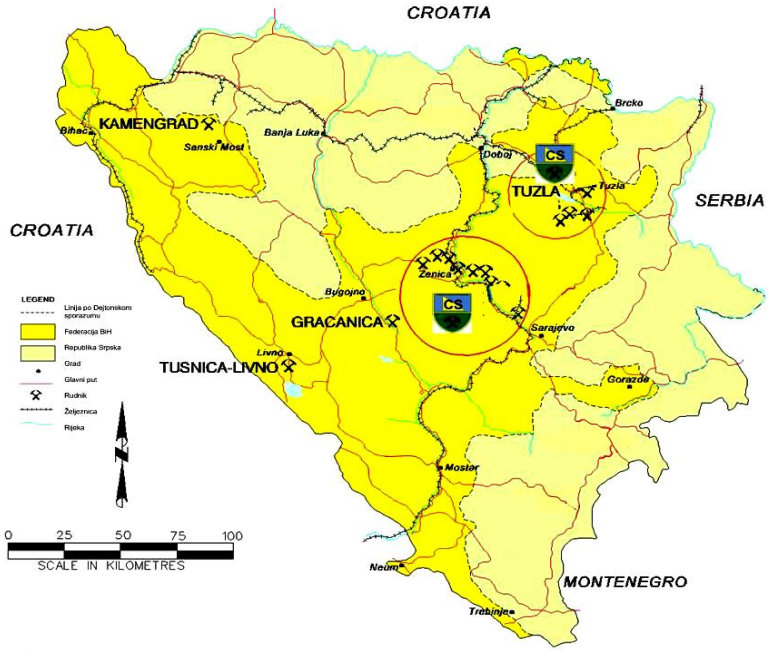
2.5.5. The organization of rescue

In the Federation of Bosnia and Herzegovina there are seven commercial companies dealing with exploitation of energy and mineral resources are classified into business with a high degree of risk, namely: RMU "Banovići", ZD RMU "She", ZD Brown Coal Mine "Breza", ZD RMU "Đurđevik" ZD RMU "Kakanj", ZD Mines "Kreka" ZD "Zenica".
From the perspective of protection and rescue have common issues, due to the organization of work, methods of operation, potential risks, especially in pit operation, which could endanger the safety of staff and property, and refers to the explosion of methane and coal dust, fire, explosion explosive warehouses funds, improper use of explosives, gas and water penetration, demolishing parts of the mine and others.
These mines are grouped into two areas: Central and Tuzla region, related railway and roads, social and political and economic organization, relatively short distances between the mines of both regions, except mines Gracanica, Tušnica, Kamengrad and Jajce (Figure 2.5 .5.).
Central Bosnia region belong mines: ZD RMU "She", ZD Brown Coal Mine "Breza" ZD RMU "Kakanj" ZD "Zenica".
Mines have organized rescue and rescue stations, with what ZD "Zenica", due to dislocation pit has three cells (Stara jama, Raspotočje and Stranjani).
Central station "Zenica" work done on the basis of "Regulations on the rescue and first aid in the mines" and an agreement between the user, and the above mentioned mines.
In central Bosnia, at the time of the formation, by the number of employees and production, led the Mines "Zenica" (Stara jama, Raspotočje, Stranjani and was), so that the central station for Mines "Breza", "Kakanj" and "Zenica" formed the location Raspotočje - Zenica, where it remains today and is the basis for rescue for the region.[56]
In the Tuzla region there are mines: RMU "Banovići", ZD RMU "Đurđevik" and ZD Mines "Kreka". From the history of the mine shows that from 1968 to 1977 operated in an economic organization "Tito mines Kreka - Lancaster," where are the jobs, related to the protection and rescue, led by the Common Services. Also, from 1994 to 1999 mines operate in a single company, "Coal Mines Tuzla", which jointly carries out tasks of protection and rescue through the central station "Kreka" duty station "Lancaster" and mining station "Đurđevik".
Mines Tuzla region achieved manufacturing underground mining and surface mining, except that two-thirds of the coal is realized by surface.

- RMU "Banovići" pit "Omazići" preparing and getting coal excavation is done in two fields, "West and East", achieved production of 253,168 tons, with 572 employees,
- ZD RMU "Đurđevik" pit "Đurđevik", in which the preparation and excavation of coal carried out in this district "Đurđevik 2" achieved a production of 115,200 tons with 368 employees,
- ZD RU "Kreka" coal pit getting through, done in marble mine pit "main layer" in the hunt "Marble" (mechanized method) and "Gretel" (Kreka chamber method), and the production was 614,384 tons, with 981 employees,
- Pit "main layer" marble is non-methane.

Mines "Kreka" have organized and equipped the central station which was formed to provide a greater percentage of the mine and the mine rescue stations, as part of the mine lignite mines employed over 10.000radnika, of which 8,000 coal pit exploitation (mining "Bukinje" ; "Marble"; "Dobrnja"; "Lipnica"; "Lukavac").
Today, the central station with the same capacity: buildings, workshops, garages, transport and rescue equipment serves four mines, out of which, two open pits, one pit to mine closure and "Marble", with the largest number of employees of mining exploitation of mines of Bosnia and Herzegovina and the possibilities of developing and obtaining coal in thirty years to come.
Also, RMU "Banovići" and "Đurđevik" its development, among other things, planned in underground mines. From the above facts it is economically rational to continue to equip the central station Tuzla, in which the Federal Ministry of Energy, Mining and Industry has so far invested some funds through the purchase of protective equipment for mining Federation of Bosnia and Herzegovina.

[56]Project "Massive mine accidents - Assessment of resources and the response of the central station for rescue."



R.M.U. Banovići	km									
R.M.U. Đurđevik	14	km								
Rudnik Kreka	22	18	km							
R.M.U. Zenica	121	138	128	km						
R.M.U. Kakanj	142	152	140	13	km					
R.M.U. Breza	186	198	180	68	53	km				
R.M.U. Bila	132	143	150	29	41	93	km			
Rudnik Gračanica	196	207	214	97	116	166	110	km		
Rudnik Tušnica	272	294	281	186	202	197	212	130	km	
R.M.U. Kamengrad	290	278	286	210	221	244	232	134	163	km
	R.M.U. Banovići	R.M.U. Đurđevik	Rudnik Kreka	R.M.U. Zenica	R.M.U. Kakanj	R.M.U. Breza	R.M.U. Bila	Rudnik Gračanica	Rudnik Tušnica	R.M.U. Kamengrad

Figure 2.5.5. CS scheme of the organization of rescue in the Federation of Bosnia and Herzegovina and the distance of the mine[57]

For consideration of the integral state in the organization of rescue services in the coal mines in the Federation of Bosnia and Herzegovina, organized by the Federal Ministry of Energy, Mining and Industry and the Federal administration of civil protection started in 2011 and completed in 2012 Project "Massive mine accidents - estimate resources and response capabilities of the central station for rescue." The project is a detailed analysis of the existing organization of rescue services in the coal mines, the operation and the connection to the system of protection and rescue and the proposals for improvement of the organization and specification of equipment to be purchased for the renewal of the existing outdated and modernize the entire system of training and intervention team for rescue.

At the suggestion of the Federal Ministry of Energy, Mining and Industry, the Federation of Bosnia and Herzegovina Conclusion V. No. 263/2012 of 07.03.2012. adopted the said project and tasked the RMU "Banovići" Inc. Lancaster and Concern EP BH dd Sarajevo for coal mines in concern for the project.

In 2012 and 2013, was purchased most of the equipment from the specifications relating to the replacement of existing outdated appliances for rescue and procurement of the remaining equipment is in process.

The realization of the planned procurement of equipment total equipment of rescue services in the coal mines will reach the required technical standards, as with a good level of training and organization of the service guarantee for improving the efficiency of rescue in mines.

[57] Image taken from the "Study of the power sector in BH" - Module 8 - Coal Mines.

3. Other accidents

3.1. Major accidents in road, rail, air and water transport

Area of transport and communications is particularly sensitive to the effects of natural and other disasters that hinder the normal flow of traffic, particularly road, rail, water and air transport.

Hazardous events in road transport and traffic in general, can be very different and have different causes.[58]

Although the mention of the dangers of road traffic first thought points to the danger of vehicle collisions, with each other or with an obstruction on or near the road, the list of risks and their causes is actually much higher.

The cause of the suffering of people and property in traffic (traffic), can be bad weather (wind, fog, rain, lightning), vehicle defects, shortcomings or imperfections roads, signs or instructions, ignorance or lack of experience of the driver in a particular situation, mental or physical problems driver, terrorist activities and so on.

Some of the dangers and risks inherent to the open roads, tunnels, almost are not existant (eg. bad weather), some are practically the same (eg, vehicle breakdown, but without interruption), while some may be significantly higher (e.g., fire or halt vehicles).

Most of the risks in tunnels due to the fact that hazardous event takes place in a space that is almost completely closed and that the open space is usually connected only via two openings (portals) tunnel.

The effects of "closed area" in particular are expressed in long tunnels if the place of accident away from the hole (portal).
When considering the dangerous events in tunnels attention is directed to those specific, i.e. those due to environmental conditions in the tunnel become especially risky.
For example. ordinary stop the vehicle in the emergency lane of the highway in the open, can, in the tunnel which has no emergency lane, significantly increase the probability of collision and the risk of consequences which will create.

Fire protection in tunnels requires a specific application of the general principles of fire prevention, fire-fighting techniques and tactics, fire alarm systems, and systems and equipment for the fire.
Management of the operations of the ventilation system, especially in terms of fire, requires an integrated approach and the synthesis of a number of multi-disciplinary skills that are not easily accessible.
Fire load in the tunnel is constantly changing and it is impossible to predict what will be the exact moment of a fire.
In principle is ever present possibility that the size of the fire to be significantly higher than some "average" in normal buildings, where the fire load and the risks, typically can advance relatively precisely determined.

Unlike commercial and industrial buildings and installations in the tunnels there is no possibility for sectoral classification, i.e. the tunnel can not be divided into fire sectors, as fire, evacuation of people seem much more difficult.

There is a very high probability that can be expected that the entire human population that needs to be saved to reside in the same sector with fire, and since it is a linear tunnel construction, a fire can be extinguished only with sites that are in the same sector, in the best case on two opposite sides.

Such narrow access to the site of accident has a negative impact on the possibility of intervention and rescue at each type of accident in the tunnel.

The analysis of possible events in a realistic tunnel, which are specific and which may cause serious consequences, leads to the following scenario:

[58] Regent Alexander, Ph.D. thesis "Analysis of measures to prevent the catastrophic fires in road tunnels".

1. fire,
2. discharge of hazardous (toxic) substances,
3. explosion.

A detailed analysis of the above scenarios they can be further classified as shown in Table 3.1. and 3.2.

Since the explosion of the phenomenon represents only a very fast-burning, fire and explosions are presented together.

Table 3.1. Hazardous scenarios with flammable and explosive substances

DANGER	**Flammable or explosive materials**		
Event	**Fire or explosion**		
Physical/Aggregate state of matter	Firm	Fluid	The compressed / liquefied gas
The event - effect	• Fire solids • Explosion dust • Explosion of explosives	• The fire puddles • Overflow tank • Fire tanks (tank) • Fire jet (torch)	• Fire jet / steam flash • (Torch) • Deflagration clouds steam / gas • Very large explosion tank full of flammable gas under the influence of fire (BLEVE), which leads to the formation of fireballs

Table 3.2. Dangerous scenario with the discharge of hazardous (toxic) materials

	influence quantity	**The decisive parameters**
Attribute releases	• Type of discharge and the total quantity • Flow • Size (size) pools • Speed of evaporation • Momentary(flash) evaporation	• Physical / physical state • Speed of evaporation
The event-effect	• The concentration of pollutants / toxic substances • Exposure time	• Size sources • The density (relative to air) • The dimension of the tunnel • Air circulation • Acute Toxicity • Flammability • Explosive • Reactivity (with water)
Consequences	• Persons • Environment	• The number of exposed persons • Exposure time • Degree of protection • The sewer system • The number of persons in the vicinity of the portal / openings

If, after the release of toxic substances no additional hazardous events such as fire and / or explosion, then to assess the effects important only stated influence the size and the decisive parameters.

If, however, omitted medium may ignite and / or explode, and then these properties should be taken into account when assessing the risks may increase.
It is generally accepted that the claim is in the early stages of tunnel fire still available a sufficient amount of oxygen. This means that the fuel present in the combustion reaction, is almost entirely transformed into the gas phase, that is released total available heat energy, and that the maximum temperature of the combustion occurring in the combustion zone.
Since the distance between the ceiling of the tunnel, and the burning material is relatively small, the center of the fire flames quickly reaches to the ceiling. The thermal energy is then changed to a building or through the flue gas is transported in the direction of flow of air. The energy transferred to the ceiling, as well as the energy of hot gases caused by radiant heat back to the fuel material, which accelerates the warming condensed phases and contributes to faster development of the fire.
In principle and in general, the development of a fire in a confined space can be divided into the following phases:

First initial phase - which essentially depends on the type of fuel, its shape and weight distribution, the source of ignition, etc., and a fire starts or smoldering or combustion flame;
The second phase of development - which includes the expansion of the burning flares up the moment the fire (flashover), or until they developed fire;
The third phase of a fully developed - whose feature is approximately constant speed of combustion and thermal power system, which can occur when fully burning or the incomplete burning;
Phase 4 afterburner - which covers the period declining severity of fire;
Fifth extinction phase - after the end of heat due to power fuel.

In case the size of the script exceeds a certain limit, in terms of the size of fire, explosion or release of toxic substances, then in fact there are real opportunities for intervention and rescue.

3.1.1. Road traffic

Road transport, as the most common form of transport, is an important link of the transport system in Bosnia and Herzegovina, and therefore in the Federation of Bosnia and Herzegovina. However, the relevant statistical indicators show that the personal security of citizens from harm in road crashes unsatisfactory, while the traffic safety on the roads is much worse than the European average.

At the level of Bosnia and Herzegovina, the Law on basics of traffic safety on the roads in Bosnia and Herzegovina ("Official Gazette", no. 6 / 06, 75 / 06, 44/07, 84/09 and 48/10), with which 22 other ordinances regulating this area unique in Bosnia and Herzegovina. The adoption of a single Law on basics of traffic safety on the roads of Bosnia and Herzegovina defines the main principles of mutual relations and behavior of road users and other operators in traffic. The main conditions to be met by roads in terms of traffic safety, management

Central Registry of drivers and vehicles, road traffic rules, traffic signs system and signs given by authorized persons duties in the event of an accident, learning to drive, the conditions for entitlement to drive a motor vehicle, taking the driving exam, the requirements for devices and equipment vehicle dimensions, total weight, axial load, the basic requirements to be met by vehicles in traffic, the work of professional organizations in Bosnia and Herzegovina, as well as other issues related to traffic safety on the roads that are unique to the entire territory of Bosnia and Herzegovina.

In addition, at the state level is adopted the Law on International and Inter-entity Road Transport ("Official Gazette", Nos. 1/02 and 14/03), which regulates the manner and conditions of carriage of passengers and goods vehicles in international and inter-entity road transport, jobs oversized transportation of goods, inspection supervision, customs control and the obligation to pay fees for the use of roads.

The main road network in Bosnia and Herzegovina was designed and built in the middle of the last century, including technical parameters, which are able to meet the then modest transport needs. Overall, the network of roads in Bosnia and Herzegovina can be assessed as the poorly developed (under European standards), and basic technical characteristics of the project low speed, small radius bends and steep slopes, and frequent connections, so that the operating speed of about 50 km / h .

The capacity of roads, in certain sections, cannot meet current traffic demand, so the level of service is unsatisfactory, which together with a large number of road structures (bridges, viaducts, tunnels and galleries), contributes significantly to the risk of accidents.

Currently in the Federation of Bosnia and Herzegovina are in traffic released three sections of modern highway, a distance of 90 km, of which the Canton passes 44 km, Zenica-Doboj Canton passes 40 km and West-Herzegovina runs 10 km. In addition to these stocks in preparation for the construction of new shares by the competent company is responsible to carry out all the preparations and determine contractors.

3.1.1.1. Safety of road traffic

Traffic accident is an accident on the road which was attended by at least one vehicle in motion and in which one or more persons died or were injured or died within 30 days of the accident or caused material damage. In Bosnia and Herzegovina each year as a result of road traffic accidents lives about 400 people lose their lives, and about 10,000 are injured, of which over 2,000 suffers fatal injuries. Because the consequences of serious accidents on the roads, in addition to immeasurable losses suffered by their families, causing costs to the society as a whole, road safety is treated as a wider social problem. Collecting data on road crashes in Bosnia and Herzegovina is performed (based on police reports) in the entity Ministries of Interior or the police of Brcko District. The result of this process are disclosed in the table corresponding statistical publications Entity Bureau of Statistics and the State Agency for Statistics, which presents data on the number and consequences of traffic accidents on the roads in Bosnia and Herzegovina

Table 3.1.1.1. The consequences of accidents on the roads in Bosnia and Herzegovina (2005 - 2009).[59]

Year	Deceased	Heavily injured	Easily injured
2005	386	2041	7374
2006	424	2107	8166
2007	430	2418	9471
2008	434	2385	9499
2009	382	2066	8986

Traffic accidents often happen on roads in residential areas and on main roads (on which is the highest level of traffic). The most common causes of accidents, which are listed in the police reports, are speeding vehicles, disrespect of way, improper overtaking and passing and intoxication of the participants.

With the general social aspects, it is important to present the facts about the unfavorable age structure of the victims, published by the Ministry of Internal Affairs of Russia and the Federal Bureau of Statistics. In 2007, on the roads in the Federation of Bosnia and Herzegovina, 22% of those killed were between 18 and 24 years of age, and even 53% of those killed in accidents on the roads of the

[59] Source: Agency for Statistics, Federal Office of Statistics.

Federation of Bosnia and Herzegovina were the most productive part of the population (25-64 years of age).

An important factor is the increasing number of vehicles that transport routes in Bosnia and Herzegovina, with extremely unfavorable age structure of the automobile fleet. For example, the average age of passenger cars registered in Bosnia and Herzegovina is about 15 years. The following chart presents the data on the total number of vehicles registered in Bosnia and Herzegovina, during one year, for the period 2005 - 2009 It is important to note that the largest number (80%) of registered vehicles, falls into the category of passenger cars, and that participation of the number of trucks is about 8%.

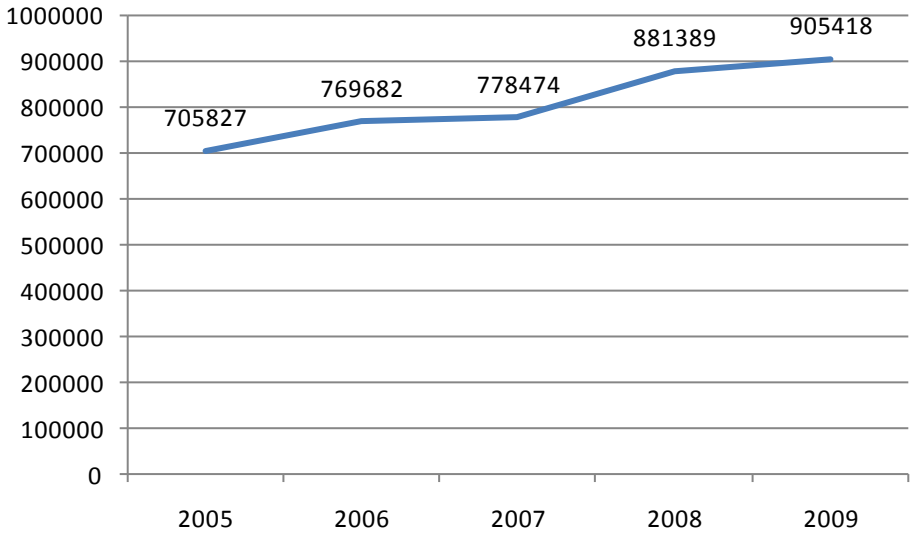


Figure 3.1.1.1. Vehicles registered in Bosnia and Herzegovina 2005-2009[60]

3.1.1.2. Safety of road traffic in the Federation of Bosnia and Herzegovina - Statistical data

- In the Federation of Bosnia and Herzegovina in 2005 there are 24,156 road accidents that killed 199 persons and 6,250 people were injured.
- In 2006, 25 301 traffic accident that killed 208 persons and 7,012 people were injured.
- In 2007, 28 561 traffic accidents which killed 236 persons and 8,085 people were injured.
- In 2008, 29 574 traffic accidents which killed 245 persons and 7,830 people were injured.
- In 2009, 29 384 traffic accidents which killed 198 persons and 7,365 people were injured.

It may be noted improvement in 2009 in terms of reducing the number of traffic accidents and the consequences that accompany them.

[60] Source: BHAMK

Table 3.1.1.2. Data on road crashes in the Federation of Bosnia and Herzegovina for the period 1999-2009

	traffic accidents		Deceased and injured		
Year	**Total**	**With material damage**	**Total**	**Deceased**	**Injured**
1999	24.585	24.507	7.032	268	6.764
2000	24.548	24.172	7.141	302	6.839
2001	25.491	20.905	7.297	254	7.043
2002	21.846	20.325	6.216	227	5.989
2003	22.855	21.704	7.079	263	6.816
2004	22.207	20.105	6.913	251	6.662
2005	24.156	19.739	6.449	199	6.250
2006	25.301	20.908	7.220	208	7.012
2007	28.561	23.281	8.321	236	8.085
2008	29.574	24.033	8.075	245	7.830
2009	29.384	24.221	7.563	198	7,365

3.1.1.3. **Safety Traffic on the highway corridor Vc in the Federation of Bosnia and Herzegovina**

The construction of the motorway corridor Vc passing through the Zenica-Doboj, Canton and Herzegovina-Neretva Canton, as well as parts which will be subsequently built, due to the large number of tunnels, viaducts and bridges, and lack of adaptation of speed limits on the same, and negligent driving, may be the cause of accidents on all shares listed highway.

In 2014, the completion of the shares and a total constructed length of Corridor Vc in the Federation of Bosnia and Herzegovina is about 100 km as follows:

- Canton ..... 44 km
- Zenica-Doboj Canton ..... 40 km
- West Herzegovina Canton .....10 km

The manager or contractors to maintain the highway will regularly visit, or to supervise the newly built motorway sections in the case of determining the occurrence of accidents, inform the appropriate police and fire services, emergency (if there are injuries) or the ministry authorized for intervention in accidental situations, inform them of the type of hazardous substances present in the accident, and to provide a place where there was an accident situation, in terms of regulating traffic flow or complete closure of the highway.

Managers shall, in accordance with EU standards do appropriate centers to track and monitor highways and entrusted the relevant Companies of maintenance and protection of highways.
The operator shall ensure and appropriate force, which will be carried out 24 hours a provision of the tunnel in case of accidents that can happen in tunnels.
Maintenance of the closed drainage system and treatment in accident situations are outsourced, which has authorization from the responsible authority for carrying out this type of activity, and made instructions of the Motorways of the Federation of Bosnia and Herzegovina, which was delivered to him and acrroding to it perform the necessary activities.
In the areas through which there is a highway there are firefighting unit with which the operator can enter into agreements on their involvement in accident situations in their areas of responsibility.

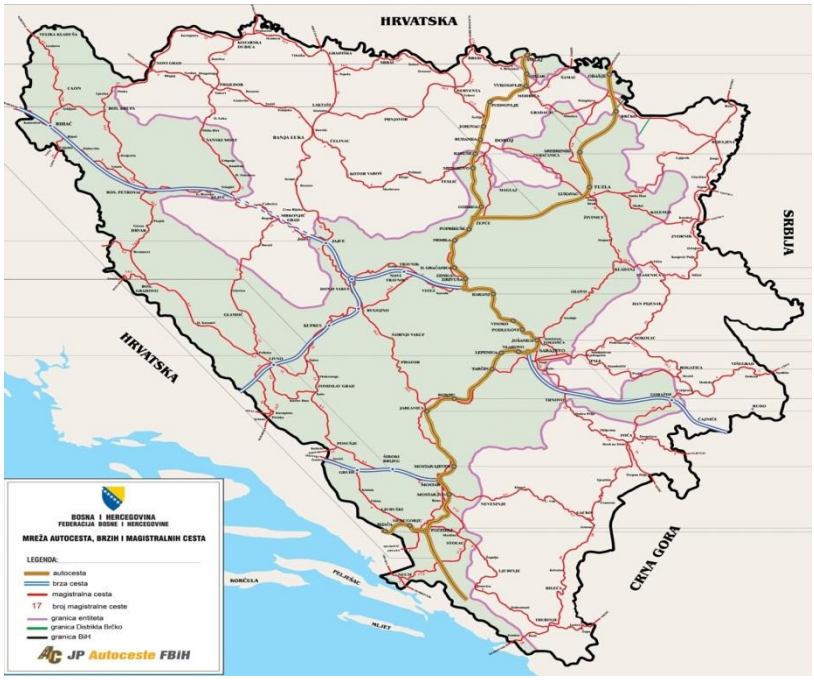


Figure 3.1.1.3. Plan of motorways and expressways in Bosnia and Herzegovina

3.1.2. Train service

Safety of railway traffic in Bosnia and Herzegovina is in the domain of work of two entity railway, vertically integrated companies: Railways of the Federation of Bosnia and Herzegovina (hereinafter: FBH) and the Republic of Srpska Railways. Railway companies are vapplying entity laws and by-laws (regulations and guidelines) in the field of railways, as well as international standards for the establishment of the security system through the UIC FISE, Technical Specifications for Interoperability (hereinafter referred to as the TSI) and the full implementation of the Convention COTIF supplements.

The Law on Railways of Bosnia and Herzegovina was adopted in 2005 ("Official Gazette", 52/05). This law is considered the reform in the field of railways and it is provided for the establishment of two new institutions that are supposed to contribute to the implementation of the EU Directive 440/91 on the separation of transport operations (operations), and infrastructures.

3.1.2.1. The legal framework for the railway sector of Bosnia and Herzegovina

Railway sector of Bosnia and Herzegovina is organized in accordance with the Convention on international railway transport COTIF, as well as the standards of the International Union of Railways UIC. The basis of the security operation the railways sector of Bosnia and Herzegovina Law on Railways of Bosnia and Herzegovina (2005), the Law on Railways of the Republic of Srpska (2001) and the Law on Railways of the Federation of Bosnia and Herzegovina (2001), which are harmonized with EU directives and international conventions.
In addition to the Law on Railways of Bosnia and Herzegovina are in use and the laws on safety of railway transport of the Federation of Bosnia and Herzegovina and the Law on safety in railway transport RS, as well as the Regulation on the work of Railways of the Federation of Bosnia and Herzegovina and the authorities at extraordinary events, and others subordinate legislation.

3.1.2.2. Transport information railway sector in Bosnia and Herzegovina

Table 3.1.2.2. Transport information of railway sector-goods

Year.	2002	2003	2004	2005	2006	2007	2008	2009
ZRS	1078962	1219896	2525725	5168881	5216201	5.320.000	5.075.802	4.100.707
ZFBH	4200000	4658000	5307000	6742000	6558000	7.168.000	8.348.189	7.202.646
ΣBH	5.278,962	5.877,896	7.832,725	11.910,881	11.774,201	12.488,000	13.423,991	11.301,353

(million)

Table 3.1.2.2.1. Transport information of railway sector - passengers

Year	2002	2003	2004	2005	2006	2007	2008	2009
ZRS	904000	847000	838000	822000	768000	706.000	733.561	446.486
ZFBH	219000	233000	267000	346000	401000	419.744	527.823	452.749
ΣBH	1.123,000	1.080,000	1.105,000	1.168,000	1.169,000	1.115,744	1.261.384	899.235

(thousands)

3.1.2.3. Extraordinary events in railway transport

Under extraordinary event is considered unwanted or unintended sudden event or a specific chain of such events which have the effect of suspending the traffic with human and material damage. Extraordinary events are divided into the following categories: collisions, train derailment, accidents caused by crossing level crossing, facial injuries caused by wagons in motion, fires, explosions, natural disasters, force majeure, terrorism and others. (Directive 2004/49 / EC, Article 3).

Extraordinary events can result from:

- Technical defects in resources, facilities and equipment such as wagons, locomotives, rail tracks, hump, SS and TK devices, means of production and transmission of electricity and other;
- Errors in the work of the executive staff;
- Accidents, incidents, emergencies at level crossings in the transport of hazardous materials;
- Natural occurrences and force majeure, such as heavy snow, strong winds, thick fog, fires, explosions, floods, earthquakes and more.

Special conditions arise from terrorist acts and war. Manifest through sabotage the disabling of the normal functioning of railway traffic.

In accordance with the above, irrespective of the occurrence of extraordinary or special conditions that may occur, rail must at all times be ready with the organization and technology of work.

3.1.2.4. The causes of extraordinary events

The causes of the extraordinary events in railway transport are outdated rail infrastructure, particularly in the sections where there are critical points that are threatened by landslides, mudslides, then, when due to heavy rainfall that damages the railway embankment, subsidence track, removal of signaling on the line, and the settlements due to non-compliance with the set of signaling on the line, especially in places where the intersecting road and railway line, unauthorized and illegal access railway line by pedestrians. Also, the causes of accidents have become obsolete

vehicular and locomotive parks, natural disasters and catastrophes and human factors (errors railway executive staff). The most common causes of railway accidents, in the last period, the carelessness of pedestrians at level crossings, and the movement of persons outdoors stripe. Pedestrians and drivers of road vehicles do not pay attention to the movement of trains and signaling stripe. It should be noted constant danger when transporting hazardous materials by rail, and keep in mind the potential far-reaching consequences.

3.1.2.5. Extraordinary events on road crossings

a) The frequency of occurrence of extraordinary events

The frequency of occurrence of railway accidents can be seen in the respective tables. It should be noted that the events of the derailment rail, road crossing and the train rush to pedestrians the most common in the past 8 years.

b) The intensity of the action of extraordinary events

The railway traffic accidents that occurred at level crossings with Bosnia and Herzegovina, on average, 15 persons were killed and 20 people were seriously injured. According to data given in the last 8 years, in railway transport, in addition to the deaths and injuries the railway sector has suffered an indirect damages that are expressed in the duration of interruption of traffic or train delays due to accidents.

c) The duration of extraordinary events

Extraordinary events that are taking place at level crossings cause disruption of railway traffic an average of 6 hours, how long the inspections and investigations of these extraordinary events last, depend on the consequences. These consequences are killed, injured and material damage. For the purpose of operating, as well as preventive a high degree of safety in railway transport, railways in accordance with the law maintain the railroad crossings, railway tracks and crossings indications, traffic signs on roads and devices to protect the safety of traffic on the railway and roads.

A) The areas of vulnerability in terms of traffic safety

From the aspect of safety railway transport is regulated by the mode of transport railway and road vehicles at intersections of roads and railways as well as pedestrian traffic along the railway line. The most frequent occurrence of accidents at level crossings and the unprotected areas of railway lines passing through populated areas.

In addition to considerable material damage, these accidents lead to heavy and light injuries of passengers and railway staff.

B) Extraordinary events during transport of explosive and flammable substances

Key factors underlying the accidents of this type are:

- Low level of training and skill of the person who handle hazardous materials,
- Poor supervision and lack of compliance with legal regulations in this field,
- The absence of specified technical requirements for adequate transport and work with explosives and flammable substances,
- Poor communication links (rail and road) and the like.

a) The frequency of occurrence

Tuzla canton in which a large number of installations of the chemical industry and coal mining is located , in which the normal operation of the necessary daily circulation of explosives, is certainly a potentially dangerous area for the outbreak of accidents of this type.

Great potential danger of transport tanks of liquid chlorine, ammonia, propylene and propylene oxide, highly hazardous materials, in the event of their penetration into the atmosphere.

These materials are used in manufacturing facilities in the municipalities of Tuzla and Lukavac. Otherwise the explosive materials we include solid and liquid explosives, chemical substances, as well as objects containing these substances, which have such properties that, under certain external influences explosive chemical decay, with the release of energy in the form of heat and pressure.

The nomenclature of dangerous substances is determined according to the European Agreement concerning the International Carriage of Dangerous Goods by Road and International conventions on transport by rail COTIF ie. under Part II of the Convention, which regulates the transport of hazardous substances and called the RID.
In our country the most current road, a little less rail transport oil and oil products, which objectively represent a great danger of possible accidents and causing major injury to people and the environment. However, fortunately, in the last few years, no accidents of this type in order to transport flammable and explosive substances.

b) Intensity of action

Possible incidents during the transport of flammable and explosive substances must be treated as a situation with risks to the population and in terms of intensity, duration and areas which may be affected. The intensity of life depends on the amount of hazardous substances that are placed in transport, destructive power of hazardous materials, the crash site and the like.

c) Duration

Hazardous materials such as various flammable and explosive materials, then toxic and corrosive substances may endanger the spilling of the population, but also watercourses and flora and fauna. The duration will, therefore, depend on the identical factors that affect the intensity of the duration of the accident.

d) The area that may be affected

The intensification of production in the chemical and mining areas, and the construction of a large number of new petrol stations in most urban areas increases the risk of accidents that are a consequence of poor organization of such transport of harmful and dangerous materials. The areas where there could be an accident with unforeseeable consequences of the production facilities of the chemical industry and mining, urban areas, as well as railway facilities, are used in these transports, such as stocks Tuzla - Srebrenik - Brcko, Tuzla - Kalesija - Zvornik.

Information about accidents in the railway sector of Bosnia and Herzegovina

Under accident, in accordance with Article 3 of the Directive 2004/49 / EC means unwanted or unintended sudden event or a specific chain of such events which have harmful consequences. Accidents are divided into the following categories: collisions, train derailment, accidents caused by crossing level crossing level crossing, facial injuries caused by wagons in motion, fires and others.

C) The causes of accidents

Table 3.1.2.5. The causes of accidents in railway transport in the Federation of Bosnia and Herzegovina

RFBH (in MLN train x km)	2002	2003	2004	2005	2006	2007	2008	2009
Damaged tracks	1	-	1	-	1	5	1	-
Missed distress signal	-	1	-	-	-	-	-	-
Deviation of the track	-	-	-	3	-	-	-	32
Damaged wheels of tr. in the service	-	-	-	-	-	-	-	-
Broken axle in the service	-	-	-	-	-	3	-	-
Signalization of the wrong side						-	-	-

D) Accidents in which the recorded deaths

Table 3.1.2.5.1. Type of accidents in railway transport in the Federation of Bosnia and Herzegovina

RFBH (in MLN train x km)	2002	2003	2004	2005	2006	2007	2008	2009
Crash	-	-	-	-	-	-	-	-
Fire in wagons	0	1	1	2	-	-	-	3
Popping out of rails	0	1	2	13	2	5	14	6
Road crossing	34	61	94	113	119	21	12	14
Train hitting a pedestrian	17	18	22	25	26	9	8	10
Other	-	-	-	-	-	39	-	15
Unknown	-	-	-	-	-	-	-	-

E) Accidents in which there are recorded deaths

RFBH	2002	2003	2004	2005	2006	2007	2008	2009
Travelers /MLN train x km	-	-	-	-	-	-	-	-
Travelers /BLN passanger x km	-	-	-	-	-	-	-	-
Victims level crossing/MLN train x km	-	-	-	-	-	11	5	2
Unofficial persons/MLN voz x km	9	5	11	9	16	11	5	2
Employees /MLN train x km	-	-	1	-	-	-	1	1
Employees /BLN passangers x km	-	-	-	-	-	-	-	-
Other /MLN train x km	-	-	-	-	-	-	3	8
Unknown/train x km	-	-	-	-	-	-	-	-

Table 3.1.2.5.2. Fatal accidents in railway transport in the Federation of Bosnia and Herzegovina

F) Accidents with injured people

Table 3.1.2.5.3. Accidents with injured persons in railway transport in the Federation of Bosnia and Herzegovina

ŽFBH	2002	2003	2004	2005	2006	2007	2008	2009
Travelers /MLN train x km	**-**	**-**	**-**	1	3	1		1
Travelers /BLN passenger x km	-	-	-	-	-	-		
Victims level crossing /MLN train x km	-	-	**-**	-	-	13	7	3
Unofficial persons/MLN train x km	8	13	11	16	10	11	7	3
Employees /MLN train x km	**-**	-	1	1	-	1		1
Employees /BLN passengers x km	-	-	-	-	-	-		
Other /MLN train x km	-	-	-	-	-	-		2
Unknown/train x km	-	-	-	-	-	-		

Table 3.1.2.5.4. The technical safety of the railway infrastructure in the Federation of Bosnia and Herzegovina[61]

RFBH	2002	2003	2004	2005	2006	2007	2008	2009
Railway stations– Total			59			60	60	60
Stations with streamlined insurance	2	2	2	2	2	2	2	2
Station with full insurance	32	32	32	33	35	35	35	35
Crossing in level(total number)			60			212	203	203
Transitioning level of protection with a manual - semi-barriers (number) (number)	5	8	8	21	21	12	12	12
Total number of lever crossing/km of railway tracks						-	-	
Number APB / km railway (%)	-	-	-	-	-		-	
The total length of the line (double track railway line counts as two)			608,495 km					
Transitioning level automatic protection / km railway line (%)	-	-	-	-	-	-		

Railways of the Federation of Bosnia and Herzegovina has a network of 716 km length of the Corridor Vc Bosanski Samac - Sarajevo - Mostar - Čapljina - plates and the line parallel to the Corridor X: Dobrljin - Banja Luka - Doboj - Tuzla - Zvornik, Brcko and directions - Tuzla - Banovići, Bosnian Novi - Bihac - Knin and Podlugovi - Vareš. Electrified 545 km double-track is 68 km of railway tracks (on the section Doboj - Zenica), with a total of 76 railway stations. Risk assessment in the field of railway transport are: the state of the railway infrastructure, mobile devices, maintenance and functioning of the safety of railway traffic. Railway infrastructure is in a state of great need for maintenance, significant restoration and reconstruction. In the area of mobile assets during the major actions on the modernization of locomotives and freight wagons, and in the preparation phase are important projects of modernization of passenger trains.

The Federation of Bosnia and Herzegovina, for reasons of budgetary constraints, does not fulfill the legal provision under which the Railways of the Federation of Bosnia and Herzegovina plan, and the Federation of Bosnia and Herzegovina fed into the cost of maintaining the railway infrastructure,

[61] Data source on the railway sector: BH Statistics Agency, The Railway Regulatory Body, ŽFBH, CDS.

which causes difficulty in maintaining the situation of business functions and performance of the provisions of the law regulating the area of traffic safety .

3.1.3. Water traffic

The Federation of Bosnia and Herzegovina has an impressive water surface: rivers, natural and artificial lakes and sea space of the Adriatic Sea. The progres s of water traffic in territorial waters belonging to the Federation of Bosnia and Herzegovina, were recorded several incidents that have resulted in human sacrifices.

Accidents mostly occurred due to rollover or collision of vessels (boats, ships, sailing, etc.). As the causes of these incidents were bad weather conditions (wind, poor visibility due to fog, high waves, etc.), bad adjusted speed sailing conditions, lack of training control of vessels - a boat ride without passing the exam, as well as malfunctioning boats.

In the Federation of Bosnia and Herzegovina in the preparation is the law on internal and maritime navigation, as well as a series of ordinances to lawfully regulate this area in order to reduce the risks and increase the safety of vessels and manpower.

3.1.4. Air transport

From airports in the Federation of Bosnia and Herzegovina, for air traffic three were opened, namely: Sarajevo, Tuzla and Mostar. Despite the implementation of all technical tools, there are some problems due to fog and other weather disasters.
Compared to other modes of transport, air transport is the safest and air accidents are rare, due to the application of very strict security measures and air traffic security and military aviation in general.

However, air accidents happen:

- 18.01.1977. the mountain is unusual for Kresevo - due to poor visibility died president of SIV former Yugoslavia Dzemal Bijedic with fellow passengers and crew;
- After the recent war over the mountain Vranica, due to unfavorable weather conditions killed the Principal Deputy High Representative in Bosnia and Herzegovina;
- 26.02.2004. in the locality of Rotimlje near Stolac, re-occurred air accident that killed 9 members of the delegation of the Republic of Macedonia headed by the President.

D – CIVIL DEFENSE FORCES AND FIRE-FIGHTING MATERIAL AND TECHNICAL MEANS ENVISAGES FOR TAKING ON THE TASK OF PROTECTION AND RESCUE FROM NATURAL AND OTHER DISASTERS

Previously listed natural disasters, particularly earthquakes, floods, epidemics, landslides and landslides, as well as the demolition of large dams on reservoirs, fires, explosions, etc. may have consequences on a larger scale.

Therefore, it is expected a large consequences on facilities and property, damage to residential, public and other buildings, damage to road and rail roads and damaged buildings on them (bridges, culverts, tunnels, stations), electrical and telecommunication networks, partially or completely destruction of water works and power plants - power plants with facilities for the transmission of electricity, district heating, basic facilities, chemical, automotive and other industries, the destruction of vital property - storage of food, livestock, crops and others.

1. Organization structure protection and rescue

Duties and needs of organization, preparation and implementation of protection and rescue of people and property in the Federation of Bosnia and Herzegovina, established by the law on protection and rescue, as well as implementing regulations arising from this law.

This law prescribes and defines the rights and duties of the authorities of the Federation of Bosnia and Herzegovina, cantons, cities and municipalities in the area of protection and rescue. All these levels of government, law and other regulations establish the appropriate organs of civil protection, such as:

- Federal administration of civil protection - for the Federation of Bosnia and Herzegovina,
- Cantonal administration of civil protection - for the Canton,
- Municipal / urban / civil protection - in all municipalities (city).

The composition of the said body of civil protection for all levels of organized civil protection operational centers in accordance with the Regulations on the organization and functioning of the operational centers of civil protection ("Official Gazette of BH", 8/07).

2. Implementation of the Law on Protection and Rescue

In addition to the formation of these structures of civil protection provided for administrative, professional and other activities in the field of protection and rescue, all levels of government in the Federation of Bosnia and Herzegovina shall make appropriate laws on the establishment of expert-operative body for the management of protection and rescue actions, i.e. civil defense.

Through the implementation of the Law on Protection and Rescue and regulations are as follows:

2.1. At the federal level

After the Federal administration of civil protection became an independent organization which for their work is responsible directly to the Government of the Federation of Bosnia and Herzegovina, the Law on Federal Ministries and other bodies of Federal Administration ("Official Gazette of the Federation BH", Nos. 48/99, 19/03, 38 / 05, 2/06, 8/06, 61/06 and 48/11), established its competence and regulates the other issues of importance to the organization and functioning of this Administration. However, although the Ordinance on internal organization of the Federal administration of civil protection No. 01-02 / 5-87 / 14 of 20.03.2014. filling all organizational units in the Federal administration of civil protection is still not fully completed.

1) Decree on Federal administration of civil protection headquarters ("Official Gazette of the Federation BH", Nos. 54/03, 38/06, 74/07 and 63/11) Federal administration of civil protection headquarters were appointed, who works in full force and successfully fulfills its function.
2) Fulfilling the obligations arising from the Regulation on the uniform methodology for assessing the damage caused by natural and other disasters ("Official Gazette of the Federation BH", Nos. 75/04, 38/06, 52/09, 56/09 and 36/14), was appointed by the Federal Commission for damage assessment.
3) In accordance with the Regulation on the organization of protection and rescue services of the Federation of Bosnia and Herzegovina ("Official Gazette of the Federation BH", Nos. 58/06, 40/10, 14/12 and 66/12) are formed Federal Service of Protection and Rescue, and that:
a) For radiological, chemical and biological protection (hereinafter: RHB) in the Department of Public Health of the Federation of Bosnia and Herzegovina,
b) For medical care at the public health institution "University Clinical Center Tuzla,
c) For medical treatment in the Institute for Emergency Medical Services of the Sarajevo Canton,
d) For medical treatment in the Clinical Hospital Mostar and RMC "Dr. Safety Music "Mostar,
e) For veterinary affairs in the Veterinary Faculty in Sarajevo,
f) For the control of land in the Federal Institute for Agroecology,
g) For protection and rescue on the water and under the water formed at the Union divers Bosnia and Herzegovina, (although the contract was signed on mutual rights and obligations between the Federal administration of civil protection and the alliance, it has not yet been implemented).
h) For Seismology and Hydrometeorology in the Federal Hydro meteorological Institute - Sarajevo (agreement was signed on mutual rights and obligations, but has not started its implementation).
I) rescue from heights in the "Club rescuers 2000" Sarajevo,
j) For air transport and reconnaissance (this service has not yet signed an agreement on mutual rights and obligations),
k) Service of the Red Cross / Cross of the Federation for the Red Cross / Cross of the Federation of Bosnia and Herzegovina.

By releasing the above regulation, the Federal administration of civil protection has undertaken appropriate activities with representatives of institutions and associations which form these services to immediately:

- Make appropriate decisions and regulations for the establishment of protection and rescue services.
- Enact and adopt personal and material formations of protection and rescue services,
- Carry out a sufficient number of emergency and rescue professional staff,
- Appoint the Head and Deputy Head of the Department of protection and rescue, and accordingly make a decision on their appointment,
- Identify needs for equipment, material and technical and other means necessary for the operation of the service, and to determine priority needs for the purchase of tools and equipment and the delivery of Federal administration of Civil Protection on the implementation,
- Draw up working procedures for the operation of the service in case of involvement in protection and rescue tasks within their competence.

Once you have completed all of these actions, the contracts on mutual rights and obligations in performing tasks of protection and rescue services from the jurisdiction of a Federal administration of Civil protection and all legal entities and associations of citizens.

In accordance with the Regulation on the organization of the specialized Federal administration of civil protection units of the Federation of Bosnia and Herzegovina ("Official Gazette of BH", No. 51/08) and the Regulations on the organization of protection and rescue services and civil protection units, their jobs, and mode (" Official Gazette of BH ", No. 77/06), formed specialized civil protection units, as follows:

a) for search and rescue in avalanches, which is filled with personnel from the Federal Ministry of the Interior
b) for rescue on the water and under the water, which is also filled by manpower from the MoI.,
c) rescue from the ruins, which are filled by persons employed in the Federal administration of civil protection and partly of men from the Federation Ministry of Interior,
d) For RCB protection, which is filled with personnel from the Federal administration of civil protection, which has the appropriate expertise for such activities

e) For mining and other tasks of protection and rescue, which is filled with personnel from demining teams of the Federal administration of Civil protection, trained for carrying out tasks within the competence of the unit.

2.2. At the Cantonal level

1) Adoption of the Law on protection and rescue, in all cantons in the Federation of Bosnia and Herzegovina, formed the Cantona administration of civil protection, but are still not fully staffed personnel and material, that is not trained and placed in the function of protection and rescue in full capacity. This is because it is still, in some Cantonal administrations of civil protection, even though they adopted regulations on internal organization which does not implement appropriate recruitment in accordance with the adopted rules.
2) In all cantons civil protection staff as professional and operational bodies were appointed to manage protection and rescue actions, although not yet completed the process of human and material replenishment and training to perform functional tasks.
3) In all the cantons of the Federation of Bosnia and Herzegovina, called the Commission to assess the damage caused by natural and other disasters.
4) The formation of civil protection as well as their equipment and staff for the immediate involvement of the fulfillment of the tasks of protection and rescue of people and property from natural and other disasters cannot be carried out in accordance with Article 127 of the Law on Protection and Rescue, because still in some cantons they have not made risk assessment of natural and other disasters or the same have not been established for the purposes of the appropriate search and rescue forces at the Cantonal level.

2.3. At the municipal / city level

1) Since the entry into force of the Law on protection and rescue, to this day the process is lasting in terms of forming municipal / city civil protection services that perform administrative, professional and other tasks of protection and rescue from the jurisdiction of the municipality, with the status of municipal administrative services, and the same and more are not completed. In this regard, in some cantons of the Federation of Bosnia and Herzegovina, cities and municipalities formed an independent municipality / city administrative services, but in some municipalities, instead of individual administrative services of the same form as sections or departments for Civil protection in the context of other, existing municipal services, which diverges from the law provides for a single structure in the system of protection and rescue.

2) Also, in accordance with the Ordinance on the work and functioning of headquarters and commissioners of civil protection ("Official Gazette of the Federation BH", Nos. 77/06, 05/07 and 32/14) (hereinafter: the Regulations on the functioning of the headquarters and Commissioner) were formed civil protection staff except in the municipality of Grahovo.

3) In accordance with the Decree on unique methodology to assess damage caused by natural and other disasters ("Official Gazette of the Federation BH", No. 75/04, 38/06, 52/09, 56/09 and 36/14), in all municipalities have appointed the Commission to assess the damage.

4) The formation of civil protection as well as their equipment and staff for the immediate involvement of the fulfillment of the tasks of protection and rescue of people and property from natural and other disasters cannot be carried out in accordance with Article 127 of the Law on protection and rescue, because still in the municipalities of Fojnica, Domaljevac - Samac, Straight, Grude, Siroki Brijeg and Ljubuski risk assessment of natural and other disasters were not carried out or the same have not been established for the purposes of the appropriate search and rescue forces at the municipal level.

Regarding the formation of units in the cantons and municipalities / city, it should be noted the problem of staffing because the adopted Ordinance on the content and manner of keeping records of civilian protection ("Official Gazette of BH", No. 67/13), does not allow access to personal data persons who should be engaged in the headquarters, units and commissioners of civil protection due to the existence of laws on protection of personal data.

2.4. Companies and other legal entities referred to in Article 32 of the Law on Protection and Rescue

The protection and rescue services, as a rule, are organized into legal entities that are defined by Article 32 of the Law on protection and rescue, and whose regular activity are of direct relevance to safety and rescue. This applies to companies and other legal persons performing activities in the field of: health, veterinary medicine, housing and utility services, water management, forestry, agriculture, chemical and petrochemical industries, mining, construction, transportation, supply, catering, firefighting, hydrometeorology seismology, ecology and other areas in which they carry out activities relevant to the protection and rescue of people and property from natural and other disasters.

1) Government of the Federation in accordance with Article 123, Paragraph 3 of the Law on protection and rescue, on the proposal of the Federal administration of civil protection, determines legal entities and associations of which will organize the service of protection and rescue, which will act on the territory of the Federation,
2) Also, the Cantonal government or head of municipality / mayor, at the proposal of the Cantonal administration of civil protection, and municipal / city civil protection determined by legal entities and citizens' associations which will organize the service of protection and rescue, which will operate in the canton, or municipality.

2.5. Organization structure of protection and rescue

According to the Law on protection and rescue and implementing regulations arising from this law, and after collecting and analyzing indicators of the implementation of these commitments, we conclude that the state organization structure of the system of protection and rescue in the Federation of Bosnia and Herzegovina, the cantons is uneven by municipalities and therefore does not contribute to the efficiency of operation of the system of protection and rescue in the prevention phase, rescue and eliminating the consequences, which can be seen from the following analytical presentation.

2.5.1. Una-Sana Canton

- Formed the Cantonal administration of civil protection, Regulations on internal organization;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquearter;
- Formed the Operations Centre of civil protection, which operates 24 hours a day, which is staffed by four employees;
- In all eight municipalities of Canton was established municipal civil protection;
- In all eight municipalities was appointed and municipal civil protection staff;
- Operating Centers of civil protection has been established in all eight municipalities.

2.5.2. Posavina Canton

- Formed cantonal administration of civil protection;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquarter;
- Formed the Operations Centre of civil protection, which works 14 hours a day and which employs four workers;
- In the municipality of Orasje was formed municipal civil protection as an independent service, and municipalities Domaljevac - Samac and Odzak established civil protection operations are situated in the context of other municipal departments;
- In all 3 municipalities Canton appointed municipal civil protection staff;
- Operating Centers of civil protection has been established in the municipality of Orasje, and they are not formed in the municipalities Domaljevac - Samac and Odzak.

2.5.3. Tuzla canton

- Formed cantonal administration of civil protection and adopted Rulebook on internal organization;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection staff;
- Formed the Operations Centre of civil protection, which works 12 to 16 hours a day and which employs four workers;
- 11 municipalities in the canton were formed independent of the municipal civil protection service, while in Kladanj and Teočak tasks of civil protection were established in a framework of other municipal departments;
- In all 13 districts of the canton was appointed municipal civil protection headquarter
- Operational centers of civil protection are formed in six municipalities, namely: Doboj - East, Lukavac, Sapna, Teočak, Zivinice and Celic.

2.5.4. Zenica-Doboj Canton

- Formed the Cantonal administration of civil protection and the Ordinance on internal organization;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquarter;
- Formed the Operations Centre of civil protection, which works 14 hours a day and which employs 3 staff;
- 11 municipalities in the canton, formed the independent municipal services, civil protection, while in Breza tasks of civil protection were established in a framework of other municipal departments;
- In all 12 municipalities of the Canton appointed the municipal civil protection headquarter;
- Operational centers of civil protection are formed in six municipalities, namely: Breza, Doboj - South, Lead, Natron, Vares and Zepce.

2.5.5. Bosnia-Podrinje Canton

Formed the Cantonal administration of civil protection and the Ordinance on internal organization;

- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquarter
- Formed the Operations centre of civil protection, which works 12 hours a day and which employs 3 staff;
- 2 in the municipality of Canton formed independent municipal services, civil protection, while in Gorazde tasks of civil protection were established in a framework of other municipal departments;
- In all municipalities of the canton is appointed and municipal civil protection headquarter;
- Operating Centers of civil protection are not formed in one municipality.

2.5.6 Central Bosnia Canton

- Formed the Cantonal administration of civil protection and the Ordinance on internal organization;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection staff;
- Formed the Operations centre of civil protection, which is open 24 hours and in which employs four workers;

- In 6 municipalities of Canton formed independent municipal services, civil protection, while in Busovača, Donji Vakuf, Kiseljak, Kresevo, Fojnica and Dobretići, tasks of civil protection were established in a framework of other municipal departments;
- In all 12 municipalities of the canton was appointed municipal civil protection headquarter
- Operational centers of civil protection are formed in 4 municipalities (communes Dobretići, Fojnica, Kiseljak, and Kresevo)

2.5.7. Herzegovina-Neretva Canton

- Formed the Cantonal administration of civil protection and fire fighting and the Ordinance on internal organization;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquarter;
- Formed the Operations Centre of Civil protection, which works 24 hours in which employs four workers;
- In 4 municipalities were formed independent of the municipal civil protection service, while in the window - Rama, Straight, Solak, Neon and the City of Mostar, tasks within civil protection were established in a framework of other municipal / city services;
- In 8 municipalities were appointed municipal civil defense headquarters (HQ not formed located in the Municipality);
- Operating Centers of civil protection have been established in 8 municipalities (municipality Ravno did not establish the center).

2.5.8. West Herzegovina Canton

- Formed the Cantonal administration of civil protection and the Ordinance on internal organization;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquarter;
- Formed the Operations Centre of civil protection, who works 8 hours a day in which he hired two employees;
- In the municipality of Siroki Brijeg formed an independent municipal civil protection, while in Ljubuski, Posusje and Grude tasks of civil protection were established in a framework of other municipal / city services;
- All the municipalities in the canton were formed and municipal civil protection headquarter;
- Operating Centers of civil protection has been established in 3 municipalities, except in the municipality of Posusje.

2.5.9. Canton Sarajevo

- Formed cantonal administration of civil protection and adopted Rulebook on internal organization;
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquarter;
- Formed Cantonal operative civil defense center that operates 24 hours a day;
- All the municipalities in the canton were formed independent of the municipal civil protection;
- All the municipalities in the canton were formed and municipal civil protection staff;
- Operating Centers civil protection have been established in eight municipalities, while in the municipality of Trnovo has not been established;
- Operational centers of civil protection of the Municipality of Center are open 24 hours.

2.5.10. Canton 10

- Formed cantonal administration of civil protection and adopted Rulebook on internal organization.
- In accordance with the Regulation on the functioning of the headquarters and commissioners formed the Cantonal civil protection headquarter;
- Formed the Operations Centre of Civil protection, which operates 24 hours a day and which employs four workers;
- In all municipalities were formed independent of the municipal civil protection;
- In 5 municipalities cantons are appointed municipal civil protection headquarter, except for the municipality Grahovo;
- Operating Centers of civil protection are not in the municipalities: Drvar, Kupres, Livno.

2.6. Findings

Based on the above analysis presented indicators, we reached the following conclusions:

- The Cantonal level (ten cantons) function cantonal administration of civil protection with their operational centers.

The internal organization of Cantonal administration of civil protection is adapted to the specifics of each canton and is set so that it can meet all the commitments in the implementation of protection measures and rescue. Arrangement of protection and rescue in the cantons is regulated by special regulation issued by the Cantonal government. In all 10 cantons such regulations are adopted. It is a different degree and level of organization of protection and rescue by the cantons and municipalities, depending on the budget capacity of each canton or municipality.

- Tied to this , having in mind that all cantons did not in time brought the relevant regulations governing this area in the Canton, municipalities / towns for that reason, did not timely make its decision on the organization and functioning of protection and rescue.
- Administrative, professional and other activities in the field of protection and rescue in the competence of the cantons the Cantonal administration of civil protection as independent Cantonal administrations.

3. Equipment

3.1. Equipment structure and staffs of civil defense units

Considering that the civil protection until 1992, was fully equipped with material and technical means and equipment necessary for the operation and action in the event of natural and other disasters during the past war activities listed MTS are stolen, destroyed or out of date. Currently the civil protection and the organized forces of protection and rescue have minor tangible assets and equipment as hand tools and light handheld machines and appliances which are sufficient to enable civil protection forces could operate effectively in the protection and rescue actions incurred by natural and other disasters.

Getting adequate MTS and equipment was mainly restricted to the minimum separation of funds from the budgets of municipalities, cantons for the equipment for the work and activities and on donor funds.

In the future it is necessary to timely plan appropriate funding for the purchase and equipping and training of structures for protection and rescue in accordance with the Law on protection and rescue.

4. Condition of organization, manning and equipment of operational centers of civil protection

Law on protection and rescue founded he organization and functioning of the operational centers of civil protection at all levels in the Federation of Bosnia and Herzegovina in a manner specified in the Regulations on the organization and functioning of the operational centers of civil protection.

The above framework defines the place, role, responsibilities, tasks, and procedures, methods of organization, work and working conditions of municipal, Cantonal and Federal operations center of civil protection. It contains precise and contents of information that is collected and processed, their temporal dynamics, form, flow and distribution destinations.

Law on protection and rescue and the Regulations on the organization and functioning of operational centers of civil protection, furthermore, establish a framework linking obligations organs, agencies and legal persons essential for the protection and rescue with the relevant operational centers of civil protection.

4.1. Functional capacity of operational centers of civil protection of the Federation of Bosnia and Herzegovina

Compared to the functionality of operational centers in the Federation of Bosnia and Herzegovina presented in the previous document Risk assessment in 2005, it is evident that, in general, significant progress was not achieved. Here we present an overview of the main characteristics of the operations centre of the Federal administration of civil protection and Cantonal operational centers.

4.1.1. Operations Centre of Federal administration of civil protection

a) Availability: from September 2011 in the Operational centre of the Federal administration of civil protection are employed five employees and manager - civil servant.

b) Working time (availability): 24/7/365.

c) Training: staff training is reduced to occasionally attend various presentations while remotely specialist training was not carried out due to lack of funding. Ignorance of foreign languages is a handicap that limits participation operatives in international training and exercises, a problem in using the documents as in the case of possible information exchange with entities that are not from our language area.

d) Working conditions: built and furnished adequate room for accommodation of the information and communication equipment. The basic equipment of the Operations centre federal administration of civil protection was finished, is designed to be, in normal conditions on the ground, providing training services in the work of the staff-operatives as he is one of the legal obligations.

Due to the intensive construction of tall apartment buildings in the immediate vicinity of the building operations center, the use of HF radio equipment has become almost impossible and input the new emission location or a new technical solution.

e) Equipment (mts): Operations Centre of the Federal administration of civil protection has a complex information system that is sized to meet the essential needs of IT for the next decade. Construction of the new telephone system, the preconditions for networking with other holders of communication resources or relevant entities in terms of protection and rescue. Completing the work on the power

system auto spare-uninterruptible power supply which will be completed basic technological unit operations center.
f) Communication and information linkages: operates using the resources of public telecom operators (mobile and fixed telephony, facsimile and Internet access). No established regular alternative means of communication. The termination of the use of HF radio equipment in demining units, as, due to the reasons stated under paragraph d), and the lack of procedures for operation, this type of communication is completely extinguished. No established direct alternative ways of communicating with any of the forces in the field.
g) Operational procedures:

- Information on the occurrence of natural and other disasters shape and specify the use of a standardized list of questions on the subject accident.
- The regular use of two types of requirements for medical evacuation: the first use the TUN teams of the Federal administration of civil protection and the other is the Medevac request of the BH Armed Forces.
- Request for assistance OSBH procedures for assistance in human and technical resources is initiated at the disposal of the armed forces.
- Request for international aid initiated the procedure for obtaining, or the introduction of international assistance. All requests to the BH Armed Forces as well as the request to international assistance at any level of the Federation of Bosnia and Herzegovina are created through OKC112.

4.1.2. Cantonal operating centers (COC)

a) Availability of Cantonal operational centers (referred to as COC) Bihac, Orasje, Mostar and Sarajevo five operatives, KOC and Grude, Livno and Travnik four operatives, KOC Tuzla and Zenica three and KOC Gorazde one operative.
b) Working time (availability): full-time 24/7/365 determined by law is carried out in KOC and Bihac, Orasje, Mostar and Sarajevo.
c) Training: as under c) in the preceding paragraph.
d) Working conditions: most of the operational centers have still not resolved the issue of space to accommodate the equipment that requires air-conditioned environment and energy.
e) Equipment (mts): worst equipped are Canton 10 and Posavina Canton, which for its work have only available elementary office equipment and telephone.
f) Communication and information linkages: Visibly equipment PMR equipment is done only in the Tuzla Canton.
g) Operational procedures in the use of all the procedures listed under g) of the previous point the requests for medical evacuation for the TUN teams.
h) The aggravating circumstances during the work:
- Poor financial situation in some cantons by automatism is reflected in the dynamics of outfitting the KOC.

- As a result of failure to pay bills for telephone service by the Government HNK there is often the disconnect of phone lines and Internet access to KOC in Mostar, and the exclusion were recorded in the period of the declaration of a natural disaster in the territory of cantons.
- There was non-compliance procedures to provide information about disturbed interpersonal relationships.

4.2. Utilization of communication resources of other entities

a) Public telecom operators: In the Federation of Bosnia and Herzegovin all three BH public telephone operators are present, with MTEL is present only in the form of GSM service providers. Calls to 121 are routed to the closest geographic KOC-in, except that in some cases, due to the low density of base stations in some regions, the call ends with improper COC-in. Given that this is a purely income-based companies to their services and service-oriented zones in order to make profits. The events of two years ago showed the vulnerability of these systems with long power outage of electricity.
b) Private providers of telephone and communications services: Due to essentially occur as sub provider; from the standpoint of protection and rescue they have no practical value.

c) Cable operators: although concentrated in urban areas, are an essential medium in the case of the need for prompt notification to the mass population.
d) Public enterprises: mainly electric power and railways of the Federation of Bosnia and Herzegovina, except as important actors in the system of protection and rescue on the activities carried out by the same have respectable communication resources that cover the sparsely populated and difficult to access regions. In addition, it is important to specify the Transmission Company of Bosnia and Herzegovina which also has a developed communication infrastructure co-located with the transmission line route.
e) Public and private broadcasters: because of the lack of precise legal provisions and adopted technical solutions are used in the most efficient manner.
f) Holders of communication resources at the level of Bosnia and Herzegovina: the current two most developed communication infrastructure on the territory of Bosnia and Herzegovina is network CIPS - the Ministry of civil affairs and the network of the Border Police. In addition to the large leakage capacity, this network also regularly held.
g) Radio amateurs: although they represent a cheap and professional communication potential, this association of citizens in the system of protection and rescue was only formally recognized.

4.3. Findings

In the event of natural and other disasters, which would be damaged or inaccessible infrastructure of telecom operators, operating centers of any level would not be able to provide the necessary communication support to relevant civil defense headquarters. The exceptions to the above are situations where operational centers of various levels of government are locally co-located.

In addition to the previously stated tasks in equipping operational centers and training staff and equipping the subjects of protection and rescue, should be at the same time:

- Targeted training to profile staff operating centers that in cases of emergency response have the ability to quickly cope in a given situation, and the ability to draw the maximum from the available equipment;
- Build operations centre Federal administration of civil protection so that it can perform and provides a legally defined control and support Cantonal operational centers, which includes advanced technical equipment and staff training;
- Initiate procedures to establish the role of public telecom operators in the states immediately and during the declaration of a disaster which would imply the setting at the request of the ad hoc GSM base stations, allocating a dedicated connection lines, the appointment of duty technical support, etc. .;
- Special regulations to facilitate the redistribution of surplus equipment and resources among all the civil protection structures.

5. Level of training and competence

For the civil protection system in the Federation of Bosnia and Herzegovina to be an effective and meaningful it is necessary for staff, services, specialty units and civil protection to be trained and equiped depending on the estimated risk of danger from natural and other disasters.

If the readiness of response to natural and other disasters is an indicator of successful prevention and planned carried out preparations and if the mitigation and elimination of consequences is a job "half done", then training and equipmentis a condition without which we cannot talk about readiness. Therefore, for the purposes of training and training structures for protection and rescue, on the basis of Article 165 of the Law on protection and rescue, Training Center structure protection and rescue and technical work is formed, which is part of the Federal administration ofcCivil protection, which is in the phase of the material-techincal modernization , filling of staff and appropriate certification for the purpose for which it was formed.
Training activities and training have been intensified in 2003, when on the basis of financial participation of the Government of the Federation of Bosnia and Herzegovina completed the construction of the Training Centre structure for protection and rescue. Funds from Project Disaster Preparedness and Prevention within the demining program which is financed by the Delegation of the

European Commission, the Centre is equipped with modern technical means and equipment for part of teaching in the field of protection and rescue for administrative and operational-technical civil protection bodies.

5.1. Realization of training activities and training in order to achieve readiness

2003 - 2013 organized numerous training activities and training structures for protection and rescue in local and foreign organization.

All the activities were carried out with the objective of reviewing the state of normative and establishing the organization and search and rescue forces at all levels, as well as education and exchange of experience in preparation and adoption of plans and programs for protection and rescue of people and property from natural and other disasters in Federation Bosnia and Herzegovina, cantons and municipalities, and management actions in the protection and rescue of people and property.

5.2. Training activities and training of international importance

At international exercises participants were:

- Fire-rescue team from Zenica, 4 rescuers,
- Team of medical assistance, service for Missing and team for psychosocial assistance of the Red Cross of the Federation of Bosnia and Herzegovina consisted of 12 members and 1 sanitation vehicle,
- Team for RCB detecting of the Federal Service for RCB protection with 1 car and 5 RHB Scouts,
- Team rapid response, demining B team of the Federal administration of civil protection of Mostar within the 1 terrain and ambulance and 9 members,
- A team of rescue on water and under the Federal Service for rescuing on and under the water and vertical transportation within the two vehicles. 2 boats from Mostar and 11 members,
- Team for searching of buried in the rubble of the Federal specialized units for rescue from the rubble composed of one vehicle to transport people and the cage with the dogs, 2 instructor-guide dogs and two dogs specially trained to detect buried in the rubble,
- Federal administration of civil protection staff composed of 4 members of staff and two operatives from the operational center of the Federal administration of civil protection,
- Evaluator and coordinator of the federal forces in the exercise, two representatives of the Federal administration of civil protection with a passenger car and a number of others.

Since training is a stake without which we cannot talk about readiness to response to natural disasters, training center structure protection and rescue and technical jobs with modest technical and financial capacities (currently with two highly educated employees, and their increased involvement) and in cooperation with other departments of the Federal administration of civil protection, made a great contribution to the organization and preparation and sending members of the federal structure of protection and rescue in various types of training and training in and outside the country. Thus, the Centre made a great contribution in the preparation and organization of international exercises (in 2008, 2010, and 2012), and the realization of topics for training civil defense, as the Federal Staff in 2011, and civil defense Canton and municipalities in 2011, and addressed the requirements for providing technical assistance.
Also, the training center structure protection and rescue and technical work has provided expert assistance to the municipal civil protection when performing exercises with the structures of protection and rescue (municipalities Vogosca, Novo Sarajevo, Sarajevo Center, etc.). In addition to these obligations, there is an expert help from Faculty of Political Sciences in Sarajevo. and in the period from 2002 to 2007, conducted training, i.e. professional practice for 279 students IV year, the Department "Defence and security", and from 2008 to 2013 were carried out certain teaching subjects

in the curriculum (hereinafter referred to as the curriculum) for 241 students II and III, the Department for Security and Peace Studies, so that the training of the teacher-instructor of the Federal administration of civil protection in the premises of the Centers for training structures for protection and rescue and technical affairs of the Federal administration of civil protection passed a total of 520 students. This suggests the traditionally good cooperation in the implementation of teaching topics with the scientific-educational institution of higher education, with which cooperation will continue in the future, not only through training but also through assistance in the preparation of individual projects, scientific research papers related to the field of protection and rescue.

5.3. International donors and partners who are financially and operationally-qualified their support and enhance the training process and training

An effective system of civil protection requires the existence of available funds for personnel, equipment and training at all levels, in order to allow civil protection authorities to implement their statutory tasks.
The training process and the training would not be possible that such activities are not to the assignment of experts, financial, organizational and technical support by numerous donors, in order to enhance the knowledge of international, regional and national organizations and their programs and mechanisms of response to disaster management.

Federal administration of civil protection in the implementation of training activities for all these years have helped numerous governments, international and regional organizations and institutions, numerous governmental and nongovernmental organizations.

5.4. Further plans on training activities and training

1) For Training Center structure protection and rescue and technical issues to be able to perform legal duties in full capacity, it is necessary to fill the same professional staff, according to the established job systematization, and equip it with modern material and technical means.
2) To intensify work on scientific research and publishing activities, and thus increase library holdings in the field of protection and rescue, as part of the Professional Library of the Federal administration of civil protection. The research work included scientific staff, as well as experts from the structure of protection and rescue system at all levels.
3) The analysis in the field of training and vocational training structures for protection and rescue at the municipal, city and Cantonal level has shown that it has achieved initial results, and that the curriculum adopted for the period 2009 - 2012 are only partly realized, but their scope and content evaluated as applicable. In the future it is necessary to bring innovated - supplemented NPiPs, for the period 2013-2015, and as part of these plans, and included plans to be adopted in accordance with the Law on fire protection, referring to the curriculum of professional training of inspectors fire protection and fire-fighting inspectors and curriculum training for professional development, training and conditioning of professional firefighters, training program and training for volunteer firemen and passing the professional exam for volunteer firemen and training employees to corporate entities, government agencies and other institutions in the field of fire protection.
4) The basic prerequisite for the functioning of the unified system of protection and rescue in the Federation of Bosnia and Herzegovina is the establishment of an efficient organization at all levels of the organization of protection and rescue in municipalities, cities and cantons, in particular, a quality selection of managerial and other professional persons in the Federal administration of civil protection, as an adequate support executive and legislative bodies at all levels, in their equipping, training and training on the adopted curriculum's.
5) For the Federal administration of civil protection to take the necessary actions and procedures in the planning, organization (material and technical), and the implementation of training future trainers-lecturers, who will after completion of training receive appropriate certificates and be able to spend training at the municipal, Cantonal and federal level.
6) Through the inspection and supervision to determine the implementation of the adopted policies and laws, and state organization structure of protection and rescue in the Federation of Bosnia and

Herzegovina, and take measures to their organization and functioning comply with legal requirements and then move on to the implementation of a curriculum.
For the civil protection system in the Federation of Bosnia and Herzegovina and be effective and meaningful it is necessary for staff, service of protection and rescue and civil defense units to be equipped and trained depending on the estimated risk of danger from natural and other disasters.

5.5. Analysis of the state of implementation of curricula in the Federation of Bosnia and Herzegovina, cantons, municipalities and cities

The analysis of the implementation of the curriculum at the level of cantons, municipalities and the city, in this context, and the data on the organized forces of protection and rescue, at these levels of administrative structure, as well as any operational and rescue forces are not formed, according to the Assessment of each level of organization, especially municipalities, cities and cantons, and as such do not provide the security that is necessary in order to protect citizens in the event of natural and other disasters.
The curricula of training and training and rescue forces of the Federation of Bosnia and Herzegovina have been mostly implemented. Training and training of protection and rescue services of the Federation of Bosnia and Herzegovina and of the specialized Federal administration of civil protection units, carried out in the framework of their training through their regular activities, as well as the Plan and programs and specialist training, and through participation in numerous workshops, seminars and exercises in Bosnia and Herzegovina or outside Bosnia and Herzegovina, with the aim of gaining new experiences - lessons learned in training for the management and response to crises and disasters.

6. The organization and equipment of firefighting capacities

6.1. In the Federation of Bosnia and Herzegovina

Based on other information available Federal administration of Civil protection, and submitted by the Cantonal administration and civil protection municipality / city in the period from 2009 to 2014, in terms of organization, age and educational structure fire power, fire power and equipment of vehicles and firefighting technique, the next state was recorded:
1) The Federation of Bosnia and Herzegovina has a total of 1,905 members of the fire brigade. Of this number, the 802 professional firefighters, volunteer firefighters, and members of the DVD are 847, while the 256 members of the fire brigades that have formed in legal entities. These data on the total number of volunteer firefighters should be suspended, as it was presented not precise data on the number of members of the DVD or DVJ-which have the status of voluntary firemen (who passed exams for volunteer firefighter in accordance with applicable regulations). This applies to the stated number of members of fire brigades that have formed in legal entities;
2) Of the total of 79 municipalities in the Federation of Bosnia and Herzegovina (which includes nine municipalities in Sarajevo Canton where the existing Professional Fire Brigade-hp PVB, formed a joint Professional Fire Brigade of the Sarajevo Canton-PVJ HP), in 43 municipalities were formed PVJ ;
3) Of these 43 PVJ-e, 38 municipal PVJ and PVJ Sarajevo Canton, have been established by adopting the decision of the competent authority in the manner prescribed by the Law on Fire Protection,[62] while 5 PVJ in the municipalities of Travnik, Jablanica, Posusje, Ljubuški and Livno, are not part of the municipal civil protection services;
4) Of the total of 79 municipalities in 10 cantons in the Federation of Bosnia and Herzegovina in 48 municipalities have formed volunteer fire departments / units (hereinafter referred to as DVD / DVJ);
5) 22 municipalities in the Federation of Bosnia and Herzegovina, in addition to PVJ, have formed and DVD / DVJ-e (Bihac, Cain, Bosanko Krupa, Tuzla, Lukavac, Srebrenica, Gradacac, Kladanj, Kakanj, Visoko, Maglaj, Tesanj, Lead, Travnik Kiseljak, Jajce, Gornji Vakuf - Uskoplje), while in 6 municipalities in Sarajevo Canton (Stari Grad, Ilidza, Hadzici, Center, Novo Sarajevo, Novi Grad, Vogosca), in addition to PVJ HP, formed DVD / DVJ;

[62] ("Official Gazette of BH", No. 64/09)

6) In the area of 9 municipalities (Sapna, Teočak, Zivinice, Doboj - East, Birch, Natron, Foca - Ustikolina, Dobretići, Grahovo), are formed PVJ-e or DVD / DVJ-e, with the municipalities of Doboj East in case of fire on its territory, engages PVJ Gracanica, Zivinice engaged fire brigade formed in the brown coal mine - RMU "Đurđevik" while Birch engage fire brigade RMU Breza (on the basis of appropriate agreements);
7) The highest number of professional firefighters in the Sarajevo Canton (191), the Zenica-Doboj Canton (159), Tuzla Canton (137), Una-Sana (105), the Herzegovina-Neretva (104), Central (64), the Bosnian Podrinje (19), Canton 10 (12), West (11), while in the Posavina Canton no professional firefighters;

8) The most numerous municipal PVJ-e in the Federation of Bosnia and Herzegovina are in the city of Mostar, Tuzla and Zenica (PVJ / P of the City of Mostar - 80, PVJ Tuzla - 69, PVJ Zenica - 58);
9) From the date of entry into force of the Law on fire protection and fire service (20.10.2009.), the 38 municipalities in the Federation of Bosnia and Herzegovina, municipal / city council at the proposal of the head of municipality / mayor passed a law (decision) on the takeover, and establishing e-PVJ for the municipality / city, while in Sarajevo Canton, formed a joint PVJ of PVB HP (during the final activities on signing the Agreement between the Government of the Sarajevo Canton and head of municipalities who are part of this unit). In this way, e-PVJ in these municipalities / city-situated in the composition of municipal / city civil defense services, while common PVJ which was formed in the Sarajevo Canton, situated in the canton Civil protection Administration;
10) In addition to the Canton of Sarajevo, in the Central and Posavina Canton, launched an initiative to form a joint PVJ between Bugojno, Donji Vakuf and Gornji Vakuf - Uskoplje, based in Bugojno, and between the Government of Posavina Canton and the municipality Orašje.
Summary overview of fire brigades and firefighters in municipalities and cantons in the Federation of Bosnia and Herzegovina, is presented in Table 10, in Annex 6 of this assessment.
The average age of the professional qualifications of the professional firefighters in the Federation of Bosnia and Herzegovina, should be more favorable, because according to his findings on a sample that includes 242 members in 16 PVJ:
- 50% of professional firefighters is within the age group above 46 years of age;
- A very small percentage, only 5.78% of professional firefighters on the treated sample of 16 PVJ the municipality / city and Canton, has completed university degree, while over 90% professional firefighters have completed secondary school education.

According to available data provided by the Cantonal government and municipality / city civil defense services, PVJ and DVJ in the Federation of Bosnia and Herzegovina, has a total of 478 different types of fire-fighting vehicles (Attacking combined, tanks, special vehicles for technical accident, transport techniques and the like.) as follows:

- Sarajevo Canton has 88 fire engines,
- In the Zenica-Doboj Canton 74,
- Una-Sana, Tuzla and Herzegovina-Neretva Canton, have 68 fire engines,
- Central Bosnia Canton has 57 fire engines,
- 20 in the Posavina Canton,
- In Gorazde Canton 15,
- In the West Herzegovina Canton 14,
- K10 has 6 fire engines.

Vehicles which have the fire departments are of different ages (most are aged between 15 and 45). This means that in the future it is necessary and appropriate action taken at all levels to the fleet of firefighting units, when it comes to the age of the vehicle, to change and to make a purchase of new fire engines and other fire-fighting equipment.
The oldest fire trucks are mainly in small and underdeveloped municipalities in the Federation of Bosnia and Herzegovina, which are unable in their budgets and by other means provided by the Act on fire protection, secure the funds needed for the purchase of new fire-fighting vehicles for the equipping of professional and voluntary fire brigades in their area.
Exceptions are PVJ in Zenica, Mostar, Tuzla and Sarajevo Canton PVJ, which in recent years provided the financial means for the purchase of a number of new fire trucks.
After analyzing these data, it can be concluded that the state of organization and equipment of fire power in the Federation of Bosnia and Herzegovina is unsatisfactory, particularly with regard to the following:

1. 38 municipal PVJ's that are established in Bihac, Cazin, Velika Kladusa, Sanski Most, Bosanska Krupa, Buzim, Bosanski Petrovac, Tuzla, Lukavac, Srebrenik, Gracanica, Banovici, Kalesija, Gradačac, Kladanj, Zenica, Zavidovici , Žepče, Kakanj, Vares, High, Maglaj, Tesanj, Olovo, Gorazde, Pale - Praca, Kiseljak, Jajce, Novi Travnik, Gornji Vakuf - Uskoplje, City of Mostar, Konjic, Capljina, Citluk, Neum, Glamoc and Drvar, and PVJ -a Sarajevo Canton, have been established by adopting the decision of the competent authority in the manner prescribed by the Law on Fire Protection,[63] while 5 PVJ in the municipalities of Travnik, Jablanica, Posusje Ljubuski and Livno, are not part of the municipal civil protection services;
2. occupancy PVJ a professional fire department is insufficient and does not correspond to the actual needs, which are yet to be precisely determined when creating fire risk assessment filed of municipality / city or canton, and finally determine the level of fire protection / municipality or canton;
3, in the assessment of fire risk areas of the municipality / city or canton, or plan for fire protection / municipality or canton, will be established and the required number of volunteer firefighters in the DVD / J, as well as the required number of fire units and services for protection against fire the legal entities / business enterprises (ie. the legal entities / companies have the obligation to establish their own unit or service for fire protection).

6.2. The organization, numbers, equipment and training of firefighting force in the field of forestry, the environment and tourism

Federal ministry of agriculture, water and forestry and Federal administration of civil protection did not submit informations from which it can determine whether on the basis of plans for the protection of forests against fire, Cantonal Forestry has organized, equipped and trained their own services, fire protection, emergency workers or groups other fire brigades for fighting forest fires in the areas under its management, which is the number of members in these organizations, with which the material and technical means available to, to what extent are trained and other necessary information.
Also, the Federal ministry of environment and tourism to the Federal administration of civil protection did not provide information for which the protected areas and cultural heritage in the Federation of Bosnia and Herzegovina have been developed and adopted plans for fire protection, and whether they are based on those plans were established and organized services for protection against fire or other fire brigades that fought fires in these areas.
Therefore, in making this assessment it was not possible to assess the situation:
1 .In the field of forestry in the Federation of Bosnia and Herzegovina, in terms of organization and equipment of fire power out fire with their disposal WCQD for the areas under its management,
2. Environment and Tourism in the Federation of Bosnia and Herzegovina, in terms of organization and functioning of preventive fire protection, organization, numbers, training and equipment of fire power out fire with their disposal authorities, legal person or other institutions which are available for use and management of certain protected areas and cultural and historical heritage in the Federation of Bosnia and Herzegovina.

6.3. Findings

1) Given the fact that for a successful intervention in terms of technological and other disasters (especially large forest fires, explosions, accidents involving hazardous materials, etc.), must ensure an extremely short period of time a large number of qualified people, specific equipment and funds, which in pre-established plan should intervene, it can be established that the Federation of Bosnia and Herzegovina does not have enough and in an optimal way organized forces, equipment and resources for successful intervention in this type of natural disasters.[64]
This means that the state organization, occupancy and equipment PVJ well as DVD / J in the Federation of Bosnia and Herzegovina is unsatisfactory, primarily because of the lack of enforcement of the provisions of the Law on fire protection, and in particular the provisions governing:

[63] ("Official Gazette of BH", No. 64/09)
[64] Bihac, Buzim, Sanski Most, Kljuc, Tuzla, Banovici, Zepce, Vares, Zavidovici, Gorazde, Kiseljak, Novi Travnik, Ljubuski, Posusje, Glamoc and Canton

a) integrating existing PVJ in authorities of cantonal administrations of civil protection, municipalities / towns and their organization in the manner prescribed by the Law on fire protection, which are only 38 municipalities and one canton in the Federation of Bosnia and Herzegovina, formed PVJ for their area, in a way provided by the said law;
b) the preparation and adoption of planning documents (fire hazard assessment, fire safety plan, programming development of fire protection and fire-fighting), which, among other things, the municipality / city and cantons, did not determine the required number of professional, but also volunteer firefighters for protection of their area, and the occupancy rate PVJ a professional fire department in the Federation of Bosnia and Herzegovina, as well as their level of training, insufficient and inadequate to needs;
c) organization DVD / J in the system of protection and rescue, as well as additional power for the fire service, which is why DVD / J generally do not resolve their status in the manner prescribed by the Law on fire protection and remain outside the protection and rescue system (for this reason, I cannot exercise the right to provide financial and all other forms of assistance in fulfilling its role in the protection and rescue, and to train and equip adequately);
d) provide the necessary financial resources for the operation and equipping PVJ and DVJ.
2) taking into account the data on PVJ formed in the Federation of Bosnia and Herzegovina, it can be said that their number as well as the occupancy rate is too low (in relation to the actual needs, that are yet to determine precisely when drafting and adopting the above planning documents for the municipality / city or canton), and that is for the most PVJ-and that after adoption and by the force of the Law on Fire Protection, taken from existing PVJ or in some cases from the DVJ.[65]
DVJ and fire units in entities that in accordance with the Law on Fire Protection represent reinforcements for the fire service, the units that are in the Federation of Bosnia and Herzegovina mostly formed prior to its adoption.

Status of professional or voluntary firemen, members of the above PVJ and DVJ in the Federation of Bosnia and Herzegovina (which include the members of the existing entrepreneurial fire brigades), mainly acquired retraining gained interest after completion of III or IV level of qualification of appropriate technology direction (fire, mechanical, construction, metal, chemical, electrical, forestry or other technical professions), and passing exams for professional or volunteer firefighter in accordance with the laws passed on the basis of the Law on Fire Protection ("Official Gazette of SR BH" No. 15/87, 37/88, 38/89, 19/90 and 26/90 and "Official Gazette of SR BH", Nos. 13/93 and 20/95) or Cantonal laws in this area.
Since most municipalities / towns and cantons did not bring fire risk assessment and fire protection plans, they are not determined by legal entities that must establish its own fire brigade or otherwise, to provide fire power to protect their buildings or premises, or has not been determined necessary the number of fire brigades in legal entities, as well as the required number of members in these units.
3) The age structure of the PVJ is not satisfactory, you need to fill out a PVJ provide rejuvenation composition in these units.
4) In the Federation of Bosnia and Herzegovina there are no secondary schools in which to educate young people for the "fireman profession" and that would enable rejuvenation composition in PVJ's.
5) Ensuring the company's financial resources necessary to equip the majority PVJ in the Federation of Bosnia and Herzegovina is insufficient and does not meet the minimum requirements.
Because of this, fire trucks and other material and technical resources in the most PVJ are outdated, and the same is not possible to act in a timely manner, or smother large, as well as other types of fire (average age of fire trucks is 15 to 45 years of age).
Available vehicles and other fire-fighting techniques in most DVJ is also outdated, and these units are established in accordance with the Law on Associations and Foundations cannot secure the funds needed for the purchase of new vehicles or fire-fighting techniques, and on the other side of the municipality / city and canton do not resolve their status in the manner established by the Law on Fire Protection, which has prevented their financing in accordance with such law.
We have to emphasize two reasons why the financing PVJ and DVJ in the Federation of Bosnia and Herzegovina are unsatisfactory:
a) the municipality / town, or cantons in their budgets or do not plan very little allocated funds for the purpose of furnishing PVJ or DVD / J, the appropriate material and technical means and equipment,

[65] Legal persons performing the activity which affects the increase in fire danger and risk (former name of these units is determined by the Law on Fire Protection SRBH was enterprising-industrial firefighting units).

b) for failure to implement Article 137 of the Law on Fire Protection,[66] is not effectively resolved the collection of specific, additional financial resources, which, among other things, be used exclusively for the purchase of vehicles and fire-fighting techniques for the purpose of furnishing PVJ and DVJ formed in DVD on the way defined by the Law on Fire Protection.
6) The Federation of Bosnia and Herzegovina does not have the appropriate aircraft for extinguishing large forest and other fires in the open air, which cannot rely on its own air force, but is always this kind of help in extinguishing large forest fires requires OSBH of countries in the region (international aid).
7) The cantons and municipalities / city does not declare a state of emergency in a timely manner by the fire, and when they declare such a state, they do not put Cantonal civil protection headquarter as the sole authority of leadership in the protection and rescue is authorized to take all measures for protection and rescue, and therefore in terms of engaging all available forces and means in the canton of the fire extinguishing open space.
8) Although the Law on fire protection established mechanisms for effective planning of action in firefighting actions, so that every action extinguishing fire brigades starts engagement of the municipality in which the fire originated, and assistance, as appropriate, provide the first neighboring municipalities and Canton, then the adjacent cantons, and then the Federation of Bosnia and Herzegovina, when all the above forces is not possible to localize and extinguish major fires, the cantons / municipalities and the city does not apply fortified order to ask for help in firefighting, or do not comply with the established procedures and measures, which of course has negative consequences for the effective extinguishing large forest fires.
In most cases, the municipality / city and canton in terms of a large forest fire in its territory, shall immediately request the help of Armed Forces of BH and international assistance through the Federal administration of civil protection and the Ministry of Security of Bosnia and Herzegovina, without being applied any of the above procedures and processes established by the Law on fire protection and other regulations governing this issue.

9) In the areas affected by a raging forest fire, often do not have adequate number of police patrols that could in certain circumstances to control the flow of traffic, and enable faster movement of fire trucks and other vehicles involved in extinguishing the fire, and to conduct investigative actions to determine the cause of the fire, finding the perpetrators of arson and other necessary measures and actions under the jurisdiction of the Interior.
10) In KSPD a state organization and equipment of their own power (services for fire protection, emergency groups of workers) to implement preventive measures for fire protection provided for in the plans for the protection of forests against fire (maintenance of forest and forest roads, surveillance and reporting of fires and other preventive measures for fire protection), and for extinguishing forest fires, insufficient and unsatisfactory.

E - Funding Requirements

1. Assess the situation

From stopping the war and the signing of the Dayton Peace Agreement (1995) to the adoption of the Law on protection and rescue (2003) in the Federation of Bosnia and Herzegovina there was no systematic way of financial treatment effects on people and property resulting from the action of natural and other disasters. The Federation of Bosnia and Herzegovina, on the recommendation of the Federal administration of civil protection headquarters usually intervened on the principle of solidarity and on the basis of approximate estimate damage from the budget of the current reserves and from the item "Transfer for special purposes-natural disaster". Cantonal and municipal levels almost did not have emergency funds for this purpose, so that the demand for appropriations from the local level to the Federal administration ofCCivil protection and the Government of the Federation of Bosnia and Herzegovina, at the same time looked like a form of pressure for some kind of financial means on the accounts of local budgets.

[66] Funds from the premium of property insurance against fire and natural forces in the amount of 6% and 1% of the funds, from functional unpaid insurance premiums relating to motor insurance.

The lack of a large number of systematic and appropriate implementing legislation in the field of protection and rescue and financing at the local level, as well as the state, led to an unstable flow of resources for these purposes and questioned the financial transparency, which has repeatedly been an open question of parliamentary debates.

Regardless of the fact that assumptions strengthened collection of public revenues, their financial base, circulation, distribution and use of funds, in the context of this assessment, were not adjusted for the targeted and systemic financial reflection to the protection and rescue of people and property.

2. The resources of the international community

The financial resources of the international community, the government, bilateral and multilateral programs for social and economic stabilization, in addition to mining, are not directed at programs and projects for protection and rescue, except for the administrative costs of the association of civil society and some professional associations of citizens. The demonstrated weaknesses are primarily from domestic carriers planning that did not take seriously the importance of this issue and have not coordinated the project running needs and priorities for protection and rescue, with the objective limits, which are directed placement of funds for subsistence needs, rehabilitation and reconstruction of the country, the economy, a return, build government institutions, development of democracy and the like.

3. Means for achieving prevention

Prevention as one of the most important strategic measures for protection and rescue, financially recognized only as an administrative bureaucratic activity of federal ministries and other organs of the federal government, rather than as an indispensable method of achieving readiness in preparation for a response to the challenges of natural disasters within the scope of carrier planning all levels of government structures.

4. Records damage to the financial amount 1997-2012

Until the adoption of the system and appropriate implementing legislation in the field of protection and rescue and finance from 1997- 2012, the requirements of municipalities and cantons for the calculated damages for various reasons (fires, floods, droughts, hail, frost, ice) amounted to over 190,937,792.86 KM.

This amount does not include damage from landslides, hazardous waste, depleted uranium, and brucellosis.

Q-fever, etc., because dealing with the consequences was being carried out through other sources, the position of holders of planning and funding, although this can also be brought under the same balance of the financial burden at all levels of the budget of the Federation of Bosnia and Herzegovina.

5. System financing protection and rescue in the Federation of Bosnia and Herzegovina

The first systemic response of financing system of protection and rescue from natural and other disasters in the Federation of Bosnia and Herzegovina is contained in the said Act on protection and rescue, which defines the sources used for supplying the funds necessary to finance the protection and rescue from natural and other disasters .

According to Article 179 of the Law on protection and rescue, funding is generated from the following sources:

1) budget of the Federation of Bosnia and Herzegovina, cantons and municipalities;
2) funds of legal entities;
3) insurance;
4) voluntary contributions;
5) international aid-grants;
6) other sources established by this and other laws.

In Article 180. of the Law on protection and rescue prescribes a special fee to finance the tasks in the field of protection and rescue. The fee was set at 0.5% on the aggregate amount of net salary of all employees. Calculated and paid by the employer at the same time with the payment of net salary. This fee is calculated and paid on income from other independent activities and occasional self-employment in the amount of 0.5% of the aggregate amount paid out of net income.
This fee is very important, (although it cannot meet all needs in the protection), and is a regular and secure source of a portion of the funds required to finance the protection and rescue. These funds, together with funds to be earmarked in the budget - according to the provisions of Article 179, item 1 of the Law on protection and rescue, the main means of financing the needs of protection and rescue.

Law on protection and rescue and the instruction on the manner of calculation and payment of special fees for protection against natural and other disasters[67], the Federal ministry of finance, are governed by the obligations of taxpayers and confirmed by the ratio of belonging to these funds:
- 15% belongs to the Federation of Bosnia and Herzegovina and are used exclusively for the purposes of Article 182 of items. 2) 3) 4) 5) 6) and 7) of the Law on Protection and Rescue;
- 25% of the Canton and is used exclusively for the purposes of Article 183 of items. 2), 3), 5), 6), 7) and 8) of the Law on protection and rescue;
- 60% of the municipality where the funds have come and serve exclusively for the purposes of Article 184 of items. 2), 3), 5) to 7) of the Law on protection and rescue.
The amount of the total of funds generated in this way we get by: the number of employees in the Federation of Bosnia and Herzegovina x average net wage in the Federation of Bosnia and Herzegovina x 12 months x 0.5%.
Given that substantially present moonlighting, you cannot accurately determine the total number of employees or those on fixed-term contracts or contractors exercise wages and other incomes, it is difficult to accurately calculate the amount of income earned.
Estimates of the Federal administration of civil protection based on data from Cantonal ministries of Finance, much of those assets amounted to at all levels of the Federation of Municipalities to about 20 million a year.

6. Conclusions

1. Previous analysis and findings suggest that despite the expressed difficulties in the consolidation of political, economic, security and other issues of state structure, there is a formal and legal presumption of availability of financial resources, although their revenue base is insufficient in relation to the need to establish the organization and functions of system elements protection and rescue, recovery and rehabilitation of consequences of natural and other disasters.
2. In order to create preconditions for the development planning of protection and rescue on realistic revenue projections based on Article 180 of the Law on protection and rescue, transparent budget execution for these items at all levels of the federal government, the Government of the Federation of Bosnia and Herzegovina adopted the Decision on conditions and manner Use of Proceeds arising from special fees for protection against natural and other disasters.[68]
3. Funds provided under Article 180 of the Law on protection and rescue are good collateral, are not and cannot be the only means for the overall needs of the dedicated protection and rescue of people and property. It is necessary to secure funds from other sources under Article 179 of the Law on Protection and Rescue.
4. Planning funding carrier planning the budgets of political communities in the Federation of Bosnia and Herzegovina, several times more profitable, more purposeful and more moral to invest in prevention (prevention of the consequences) but to invest in consequences that are caused by lacking prevention multiply.
5. Prevention in the protection and rescue of the Federation of Bosnia and Herzegovina, cantons and municipalities should be supported financially within the regular budget planning for the core business, aligned with the priorities of the Annual plan of implementation of the Program of development of protection and rescue in the Federation of Bosnia and Herzegovina. In addition to budget funds for protection and rescue in the normal course of budgeting, to use part of the funds set aside on the basis of 0.5% for the purposes of preventive measures for the protection and rescue of people and property.

[67] "Official Gazette of BH", No. 81/08.
[68] "Official Gazette of BH", no. 4/12 and 80/13.

6. Means of special fees should therefore plan and the programs of protection and rescue, realized in the framework ratio:

- 30% for the equipment of civil protection structures;
- 20% for prevention;
- 40% for repairing damage;
- 5% for training civil protection structures (commissioners, service, management, staffs, services for protection and rescue, civil protection units and population);
- 5% of the costs of participation in the implementation of protection measures and rescue actions during natural or other disasters.

7. Managing the available financial and material resources it is appropriate and only feasible budgeting at all levels of municipalities, cantons and the Federation of Bosnia and Herzegovina and their optimizing, under the principle of connectivity, while respecting the framework conditions that need to be strategically formulated in the Program of development of the system of protection and rescue in the Federation of Bosnia and Herzegovina, which also applies to funds under Article 180 of the Law on Protection and Rescue.

8. Program of development of protection and rescue for all persons in the planning, especially for administrative and professional civil protection authorities, creates a basis for the obligatory development of annual plans in the implementation of development measures for achieving readiness protection and rescue system in response to the challenges of natural and other disasters.

9. For the purposes of protection and rescue from natural and other disasters in the budget of the Federation of Bosnia and Herzegovina to provide funding in the amount of 0.5% of the total budget for the current year, and the budget of cantons and municipalities to provide funding in the amount of 1% of the total budget for the current year. For municipalities and cantons that are unable to provide the funds in this way to apply the principle of connectivity. Of this 70% allocated funds allocated for the implementation of preventive protection and rescue measures and funding of fire protection measures stipulated in the Law on fire protection and financing joint activities on protection and rescue in Bosnia and Herzegovina, and 30% for the remediation of damage consequences of natural and other disasters, assistance to other countries, and for the payment of benefits in the protection and rescue. These funds decided by the Government of the Federation, the Cantonal government or head of municipality.

10. Since the state of equipment, civil protection forces for the execution of specific tasks unacceptably poor, it is necessary to make policy decisions at all levels of its organization to realize the program of retrofitting structures of civil protection which the Government of the Federation of Bosnia and Herzegovina adopted back in 2001. Financial resources for this purpose would amount to a minimum of 45,000,000.00 BAM for the entire territory of the Federation of Bosnia and Herzegovina.

11. Various business interests' compatible interests' protection and rescue may be a form of co-financing of these activities, especially if they promote the development of awareness nationwide values in Bosnia and Herzegovina, protection and rescue of people, property and the environment.

F - GENERAL CONCLUSIONS OF ESTIMATES

1. Key dangers for the Federation of Bosnia and Herzegovina arising from susceptibility to earthquakes, large floods, high snow drifts, especially in mountainous areas, landslides and mudslides, periodic droughts and hail (ice), and in the summer months big forrest fires. During the autumn and winter there are large cold and stormy winds which caused major damage to infrastructure. The assessment identified possible accidents in relation to the specifics of the environment in the grip of water accumulations, landslides, earthquakes and other disasters. It undertakes further and specifically assess the sensitivity and vulnerability to all hazards and risks of these critical point and the facilities to modern standards of safety and to take concrete measures to improve preparedness and response to disasters

Table 5. Type dangers - natural disasters

	Type of danger - natural and other disasters	The affected area - CANTON (s)
1	2	3
1.	**Earthquakes**	This danger and risk are subject to all urban areas in the Canton 1, 2, 3, 4, 5, 7, 8, 9 and 10 - Intensity 7.8 and 9 0MCS and the seismic parameters are subject to a particular area of Canton 7:08 , as evidenced by the seismological maps.
2.	**Demolitions**	In major urban areas and settlement areas of Canton, and the dam: the water streams and lakes accumulation lakes(Modrac, Jablanica, Busko, Pliva and others.) Canton 2, 5, 6, 7 and 10
3.	**Big floods**	In the last 5 years, intensely affecting the area of the Federation, causing significant material damage and were recorded in the Canton area: 1, 2, 3, 4, 5, 6, 7 and 9;
4.	**High snow drifts**	In particular, they were recorded in 1999, 2005 and 2012 in the winter and in the Canton area: 1, 4, 5, 6, 7, and 9.
5.	**Landslides and mudslides**	This phenomenon occurs as a result of the large number of causes, but it is particularly observed in Canton: 3, 4, 5, 6, 7, and 9.
6.	**Drought**	Drought, as natural disasters which inflicted great damage to farming and, most commonly afflicted areas of Canton 2, 7, 8 and 10 and caused considerable material damage.
7.	**Hail (ice) during the spring and autumn months**	The natural disaster that occurs suddenly and lasts only briefly, its negative impact is most evident on the fruits and field crops in Canton 2, 3, 7 and 8.
8.	**Bitter cold and stormy winds**	Causing major damage to infrastructure. In the past (and unfortunately fatal), there were extreme effect in Canton: 4, 6, 7.
9.	**Fires and explosions**	Forests and forest soil in the Federation each year in the period from 01.03. to 01.11 is exposed to an increased risk of forest fires. In the last five Year, Canton 4, 7, 8 and 10 are most at risk Cantona in the Federation in terms of exposure to risk of the occurrence of large forest fires. Canton 3, 4 and 9, on which are best constructed capacities of technical and technological plants and facilities, which in technological process using large amounts of flammable and explosive hazardous materials, are exposed to an increased risk of wildfires, and the devastating explosions and due to various causes and phenomena, which can never be eliminated completely.
10.	**The mass of human, animal and plant disease**	Registered as common is a large negative effects in the Canton 4, 6, 7, and 9.
11.	**Accidents involving hazardous materials**	The aforementioned risks are increasingly exposed to all transportation vehicles for road and rail transport flammable and explosive hazardous materials, as well as technical and technological plants and facilities. Risks of expansion and Gas Explosion gas mixtures increased exposed infrastructure for transportation and distribution of natural gas in Canton 9th
12.	**Mining accidents**	Continued threats in the canton where the mines are located, especially in Canton: 3 4.
13.	**Radiation-chemical-biological contamination of air, water and land**	Exposed to all the major places: heating homes and other buildings, more intense road traffic, industrial capacities are located, etc.., Mainly, Canton: 2, 4, 6, 7, and 9.
14.	**Mines and UXO**	The endangered areas are along the former lines of separation, mainly Canton: 1.2, 3, 4, 5, 6, 7, 9 and 10t
15.	**Traffic accidents**	Threatened the entire territory of the Federation of Bosnia and Herzegovina: the reasons are multiple - age and defective vehicles, bad and damaged roads, traffic fragmentation and others. The construction of the motorway corridor Vc passing through the Zenica-Doboj Canton Sarajevo and West Herzegovina Canton, as well as parts which will be subsequently built, due to the large number of tunnels, viaducts and bridges, and lack of adaptation of speed limits on the same, and negligent driving may cause traffic accidents on all sections of these highways.
16.	**Socially conditioned processes**	From destruction to construction; Dissolution of the construction of the state of law; peace instead of war; of destabilization towards stabilization; from the instability of the security; of ethnic cleansing towards the return of refugees and displaced persons; of social and economic poverty, backwardness to development and prosperity; disintegration of cooperation to integraciPit in the country, the region, the European and Euro-Atlantic; of jeopardizing the realization of human rights and freedoms; of the damage and threats to a healthy environment,ecosystem.

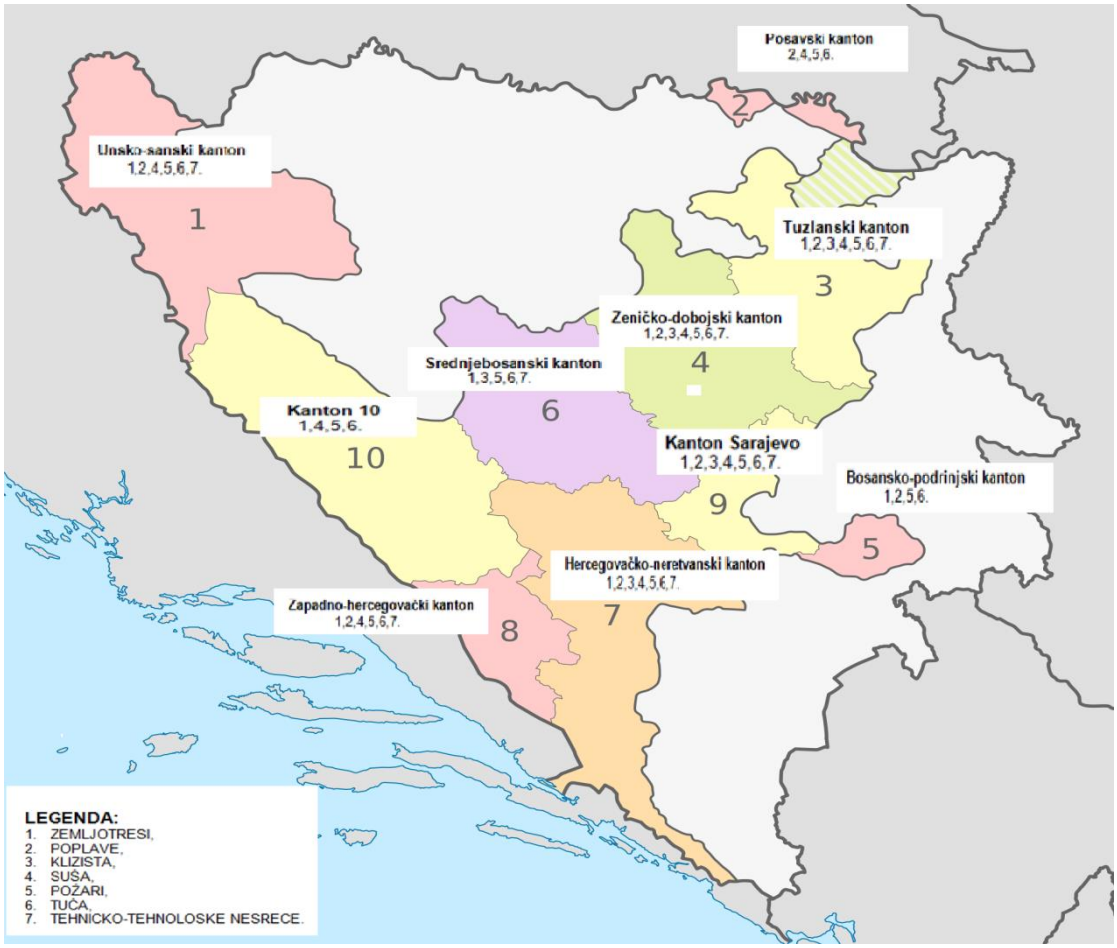


Figure 5. Type of dangers - natural disasters in vulnerable areas of the cantons of the Federation of Bosnia and Herzegovina

2. Continue the activities on further development of the legal framework and planning documents in the field of protection and rescue of people and property from natural and other disasters in the state and entity level in order to consolidate the structure and development in the field of protection and rescue in the Federation of Bosnia and Herzegovina. Standing is an obligation and a right, and all other legal entities and citizens' exercise of protection and rescue measures and personal and reciprocal protection.

3. Federal administration of Civil protection and Federal administration of civil protection headquarter in ways of administrative, planning and operational professional promote legal responsibility of the Government of the Federation of Bosnia and Herzegovina for the realization of preparations for protection and rescue which is achieved by mitigating the risk of the emergence of accidents, reducing the number of human losses, the efficient operation of the rescue , removal and remediation of the consequences, reconstruction, stabilization and normalization of the situation after the accident to the scientific and technical analysis of phenomena and events related to the accident and the readiness of the community for an efficient response to possible disaster now and in the future.

4. It is necessary to unite efforts of all relevant institutions, scientific institutions, public companies and relevant individuals in the Federation of Bosnia and Herzegovina in order to activate community to achieve a response in the event of natural and other disasters, as well as achieving rational readiness of the community for the prevention of, mitigation and consequence management, operation and management of the natural and other disasters.

5. In the Federation of Bosnia and Herzegovina, there are certain facilities that are functionally integrated in the system of protection and rescue of a planned response to specific natural disasters, and relate to the existing emergency services PVJiDVD, administrative and operational-technical civil protection bodies Cantonal and municipal / city, police (traffic police and special police units), the capacity of public companies.

Collaboration with all stakeholders in the planning organs of the federal government, other institutions of the strategic direction for the development and harmonization of development and harmonization of protection and rescue plans and fire prevention plans and programs of development of protection and rescue in which specifying the issues the importance of Development Planning of fire protection and firefighting, as well as the creation of trust in the institutions of the legal system. These complex tasks can be executed only if the competent authorities of the Federation of Bosnia and Herzegovina, cantons, municipalities / cities in accordance with their competencies form the administration and service as operational and professional bodies for the protection and rescue of people and property, and the protection and rescue of fire.

6. Recognizing the overall natural, geographic, urban, economic, social, migration and the characteristics of complex social processes in terms of the existing state organization in Bosnia and Herzegovina, of transition and reform, it is even more detailed and professionally better assess the risks of natural and other disasters, at all levels (from the municipality / city, canton to the Federation of Bosnia and Herzegovina) and as such harmonize the federal and state level. The origins of serious risk analysis should be a prerequisite in planning and establishing priorities to prepare itself in case of natural and other disasters.
7. Information and communications support to the management of protection and rescue actions provides Operations Centre of the Federal administration of civil protection, which is in the process of organizational and technical construction in accordance with the assessment of threats and demands for a functional connection with the Cantonal and municipal civil defense centers. These indicators in the assessment of threat to indicate the need for establishment of qualitative and quantitative indicators within a single database, not only for understanding natural and other processes, but in order to create support for managing the actions of protection and rescue of people, material and cultural goods and environment. These data should provide the relevant ministries and other agencies of the federal government, other relevant institutions, departments, scientific institutions and structures of civil protection. Federal, Cantonal and municipal / city operational civil protection centers should maintain a database on the frequency of accidents, hazards and risks, which will enable the routing operation of the whole system and the use of resources in the state caused by the accident.
8. In the assessment of threat to the Federation of Bosnia and Herzegovina, Cantonal and municipal / city are determined by risk, and natural and other disasters that may threaten people and property.
In this regard, all of the local community, companies that work in the process can lead to accidental situation shall, in order to inform and alert citizens to the possibility to provide, or to its space-object to install appropriate systems for alarm (siren).
9. Willingness response to disasters is an indicator of successful prevention and planning carried out preparations to mitigate and eliminate the consequences, and training and training a condition without which one cannot speak of readiness. System response in relation to the issue of training and training based on the creation of program-planning and technical documents for the teaching process of training, realization of procedures, their verification, insurance technical, pedagogical and methodical and didactic requirements for carrying out teaching materials, practical and theoretical training for operational needs of professional bodies, departments, units and civil defense specialists.
10. Chamber of goods (industrial facilities, oil and gas installations, farms, hydroelectric power plants, power plants, forest resources, roads and buildings on them and other infrastructure facilities), in terms of protection and rescue, should be directly covered by the evaluation parameters of possible accidents and risks by creating a database of the relevant federal ministries and other federal authorities, organizations, institutions and public companies. Hadzici - settlement Žunovnica,
Technical Repair Institute, due to contamination by depleted uranium, as well as the municipalities where a landfill industrial waste, are areas of serious research to avoid or mitigate these risks.
In this connection, it is necessary, with respect to these risks, develop a special cadaster - database of these areas in order to elect more precise methods and techniques of possible responses to the elimination or reduction.

11. The essential questions of environmental issues and to create preconditions for balanced use of natural resources and the establishment of sustainable development, the issue of the environmental management and spatial planning strategy in the country and the region. The problem of hazardous waste (industrial, medical, etc.) is one of the priority environmental problems. In Bosnia and Herzegovina there is no controlled system of hazardous waste, but there is a registry of hazardous waste generators. Uncontrolled disposal of hazardous waste (4,000 smaller or larger landfills), and improper disposal of the local landfill is the result of lack of awareness and a drastic deviation from the obligation to apply the legal provisions at all levels in the Federation of Bosnia and Herzegovina.
Such landfills without proper design solutions, without technical equipment, without the physical and technical protection, without degassing technology, without coverage inert materials, without control of leachate and infrastructure facilities, the environmental atomic bomb. The answer to these challenges is the proper policy-making, programming and implementation of programs of sustainable development, management of national resources and environmental protection, including all structures of Bosnian society and international cooperation on substantive environmental issues. Special attention in the coming period should be given to motivate all stakeholders in order to continue the preparations for the construction and the construction of modern sanitary landfills for solid waste disposal, which would prevent the uncontrolled dumping of waste in illegal dumps.
12. Earthquake threat in Bosnia and Herzegovina and thus in the Federation of Bosnia and Herzegovina, especially in big cities, with the existing intensive construction and upgrading of residential and commercial buildings, often without adequate zoning plans and permits required by audit and review the appropriateness of building standards and taking appropriate measures to achieve readiness (resistance to demolition). Assessment of the resilience of the existing large housing and other public facilities (schools, universities, hospitals, railway stations, airports, etc.), the seismic earthquakes can be determined only approximately, because the buildings are built at different times, in different ways and with different degrees resistance. The full risk assessment of these complexes is needed, especially in areas with high seismic risk.
13. Forests, water and other ecosystems are important for the economic situation in the country, and also the resources that are often prone to losses from natural and other disasters, especially fire. If the losses are not immediately visible and do not pose a direct threat to people and property is regularly missing effective response to the disaster and recover from disasters. An example of how the large forest fires that occur in inaccessible areas contaminated with mines, as well as losses in agriculture caused by flooding or by raising the level of groundwater. Also, flooding can cause multiple and long-term impact on housing, economic, infrastructure and other facilities, as well as damage to the Agriculture, soil environment. Especially emphasize erosion and soil contamination and degradation, etc. that prevent the rapid recovery of agricultural land and the recovery of agricultural producers, which caused damage remain without the possibility of financial recovery and weak features compensations for damages from insurance companies, where their property is insured, and the weak state subsidies-subsidies.
14. In line with the exit strategy of sustainability teams for demining and removal of unexploded ordnance from the civil protection 01.01.2010. by the end of 2019, the Government of the Federation of Bosnia and Herzegovina V. No. 655/09, of 27.08.2009. resources for these activities by 2019, are provided in the Budget of the Federation of Bosnia and Herzegovina. In order to achieve the quality and uniformity of all cleared areas during demining activities, it is necessary to consider all the possibilities that the amendments to the Law on Demining of Bosnia and Herzegovina create the conditions that all resources for demining in Bosnia and Herzegovina to consolidate and ensure their capacity, with relying on its own financial resources, and management capabilities that capacity. I continue to carry out all the activities from the Strategy for mine action, a means to reduce risk areas in order to enable the economic base for sustainable return and a stable security environment. Through various forms of education (through the Red Cross / Cross, the media, schools, etc.) To develop all forms of prevention of landmine dangers in government and awareness among the citizens. If there is no agreement on the pooling of demining capacity, it is necessary to examine the needs and possibilities of the Federation of Bosnia and Herzegovina to funding the existing demining teams are part of the Federal administration of civil protection.
15. Economic situation in the Federation of Bosnia and Herzegovina stipulates opportunities, dynamics and stages of construction elements of protection and rescue system and achievement of readiness to respond to the challenges of natural and other disasters. Economic constraints have direct impact on the revenue base of funding sources, which is weak in relation to the need to establish the organization and function of the elements of the system of protection and rescue. It is therefore important to rationally determine the current and evolving priorities of functioning and

construction of the system, based on the risk assessment of all areas of prevention, plans and programs, structure operational forces, equipping resources and equipment, stockpiling in stockpiles.

For the rational and correct planning of financial resources is necessary, econometric analysis, for each type of accident designate. "Return period", as economically reasonable basis for calculating damages and any other consequences. It is also important from the standpoint of ways of providing financial and material resources. Management of available financial and material resources it is appropriate and feasible only through the budgets at all levels of municipalities, cantons and the Federation of Bosnia and Herzegovina and their optimizing, under the principle of connectivity, while respecting the framework conditions that need to be strategically formulated in the Program of development of protection and rescue in the Federation of Bosnia and Herzegovina, which also applies to assets under Art. 179 and 180 of the Law on Protection and Rescue. For the purposes of protection and rescue from natural and other disasters is justified that at all levels in accordance with the above articles of the Law on protection and rescue, the annual budgets funds for protection and rescue (which would be done equipping and training of organized structures for protection and rescue).

16. BH Armed Forces and the police are part of the protection and rescue system. Police forces in relation to its statutory role and purpose, training and equipment in terms of natural and other disasters ensure public order, personal and property security, traffic and keep warning of the dangers in the affected areas. According to the Law on defense of Bosnia and Herzegovina ("Official Gazette", 88/05) and Standard Operating Procedures engagement BH Armed Forces to assist civil authorities in responding to natural and other disasters, perform the involvement of the Armed Forces of Bosnia and Herzegovina in assisting civil authorities of Bosnia and Herzegovina in the relief and rehabilitation of consequences of natural and other disasters. On the same legal and implementation basis and on the basis of the certified international rules and procedures of the UN, is made the engagement OSBH in the framework of international humanitarian assistance activities in accidents. BH Armed Forces, and their elements and units of the tasks performed in accordance with its organization and establishment structure and purpose.

17. Permanent and immediate threat of natural and other disasters caused by natural or human activities, requires the cooperation of Bosnia and Herzegovina with neighboring and other countries in the joint planning of actions to protect and rescue, receiving and delivering international humanitarian assistance in case of major accidents. Bosnia and Herzegovina has accepted the international humanitarian standards contained within: the UN Office for the Coordination of Humanitarian Affairs - UN OCHA, the UN Development Program - UNDP, UNICEF - the UN Foundation for Children and the UNHCR / HELP -High Commissioner for Refugees / Assistance Program - HELP , DPPI Stability Pact for South Eastern Europe - Initiative preparedness and disaster prevention Stability Pact, CMEP SEE - Civil-Military Emergency Planning for South Eastern Europe, the OPCW and SRSA - an international organization to establish a system of protection and rescue of chemical weapons and other chemical toxins, IFRC - International Federation of Red Cross / Cross and Red Crescent Societies, IFRC - International Federation of Red Cross / Crescent, NATO / EADRCC - The Euro-Atlantic Coordination Centre for disaster relief and others. The current cooperation at the international level in the planning of prevention, providing and receiving help in case of an accident not at the required level of system performance. Ministry of Security of Bosnia and Herzegovina is competent to take all measures and procedures for international cooperation in the field of protection and rescue, and civil defense.

At the state level, adopted the following regulations which, among other issues governing the issues of providing and providing international assistance in protection and rescue: Guidance on the procedure for crossing the state border when receiving and / or sending of international assistance in the Protection and Rescue ("Official Gazette BH ", No. 56/09) and Instructions for interdepartmental coordination when receiving, sending and transit of international assistance in the protection and rescue (" Official Gazette ", number 77/13).

Also, the Agreement on Cooperation between the Ministry of Defense of Bosnia and Herzegovina and the Ministry of Security of Bosnia and Herzegovina in responding to natural or other disasters (2009), as well as standard operating procedures of the engagement of the Armed Forces of Bosnia and Herzegovina to assist civil authorities in responding to natural or other disaster (2010).

In addition, Bosnia and Herzegovina signed agreements on cooperation in protection from natural and other disaster with the Republic of Croatia (2001), the Republic of Montenegro (2007), Republic of Macedonia (2007), Slovenia (2011) and the Republic of Serbia (2011).

Also, an agreement was standard operating procedure between the National Protection and Rescue Directorate and the Croatia Ministry of Security of Bosnia and Herzegovina on the provision of cross-border help in extinguishing the fire of open space (2006), as well as standard operating procedure

between the Ministry of Security of Bosnia and Herzegovina and Directorate for the Protection of the Republic of Macedonia on the provision of assistance in case of natural or other disasters civilization (2009).

In order to promote joint action, the planning of measures to prevent accidents, improve scientific research and training in the protection of the accident required the attention of international cooperation aimed at: regional and sub regional cooperation on major issues of recognizing danger, observation and monitoring, forecasting and predicting risk and accidents, planning, prevention, information and communication system in support of accident management, civil-military international cooperation, border crossing procedures, increasing the personal protection of citizens, the development and production of protective and rescue equipment.

18. Red Cross / Cross of the Federation of Bosnia and Herzegovina, non-governmental and civil society organizations have a special role in raising awareness of the importance of the protection and rescue of people and property from natural and other disasters and hazards, updating and realization of the content of all the measures of protection and rescue. Because of the diversity of content activity (assisting in locating, rescuing and care of endangered and victims, great variety of security of humanitarian aid in the event of mass natural and other disasters, etc.) It is necessary to affirm the social significance of the non-governmental humanitarian sector and civil society organizations.

19. In the framework of the measures of protection and rescue is necessary to develop meaningful and acceptable (doctrinal) decisions on all measures of protection and rescue, organization chart setting out the working part of the system which requires the content of specific measures under the jurisdiction of one or more holders of planning in the institutions of the federal, Cantonal and municipal / city levels of government.

20. The threat creates the basis for the development of the Federal program of development of protection and rescue and the Federal plan for protection and rescue, by analogy Cantonal and municipal / city programs and plans and their alignment with each other procedures to ensure financial support for their implementation, parliamentary or assembly verification. After the adoption of the Risk Assessment, by the Government of the Federation of Bosnia and Herzegovina, it is necessary to draw up a long-term program of development of protection and rescue in the Federation of Bosnia and Herzegovina for the next period. During this same period, it is necessary to prepare a program of activities and to draw up plans for protection and rescue at all levels.

G - ATTACHMENTS

Annex 1

International cooperation

In international cooperation, especially with neighboring countries, there are adopted programs and procedures for disaster relief. They can be recorded only some cases of initiatives and the beginning of cooperation in the areas of:

- Monitoring and information exchange service monitoring and alerting,
- The exchange of information and the Hydro meteorological Seismological Bureau,
- Exchange of information and experiences in anti-hail protection,
- Protection of water in cross-border areas,
- Cooperation of National Societies of the Red Cross / Cross and Red Crescent.

We consider it necessary that in the framework of the signing of bilateral and multilateral agreements include the issues of mutual cooperation and assistance in monitoring, training, equipping, prevention, prevention and elimination of consequences.

Previously, it is important to provide special-purpose funds at the state level in order to enter into interstate agreements on requesting and providing assistance in natural and other disasters of great magnitude.

The cooperation can be improved only by adopting appropriate regulations, joint planning implementation of protection and rescue, narrow mutual cooperation of participants in protection and rescue as well as providing technical resources and equipment for protection and rescue.

Experience regarding acceptance of international assistance

Regarding the acceptance of international assistance to Bosnia and Herzegovina could be concluded that in addition to positive aspects, it was not organized in a unique way, but they all humanitarian and other organizations help deliver the Officer distributed by the Group, which we get on the ground sort of anarchy in the actions of individual entities. Exceptions are the ICRC and the IFRC, which are its mandate and activities carried out in accordance with the Mission and Principles of the International Red Cross / Cross and Red Crescent Societies (IMRC), in cooperation with the National Red Cross / Society of Bosnia and Herzegovina. Some international organizations have operated without transparency and completely independent from all existing plans, policies and procedures in Bosnia and Herzegovina, and the consequences of their actions large funds spent in rehabilitation, poorly carried out activities which may pose a potential cause of destruction of the property of non-sanitary living conditions, environmental degradation, etc.

In addition, the premises of the Federation of Bosnia and Herzegovina, many international organizations are abandoning certain locations would leave large amounts of waste materials, which are spoiled designated area.

Through various charitable donations to the Federation of Bosnia and Herzegovina addressed to large amounts of drugs and medical supplies that have expired and now represent ballast - great ecological bombs that are difficult to neutralize without adequate resources (Mostar, Sarajevo and others.).

In order expiry date, mostly food items that are delivered as humanitarian aid, authorities of all levels of government: from municipality to the Federation of Bosnia and Herzegovina, have found themselves in trouble, what to do with large amounts of these items, given that there are no funds for their safe destruction. Therefore, the same uncontrollable disposed of in illegal dumps in towns and villages or in their vicinity and near watercourses which cause water pollution and the environment.

Also, the discharge of large amounts of waste water from the various entities in the streams comes to pollution of watercourses, the environment, and thus the water for drinking and other purposes.

Bosnia and Herzegovina after the war received international support for the elimination of the consequences of war and the improvement of living and working conditions, especially to indicate assistance in rehabilitation of facilities of water supply of cities and towns which significantly contributed to the normalization of supplying the population with drinking water.

International assistance in the event of natural and other disasters

In the event of natural and other disasters in the Federation of Bosnia and Herzegovina, Federal administration of civil protection staff has the option, after the Government of the Federation of Bosnia and Herzegovina declares state of natural or other disasters, to seek international assistance, but only under two conditions:

- That municipalities and cantons - affected by natural disasters, have exhausted all the resources and capabilities for the protection and rescue of people and property;

- The Federation of Bosnia and Herzegovina has exhausted all of its resources, both civilian and military;
- To have exhausted the possibilities and resources of the other entity by the Civil protection of the Republic of Srpska made available to the Federal administration of Civil protection Headquarters, based on the "Agreement on cooperation in the realization of the tasks of civil protection",[69] and through the Ministry of Security of Bosnia and Herzegovina. It should be noted that international assistance is mobilized in the event of a natural disaster of such proportions that it is estimated that, based on the number of victims and the evacuated population, the number of destroyed buildings for housing, property and infrastructure, as well as damage to the economy, the Federation of Bosnia and Herzegovina and the state of Bosnia and Herzegovina are not able to maintain the existing capacity of the situation under control and eliminate the consequences of the accident. In this case usually starts from the assessment that, in accordance with the economic possibilities, each state creates preconditions capacity for protection and rescue planning and organizational measures of prevention and preparedness resources.

Help from the outside, whose procedure search coordinated by the Ministry of Security of Bosnia and Herzegovina, addressed to in the case of Bosnia and Herzegovina and its entities, in the form of requests:

- On a multilateral basis - the United Nations, and International Federation of Red Cross and CP (IFRC) by the Secretary of the Red Cross / Cross - by the competent authority / Defense Headquarters of the International Red Cross / Red Crescent and the Cross that the just-based procedures requires IFRC- in, can quickly obtain help on assessed needs;
- On a bilateral basis - countries with which Bosnia and Herzegovina signed an agreement on cooperation and assistance in disasters (Croatia), countries associated regional initiatives (DPPI), member of the UN or NATO;[70]
- On a regional basis - through regional initiatives Disaster Preparedness and Prevention (DPPI) of the Stability Pact for South Eastern Europe, it is possible to expect coordinated assistance of the Member States of the Initiative: (Albania, Bulgaria, Greece, Croatia, Hungary, Macedonia, Moldova, Romania, Slovenia, Serbia and Montenegro and Turkey) on the consolidated appeal for assistance to the country affected by the disaster, through the Office for the Coordination of Humanitarian Affairs (OCHA), or directly, but with the knowledge of OCHA.

UN OCHA works operationally at the request of the Resident / Humanitarian Coordinator of UNDP in Bosnia and Herzegovina (which is coordinated by the Team of the UN Disaster Management - UNDMT due to the presence and the arrival of a large number of UN agencies), national or Resident Representative of UNDP in Bosnia and Herzegovina, and based:

- Primarily "General Assembly resolution. 46/182 of 19.12.1991.", and"Guidelines on the use of resources of the military and civil defense disaster" from Oslo, May 1994; and - "Convention on the Privileges and Immunities of the United Nations", adopted by the UN General Assembly on 13 February 1946 (on the allocation of members of the UNDAC and staff protection and rescue status of "experts on mission for the United Nations", when alarm, mobilization and engagement of the international military Civil (MCDA) staff requested OCHA.

Help by NATO cannot be expected directly, but it is feasible bilaterally (on the basis of the agreement on assistance in the forces and resources of the state - a NATO member state - country), or request the Secretary General of NATO to help the country - non-NATO -a through some powerful international organizations (UN OCHA, IFRC and the World Health Organization-WHO, or UNHCR, etc.), on the basis of the UN Charter and the Guidelines on military and civil defense (MCDA) in Oslo, and NATO's strategic documents and operational documents (based on the Oslo Guidelines):

- "Standard operating procedures for cooperation in disaster relief in time of peace", in 1953;
- "Policy to help in the disaster in peacetime", approved by the North Atlantic Council, May 1995;
- "Euro-Atlantic Disaster Response capacity" (which established mechanisms for disaster response - EADRCC and EADRU), approved by the Euro-Atlantic Partnership Council in May 1998;

[69] "Official Gazette", number 36/01.

[70] Official Gazette of BH ", number 7/10

- "Standard operating procedures of the Euro-Atlantic Center for coordination of activities in the disaster (EADRCC)" and "Standard Operating Procedures for use EADRU in international aid in the disaster" in June 1998.

Coordinated efforts of the Secretary General of the UN, through the Office for the Coordination of Humanitarian Affairs (OCHA), whose representative operates in the Euro-Atlantic Center for coordination of action in the accident NATO (NATO EADRCC), it is possible, finally, to expect that the Federation of Bosnia and Herzegovina over requirements at national level for more coordinated assistance, get help from NATO or some of its members.

Each State, whether member of the UN and / or NATO, in order to create conditions for rapid and targeted assistance must be timely under the Disaster Preparedness and Prevention to submit information on their military and civilian resources to the Central Registry of state capacity-states UN member states for use / disaster management. This (UN) and its similar registry (NATO) serve as the operational tool for the support of the UN system and the international community in their efforts to improve the efficiency of emergency humanitarian assistance. Central Registry consists of the following elements / register:

- Register with directories of international teams for search and rescue;
- Register with the data on government officers / civil servants - the central points of contact for emergency response to the accident;
- Register with information on government services for disaster relief, governments of countries - major donors;
- Registry Data storage resources for disaster relief;
- Register with information on experts for accident management (actions and forces of protection and rescue);
- Register with information on the strengths and resources of the military and civil defense.

The needs of the affected area, which has been determined by the competent Federal headquarters of civil protection and disaster assessment team and the Coordination of Humanitarian Affairs (UNDAC-team), the situational reports from the field indicate that the OCHA and the same day of arrival at the affected area, it is for the most part meet on the basis of data from the said Central Registry and a database of resources available to the competent local agency for accident management - LEMA (which actually refers to the responsible Federal administration of civil protection staff) or other staff with whom UNDAC- team coordinate relief operations.

The UN team which is composed of civil-military experts from the country which has mobilized its team of experts, has the task register occurring event, all its consequences, and when called upon to assist local authorities in determining the need for international assistance and monitoring of the terrain, as well as to coordinate such assistance immediately after a major disaster.

Evaluation of the situation in the affected areas and assessment of real needs, as well as long lasting relief efforts coordinated by OCHA, depend on the assessment scale accident you prepare UNDAC-team, as well as its evaluation of the implementation coordination of aid operations in the field when it performs with other local forces and forces of international assistance.

- For the purpose of coordination of field operations UNDAC team-usually, though not always, established the Center for Coordination of field operations (OSOCC), whose task is to state authorities to help disaster victims in meeting the increased need for management posed by the arrival of international aid .

Guidelines from Oslo predict more content civilian-military resources to help (the forces and material and technical equipment) the affected area, i.e.:

- Reconnaissance from the air, land and sea and assessment in order to determine the size of the accident and the damage -victims;
- Close reconnaissance in the area of accident and reconnaissance of roads within it and the roads leading to this area;
- Organized and mobile manpower (directly involved and / or assigned to the Branch DHA aid coordination) to help in the search, rescue, evacuation, coordination and provision of services (for example, stocks of medical assistance, water, food, shelters for the homeless and injured, and al.);
- Assists in engineering operations;
- Assists in communication facilities, resources and services / expertise; Basic land logistical support;
- Medical support to civilian agencies;

- Assists in the air transport assistance to the affected area or ejection from the air to help over the area of operations of humanitarian aid;
- The provision of resources by sea;
- Ensure coordination, support in transport, power assistance, facilities for food and nutrition, facilities for drinking water and repairing water infrastructure;
- Assistance in case of CBR contamination and environmental pollution;
- Removal of unexploded ordnance (UXO) and protection of the civilian population.

From these documents regulating the issues of operational procedures of cooperation in the event of an accident, derives several stages of international operations to assist victims of disasters, namely:

- Phase mode (timely conclusion of bilateral agreements on mutual cooperation and assistance in accidents / disasters, and identify initial point of contact of each of the parties concerned in the operation help-date database of the Central Registry, as well as security arrangements for the rapid deployment of assistance will be delivered: visas, border crossing models, release of customs and taxes, the status of staff, any transit through the territory of a third country, the issue of communication and ensuring the flow of information, and the like.);
- Phase formation of an accident / disaster (activities and procedures of seeking help, assessment of accident / disaster, preparing for deployment assistance, coordination of aid operations in the affected area, crossing the border and coordination of movement);
- Deployment phase (execution of the national movement of the element of international assistance activities during the execution of the task);
- Withdrawal phase (preparation activities for the withdrawal and the flow of movement of the State element of international assistance);
- After the withdrawal phase (phase of final reports, demining and the lessons and lessons learned from the completed task).

Each state will for their lower levels - the civil defense headquarters, according to estimates, and Capacity to receive and provide assistance, by aspects of internationally applicable standard operating procedures of receiving, delivery and transit aid in an accident, to organize training on standardized procedures of international assistance: from alarm and seek help through the receiving / delivery or sending aid from the border to the crash site, to coordinate protection and rescue operations and the execution of the mission to the withdrawal. Once through the Operational Communications Centre 112 Bosnia and Herzegovina receives a message from an international entity - the donor help to send the appropriate help (in the required number and quantity), the competent Defense Headquarters, in a country receiving assistance in coordination with the OSOCC infection, transmit all relevant information relevant ministries (Foreign Affairs and Security Transport and Communications, Internal Affairs, Finance, as well as reference to health, veterinary and sanitary inspections) on the arrival of teams and resources to help the agreed border crossings with appropriate documentation, for the purpose of regulating:

- Permit the entry of foreign military transport means with the personnel and the MTS to the national territory;
- The arrival of international aid (people and resources) by air;
- Permit the use of radio communications and frequency;
- Prevention of procedural retention and exemption from road tax and other liabilities (all current);
- Permits the import of hazardous materials / explosives;
- Ensuring a police escort to the target location;
- Insurance import and transport of fuel into the national territory;
- Consent to the release of customs and tax duties on goods vehicles and fuels;
- Insurance other security arrangements and ensuring the accompanying logistics convoys assistance (refueling points, mobile teams for servicing and maintenance of aid convoys, securing towing services, police escort convoys and providing other necessary logistics - food, shelter, medical care, fuel-saving equipment, etc.).

Federal headquarters of civil protection in the event of a major natural disaster in the Federation of Bosnia and Herzegovina, which surpasses the capabilities and capacity of civilian and military defense to control the situation, might, therefore, to seek international assistance, but only through the competent authority (Staff) at the national level, or with the knowledge of a higher level (in the case that it makes the Secretary of the Red Cross of the Federation of Bosnia and Herzegovina - RC Federation of Bosnia and Herzegovina, as a member of FSCZ in addressing IFRC for assistance). It is

more important that under certain specified conditions and procedures under regulated at the state level, FSCZ create all of these preliminary assumptions successful field coordination of international aid (competent Defense Headquarters - UNDAC / OSOCC), which will be addressed at the request of states and organizations (preparation base information on resources for protection and rescue, and training through theoretical - practical forms of specialized training and equipping and rescue forces for such complex tasks).

Red Cross / Cross of the Federation of Bosnia and Herzegovina

Red Cross / Cross of the Federation of Bosnia and Herzegovina is a charity, voluntary organization of public interest for the Federation of Bosnia and Herzegovina, which is part of the Red Cross / Cross of Bosnia and Herzegovina, based on the mission and principles of the International Red Cross / Cross and Red Crescent and Geneva Conventions and enjoys special protection and care institutions of the Federation of Bosnia and Herzegovina, the Canton, city and municipality.

Red Cross / Cross assist the authorities in carrying out humanitarian tasks.

Carries out its activities in accordance with the law regulating the area of the Red Cross / Cross Federation of Bosnia and Herzegovina and other applicable regulations in the Federation of Bosnia and Herzegovina, the statute and other acts of which this activity was determined.

In situations of natural and other disasters, the Red Cross / Cross of the Federation of Bosnia and Herzegovina carries out specific tasks, in accordance with the law regulating the area of the Red Cross / Cross Federation of Bosnia and Herzegovina, the Law on Protection and Rescue and other applicable laws in the Federation of Bosnia and Herzegovina.

Cooperate with all governmental and non-governmental organizations involved in disaster response and in that regard developing its own structure of action, management, cooperation and coordination.

By participating, through their representatives (the Secretary) to the Federal and protection staffs at the level of cantons, cities and municipalities, Red Cross / Cross provides humanitarian assistance to citizens in times of natural and other disasters, and coordinates action by other humanitarian organizations (local and international).

Annex 2

2. Non-Governmental organizations and association

In the Federation of Bosnia and Herzegovina there are several non-governmental organizations and associations involved in the business of monitoring, security ties, taking preventive measures to prevent, reduce or eliminate the effects of accidents, education of the population, etc. (Alliance divers Bosnia and Herzegovina, the Mountain Rescue Service , Career Expo 2000, Mountain associations, scout, Gorani, etc.).

Amateur Radio is a non-governmental organization that includes the security of communication systems for all the structures involved in the prevention of disaster prevention.

Aeronautical Federation, over the air clubs and parachute club provides transportation and quick arrival of humans and most pressing material resources to the disaster area.

Fire unions or other associations of professional and volunteer firefighters in the Federation of Bosnia and Herzegovina, which was formed in accordance with the Law on Associations and Foundations ("Official Gazette of the Federation BH", Nos. 45/02 and 85/07), are engaged in jobs that relating to providing technical assistance in the establishment of voluntary fire brigades and volunteer fire units, proposing measures to improve the fire service, the development of self-protection and technical education in the field of fire protection, the organization of action on development and popularization of firefighting and fire protection and other activities.

Annex 3

SUMMARY

EPIDEMIC IN THE FEDERATION OF BOSNIA AND HERZEGOVINA BY YEAR

YEAR 2000

No.	DISEASE	CANTON	Muncipality	Settlement	number of patients	Sign-logoff
1	2	3	4	5	6	7
1.	Hepatitis virosa A	Tuzla	Srebrenik	Duboki potok, Bjelave	11	31.01.2000
2.	Hepatitis virosa A	Tuzla		Kiseljak	12	13.03.2000
3.	Hepatitis virosa A	ZE-DO	Visoko	Perutac	6	21.08.2000
4.	Hepatitis virosa A	ZE-DO	Zenica	Gradište	34	25.08.2000
5.	Hepatitis virosa A	ZE-DO	Zenica	Babino polje	53	06.12.2000
6.	Hepatitis virosa A	ZE-DO	Zenica	Blatuša	13	06.09.2000
7.	Hepatitis virosa A	ZE-DO	Tešanj	Simetrale	538	01.09.2000
8.	Hepatitis virosa A	ZE-DO	Zavidovići	City	215	14.09.2000
9.	Hepatitis virosa A	ZE-DO	Visoko	Ljetovik	10	09.10.2000
10.	Hepatitis virosa A	ZE-DO	Visoko	Malo čajno	7	17.10.2000
11.	Hepatitis virosa A	ZE-DO	Zenica	Pridražići Tetovo	16	03.11.2000
12.	Hepatitis virosa A	Tuzla	Banovići	Brezovača	4	12.12.2000
12 epidemics					**919**	
13.	Parotitis epidemica	Tuzla	Živinice	Đurđevik, Bašigovci, Lukovica, Gračanica	296	10.01.2000
14.	Parotitis epidemica	Tuzla	Kladanj	City	327	08.02.2000
15.	Parotitis epidemica	Tuzla	Banovići	City	508	10.02.2000
16.	Parotitis epidemica	Tuzla	Kalesija	City	25	08.03.2000
17.	Parotitis epidemica	Tuzla	Tuzla	City	43	26.04.2000
18.	Parotitis epidemica	Tuzla	Gradačac	Srnice G. Bib. polje	32	23.05.2000
19.	Parotitis epidemica	ZE-DO	Zenica	Perin Han, Gorica	97	15.01.2000
20.	Parotitis epidemica	Una-Sana	Cazin	SŠ Centar	15	18.05.2000
21.	Parotitis epidemica	Central Bosnia	G. Vakuf	Voljevac, Zastinje	25	03.08.2000
22.	Parotitis epidemica	ZE-DO	Visoko	Village Kalići	27	19.10.2000
23.	Parotitis epidemica	Tuzla	Sapna	g.Sapna, lisa	20	31.10.2000
24.	Parotitis epidemica	ZE-DO	Kakanj	City	220	08.11.2000
25.	Parotitis epidemica	ZE-DO	Zenica	City	126	28.11.2000
13 epidemics					**1.761**	
26.	Varicellae	Central Bosnia	Donji Vakuf	City	42	05.04.2000
27.	Varicellae	Una-Sana	BHać	Ozimice I, II	363	19.04.2000
28.	Varicellae	Tuzla	Maoča, Brka	G.Rahić, Brka	16	10.05.2000
29.	Varicellae	Una-Sana	Ključ	Kindergarden „Ljiljan"	41	26.05.2000
4 epidemics					**462**	
30.	Meningitis virosa	HNK, ZHK, HBK	Mostar, Čitluk, Posušje, Tomislavgrad	City settlements	24	04.07.2000
1 epidemics					**24**	
31.	Q groznica	HNK	Mostar	Goranci, Bogodol	54	24.05.2000
32.	Q groznica	HNK	Konjic	Vrdolje	2	24.05.2000
33.	Q groznica	ZE-DO	Kakanj	City	59	25.05.2000
3 epidemics					**115**	
34.	Brucelosis	HNK	Mostar	Bogodol, Goranci	10	05.05.2000
1 epidemics					**10**	
35.	Toxiinfectio alim.	Una-Sana	BHać	Ribić	8	27.06.2000
36.	Intoxicatio alim.	ZE-DO	Zenica	Obrenovci	6	22.06.2000
37.	Toxiinectio alim.	ZE-DO	Zenica	KP Zavod	15	23.03.2000
38.	Intoxicatio C.ignata	Una-Sana	V. Kladuša	Elem. school	49	04.10.2000
4 epidemics					**78**	
39.	Influenza	Federation Bosnia and Herzegovina			39.245	1.-12.2000
TOTAL FEDERATION BOSNIA AND HERZEGOVINA					**42.614**	

The average number of cases per outbreak:- No flu epidemic: 86.39 - A flu epidemic: 1,092.6

YEAR 2001

No	DISEASE	CANTON	Muncipality	Settlement	number of patients	Sign in-sign out
1	2	3	4	5	6	7
1.	Hepatitis virosa A	ZE-DO	Tešanj	Piljušići	41	07.02.2001 07.06.2001
2.	Hepatitis virosa A	ZE-DO	Zenica	Stranjani	23	18.04.2001 12.09.2001
3.	Hepatitis virosa A	USK	BHać	Čekrlije, Vinica	245	13.03.2001 26.11.2001
4.	Hepatitis virosa A	USK	BHać	Založje	18	16.05.2001 01.09.2001
5.	Hepatitis virosa A	ZE-DO	Zenica	Ćerići	11	08.11.2001
6.	Hepatitis virosa A	USK	Bihać	MZ Čavkiji	7 7	29.11.2001 28.02.2002
6 epidemics			**TOTAL:**		**345**	
7.	Parotitis epidemica	ZE-DO	Olovo	Solun, Ol. Luke	53	01.02.2001 28.06.2001
8.	Parotitis epidemica	ZE-DO	Breza	Breza	51	04.04.2001 08.06.2001
9.	Parotitis epidemica	Tuzla	Lukavac	City	7	15.05.2001 24.07.2001
10.	Parotitis epidemica	Una-Sana	Cazin	City	9	10.07.2001
11.	Parotitis epidemica	Central Bosnia	N. Travnik	City	85	09.11.2001
5 epidemics				**TOTAL:**	**205**	
12.	Trichinelosis	Tuzla	Kladanj	Stupari, Tarevo	16	08.01.2001 07.02.2001
13.	Trichinelosis	Una-Sana	S. Most	Čaplje	12	13.03.2001 05.04.2001
14.	Trichinelosis	HNK	Konjic	Mokro, Bjelimići	3	02.04.2001 03.04.2001
3 epidemics			**TOTAL:**		**31**	
15.	Varicellae	Tuzla	Tuzla	Grad-Institution for children	28	23.02.2001 09.04.2001
16.	Varicellae	Tuzla	Banovići	City	16	05.06.2001 16.08.2001
17.	Varicellae	Una-Sana	B.Petrovac	TC Gorinčani	19	01.11.2001 07.12.2001
18.	Varicellae	Una-Sana	Ključ	City	16	21.11.2001
19.	Varicellae	Una-Sana	Bos.Krupa	City	14	22.11.2001
20.	Varicellae	Una-Sana	B.Petrovac	City	14	03.12.2001
21.	Varicellae	Tuzla	Kladanj	City	20	04.12.2001 04.03.2002
7 epidemics				**TOTAL:**	**113**	
22.	Intoxicatio aliment.	Tuzla	Kalesija	Mahmutovići	4	20.02.2001 21.02.2001
23.	Intoxicatio aliment.	ZE-DO	Zenica	Nemila	17	27.03.2001
24.	Intoxicatio aliment.	Tuzla	Lukavac	Gnojnice	7	30.07.2001 06.08.2001
25.	Intoxicatio aliment.	Una-Sana	Bihać	Firm Krajinametal	71	03.08.2001 06.08.2001
26.	Intoxicatio aliment.	Tuzla	Kalesija	Settlement Janjići	9	19.09.2001 03.10.2001
5 epidemics				**TOTAL:**	**108**	
27.	Enterocollitis	ZE-DO	Kakanj	Dubovo brdo	33	15.05.2001 28.05.2001
28.	Enterocollitis	Tuzla	Lukavac	Gnojnica, Murgiji	29	19.06.2001 24.07.2001
2 epidemics			**TOTAL:**		**62**	
29.	Micetizmus	Tuzla	Sapna	Vinica	9	08.06.2001 14.09.2001
30.	Micetizmus	Tuzla	Kladanj	MZ Tarevo	4	04.07.2001 27.08.2001
2 epidemics			**TOTAL:**		**13**	
31.	Influenza	Federation Bosnia and Herzegovina			35.695	
TOTAL FEDERATION BOSNIA AND HERZEGOVINA					**36.572**	

The average number of cases per outbreak: - No flu epidemic: 29; - A flu epidemic: 1.180

YEAR 2002

No.	DISEASE	CANTON	Muncipality	Settlement	Number of patients	Sign in-sign out
1	2	3	4	5	6	7
1.	Parotitis epidemica	Una-Sana	Bihać	Vojarna Grmeč	7 **84**	10.01.2002 **05.06.2002**
2.	Parotitis epidemica	Una-Sana	V. Kladuša	Schools	51	13.05.2002
3.	Parotitis epidemica	Una-Sana	Bužim	City	16 **32**	13.05.2002 **23.09.2002**
4.	Parotitis epidemica	Una-Sana	B.Petrovac	City	25 **39**	10.06.2002 **26.08.2002**
5.	Parotitis epidemica	Central Bosnia	Busovača, Travnik, G.Vakuf	Muncipality	204	01.01.2002 **01.05.2002**
5 epidemics		**TOTAL:**			**410**	
6.	Varicellae	Una-Sana	BHać	Č.Š. Pokoj	23 **34**	04.01.2002 **20.03.2002**
7.	Varicellae	Una-Sana	S.Most	Kindergarden	82	18.06.2002
8.	Varicellae	Una-Sana	Cazin	Kindergarden	13	11.10.2002
9.	Varicellae	Tuzla	Tuzla	Elem. school	12 **96**	19.10.2002 **28.03.2002**
10.	Varicellae	Una-Sana	Bos.Krupa	Elem. school	15	15.11.2002
11.	Varicellae	Una-Sana	S.Most	Elem. school	29 **47**	27.12.2002 **16.02.2003**
12.	Varicellae	Central Bosnia	Jajce, Travnik, Kreševo, Bugojno	Elem. school	496	01.01.2002
7 epidemics		**TOTAL:**			**681**	
13.	Q fever	CANTON 10	Livno	Building APTF-a	24	19.03.2002
1 epidemics					**115**	
14.	Intoxicatio aliment.	Tuzla	Tuzla	College housing	18 **18**	05.06.2002 **12.06.2002**
15.	Intoxicatio aliment.	Tuzla	Kalesija	Tojšići, Lipovača	33 **38**	03.09.2002 **12.09.2002**
16.	Intoxicatio aliment.	ZE-DO	Zenica	Settlement Bilmišće	6 **6**	24.07.2002 **03.12.2002**
17.	Intoxicatio aliment.	ZE-DO	Zenica	Babišnica	9	06.08.2002
18.	Intoxicatio aliment.	Una-Sana	Ključ	D. Vojići Velagići	8 **8**	08.08.2002 **08.08.2002**
19.	Intoxicatio aliment.	Tuzla	Tuzla	Old part of the city	4 **5**	05.07.2002 **27.08.2002**
20.	Intoxicatio aliment.	Tuzla	Gradačac	Zelina	18 **26**	29.10.2002 **27.11.2002**
21.	Intoxicatio aliment.	Tuzla	Tuzla		4 **4**	13.11.2002 **09.12.2002**
8 epidemics		**TOTAL:**			**114**	
22.	Intrahospitalna influenca	HNK	Mostar	Surgery and urol. KCM	3	17.05.2002
1 epidemics		**TOTAL:**			**3**	
23.	Grip	Una-Sana	BHać	City	1193	07.02.2002 10.05.2002
1 epidemics		**TOTAL:**			**1.193**	
24.	Meningitis seroza	Una-Sana	Cazin	City	8 **14**	05.07.2002 **27.08.2002**
1 epidemics		**TOTAL:**			**14**	
25.	Febris haemorrhag	Tuzla	Banovići	Villages	6 **8**	09.07.2002 **15.08.2002**
26.	Febris haemorrhag	Central Bosnia	N.Travnik, Travnik, Gornji Vakuf	Muncipality	**41**	18.06.2002
2 epidemics		**TOTAL:**			**49**	
27.	Enterocollitis ac.	Una-Sana	Bos.Krupa	Student camp	27 **27**	11.07.2002 **17.07.2002**
28.	Enterocollitis ac.	ZE-DO	Zenica		4 **4**	27.11.2002 **08.01.2003**
2 epidemics		**TOTAL:**			**31**	
29.	Virusni hepatitis A	ZE-DO	Maglaj	Bradići	9 9	22.07.2002 **26.08.2002**
1 epidemics		**TOTAL:**			**9**	

30.	Antrax	Tuzla	Gračanica	Village Delići	2 **2/1 dead**	09.08.2002 **09.08.2002**
1 epidemics		**TOTAL:**			**14**	
TOTAL FEDERATION BOSNIA AND HERZEGOVINA:					**2530**	

YEAR 2003

No.	DISEASE	CANTON	Muncipality	Settlement	Number of patients	Sign in-sign out
1	2	3	4	5	6	7
1.	Varicellae	Una-Sana	Bihać	O.Š.	29 **129**	10.01.2003 **23.06.2003**
2.	Varicellae	Una-Sana	Ključ	Kindergarden O.Š	12 **48**	05.02.2003 **23.07.2003**
3.	Varicellae	Una-Sana	V. Kladuša	Kindergarden	38 **65**	10.03.2003 **28.07.2003**
4.	Varicellae	Tuzla	Banovići	City and village Bilavac	11 **14**	02.04.2003 **05.05.2003**
5.	Varicellae	Tuzla	Lukavac	N. City	35 **66**	19.05.2003 **28.072003**
6.	Varicellae	Tuzla	Kladanj	MZ Stupari	21 **82**	11.11.2003 **09.03.2004**
7.	Varicellae	Una-Sana	Sanski Most	Čaplje, Vrhpolje, Kijevo	38 **38**	11.12.2003 **09.03.2004**
7 epidemics		**TOTAL:**			**442**	
8.	Intoxicatio aliment.	CANTON Sarajevo	Sarajevo	VF Komerc	3 **3**	24.02.2003 **26.02.2003**
9.	Intoxicatio aliment.	Tuzla	Kalesija	Vukovije	5 5	08.06.2003 **25.06.2003**
10.	Intoxicatio aliment.	Una-Sana	Bužim	Zaradostovo	11 **11**	09.07.2003 **18.07.2003**
11.	Intoxicatio aliment.	Tuzla	Tuzla	Family	15 **16**	20.08.2003 **30.10.2003**
4 epidemics				**TOTAL:**	**35**	
12.	Grip	ZE-DO	Kakanj	City	342 **630**	12.03.2003 **10.04.2003**
13.	Grip	Tuzla	Tuzla	City	1307 **2138**	19.03.2003 **21.04.2003**
14.	Grip	Tuzla	Lukavac	City	372 **1067**	21.03.2003 **21.04.2003**
15.	Grip	Tuzla	Živinice	City	1059 **1641**	19.03.2003 **21.04.2003**
16.	Grip	Tuzla	Gradačac	City	340 **771**	24.03.2003 **22.04.2003**
17.	Grip	Tuzla	Kladanj	City	235 **383**	27.03.2003 **22.04.2003**
18.	Grip	Tuzla	Banovići	City	250 **397**	02.04.2003 **23.04.2003**
19.	Grip	Una-Sana	Sanski Most	City	231 **528**	01.04.2003 **30.05.2003**
20.	Grip	Una-Sana	V.Kladuša	City	282 **461**	11.04.2003 **05.05.2003**
9 epidemics				**TOTAL:**	**8016**	
21.	Trichinell.	ZE-DO	Zavidovići	Vukovići Valley	18	14.03.2003
22.	Trichinell.	Tuzla	Kladanj	s. Plakovići	6	01.04.2003
2 epidemics				**TOTAL:**	**24**	
23.	Enterocollitis	ZE-DO	Visoko	firm „Prevent“	**38**	04.07.2003
24.	Enterocollitis	ZE-DO	Zenica	Moščanica	**6**	27.06.2003
25.	Enterocollitis	ZE-DO	Kakanj	s. Bištrani	15 **22**	17.08.2003 **26.08.2003**
3 epidemics		**TOTAL:**			**66**	
26.	Scarlatina.	Tuzla	Tuzla	Lipnica, Š.Brod, Plane	12 **14**	15.12.2003 **20.01.2004**
1 epidemics		**TOTAL:**			**14**	
TOTAL FEDERATION BOSNIA AND HERZEGOVINA:					**8597**	

YEAR 2004

No.	DISEASE	CANTON	Muncipality	Settlement	No. of patients	Sign in-sign out
1	2	3	4	5	6	7
1.	Influenza	Una-Sana	Bihać	Muncipality BHać	729 **4352**	16.01.2004 **31.03.2004**
2.	Influenza	Una-Sana	Sanski Most	Muncipality S.Most	217 **601**	06.02.2004 **06.04.2004**
3.	Influenza	Bosansko-podrinjski	Goražde	Muncipality Goražde	311	10.02.2004
4.	Influenza	ZE-DO	Olovo	Dolovi, Olovske Luke, Solun	204	09.02.2004
4 epidemics		**TOTAL:**			**5468**	
5.	Varicellae	Una-Sana	Bos.Krupa	Bos. Otoka, Hodžinac	30	14.01.2004
1 epidemics		**TOTAL:**			**30**	
6.	Trichinell.	Tuzla	Gračanica	Muncipality Gračanica	10 **21**	05.03.2004 **07.04.2004**
1 epidemics		**TOTAL:**			**21**	
7.	Toxiinfectio alim.	Tuzla	Lukavac	Poljice	5 **6**	20.04.2004 **10.05.2004**
8.	Toxiinfectio alim.	Tuzla	Kalesija	D. Ruinci	5 **5**	21.05.2004 16.06.2004
9.	Toxiinfectio alim.	Una-Sana	V.Kladuša	Health facility	4 **4**	07.05.2004 **10.05.2004**
10.	Toxiinfectio alim.	Tuzla	Tuzla	Rest. „Saranda“	24 **89**	11.06.2004 **30.06.2004**
4 epidemics		**TOTAL:**			**104**	
11.	Brucellosis	HNK	Konjic	Boračko lake, Borci, Vrdolje	6	08.02.2004
12.	Brucellosis	ZE-DO	Zenica	Settlement Šerići	5	18.05.2004
2 epidemics		**TOTAL:**			**11**	
TOTAL FEDERATION BOSNIA AND HERZEGOVINA:					**5.634**	

SUMMARY OF EPIDEMICS IN THE FBH FOR THE PERIOD 2005-2012

Year	Type of epidemics	Number of epidemic	Number of patients
1	2	3	4
2005.	Toxiinfectio alimentaris	4	203
	Brucellosis	3	32
	Trichinellosis	1	2
	Leptospirosis	1	16
	Enterocollitis	3	54
	Varicellae	2	170
	Scarlatina	1	16
	Meningitis virosa	1	97
	Influenza	3	3.712
Total		**19**	**4.302**
2006.	Toxiinfectio alimentaris	1	6
	Q-febris	1	4
	Varicellae	1	37
	Influenza	1	497
Total		**4**	**544**
2007.	Toxiinfectio alimentaris	3	751
	Brucellosis	2	352
	Trichinellosis	1	23
	Hepatitis virosa A	1	9
	Enterocollitis	1	7
	Morbilli	2	118
	Varicellae	2	435
	Influenza	5	3.524
Total		**17**	**5.219**
2008.	Toxiinfectio alimentaris	2	83
	Brucellosis	5	85
Total		**7**	**168**
2009.	Toxiinfectio alimentaris	2	79
	Trichinellosis	1	4
	Rubeolla	1	50
	Influenza	1	575
Total		**5**	**708**
2010.	Rubeolla	2	69
	Toxiinfectio alimentaris	6	39
	Enterocollitis	1	6
	Varicellae	1	19
	Parotitis epidemica	1	45
Total		**11**	**178**
2011.	Parotitis epidemica	1	5998
	Toxiinfectio alimentaris	1	86
Total		**2**	**6084**
2012.	Parotitis epidemica	1	52
	Toxiinfectio alimentaris	2	41
	Scarlatina	1	8
Total		**4**	**101**
Total in Federation BH (2005. - 2012.)		**69**	**17.304**

Annex 5

OVERVIEW
Harmful organisms in agricultural plants in the Federation of Bosnia and Herzegovina

Open area	In the protected area:
- Phytophthora infestans	- Fusarium spp.
- Alternaria solani	- Pythium spp.
- Venturia inaequalis; Venturia pirina	- Liriomyza spp.
- Monilia laxa; Monilia fructigena	- Thrips
- Fusarium spp.	- Tetranychus urticae
- Blumeria graminis f.sp.tritici; B. hordei	- Phytophthora spp.
- Podosphaera leucotricha	- Botrytis spp.
- Plasmopara viticola	- Verticilium spp.
- Peronospora destructor	
- Peronospora parasitica	
- Oidium tuckeri	
- Unincula necator	
- Botritis cinerea	
- Aphididae	
- Elateridae	
- Tortricidae	
- Acarinae	
- Carpocapsa pomonella	
- Grapholita funebrana	
- Diabrotica virgifera virgifera	
- Leptinotarsa decemlineata	
- Rhagoletis cerasi	
- Polystigma rubrum	
- Puccinia spp.	
- Oulema melanopus	
- Ostrinia nubilalis	
- Hylemia antiqua	
- Hoplocampa spp.	
- Psilla spp.	
- PPV (plum pox potyvirus)	

Table 1. Overview of fire in the period from 2008 to 2013 **Annex 6**

YEAR	NUMBER OF FIRES			Total surface affected (ha)	TOTAL FIRE	TOTAL NUMBER OF PEOPLE		
	Open area	facilities	vehicles			deceased	injured	evacuated
1	2	3	4	5	6	7	8	9
2008	830	313	76	1.288.64	1.217	4	5	0
2009	719	384	48	405.24	1.154	10	25	27
2010	1.038	311	64	390.35	1.411	7	9	7
2011	2.806	470	103	1.796.29	3.379	5	20	0
2012	5.324	534	117	41.717.81	5.975	4	14	0
2013	1.939	544	92	3.486,01	2.575	6	13	350
TOTAL	**12.656**	**2.556**	**500**	**49.084,34**	**15.711**	**36**	**86**	**384**

Table 2. Overview of the number of assistance Armed Forces of BH and international assistance in extinguishing large forest fires using air and other forces during the period from 2008 to 2013

YEAR	BIG FOREST FIRES ENDANGERED AREAS		HELP WITH THE EXTINGUISHING FOREST FIRES		ENGAGING THE AIRCRAFT	NOTE
	CANTONS	MUNCIPALITY/CITY	WITHIN BH	OUTSIDE BH(INT. HELP)		
1	2	3	4	5	6	7
2008	Herzegovina-Neretva	Mostar, Konjic, Ravno, Čapljina	OS BH	Republic of Croatia	helicopters OS BH, canadairs RH	Republic of Croatia extinguished the fire using a Canadair in the Municipality Ravno and Čapljina and Tomislavgrad, while helicopters OS BH worked in the City of Mostar and Konjic.
	CANTON 10	Tomislavgrad	OS BH	-	helicopters OS BH	
2009	CANTON 10	Glamoč	OS BH	-	no	Assistance is provided by the Armed Forces personnel (soldiers).
2010	CANTON 10	Bosansko Grahovo		Republic of Croatia	air tractor, canadairs RH	
		Tomislavgrad, Livno	OS BH		helicopters OS BH,	
	Herzegovina-Neretva	Čapljina		Republic of Croatia	canadairs RH	
2011	Herzegovina-Neretva	Grad Mostar	OS BH		helicopters OS BH	Forest fires were the most vulnerable Muncipality Konjic, where the AF BH as much as 6 times provided assistance using helicopters
		Konjic	OS BH			
		Neum		Republic of Croatia	canadairs RH	
		Čapljina	OS BH			
	West Herzegovina	Ljubuški	OS BH		helicopters OS BH	Assistance is provided by the Armed Forces personnel.
2012	Herzegovina-Neretva	Konjic, Jablanica, Grad Mostar	OS BH	Republic of Croatia, Russian Federation, Republic of Turkey, EUFOR	helicopters OS BH, RF, RT, EUFOR-a i canadairs RH	OS BH in affected areas have assisted 15 times, while the international aid given to 9 times.
	Zenica-Doboj	Zavidovići, Olovo				
	CANTON 10	Tomislavgrad				
2013	Herzegovina-Neretva	Jablanica	OS BH	Republic of Croatia, EUFOR	helicopters OS BH, EUFOR-a and canadairs RH	Helicopters OS BH, EUFOR and Canadairs RH OS BH in affected areas have assisted 23 times, while the international aid given to 9 times.
		Ravno		Republic of Croatia		
	CANTON 10	Tomislavgrad		Republic of Croatia		
Ukupno	**4**	**13**				

Table 3. Summary of forest fires and burned areas, as well as the estimated damage in the period from 2007 to 2012, according to data from the Federal Ministry of Agriculture, Water and Forestry

Year	Number of fires	Surface affected by fires (ha)	Burned woodmass (m^3)	Number of burned seedlings	Damage estimate (BAM)	NOTE
1	2	3	4	5	6	7
2007.	932	13.742,00	40.017,00	32.644,00	9.574.263,00	
2008.	355	5.354,00	32.318,00	199.533,00	3.794.094,00	
2009.	190	1.396,00	1.954,00	132.576,00	1.121.077,00	
2010.	116	116,00	1.268,00	15.807,00	434.691,00	These data are for 8 Canton, as HNC and WHC are not provided the requested information
2011.	682	6.609,91	6.893,94	23.778,00	5.047.159,00	These data are for the Canton 9, because CNT did not provide the requested data
2012.	1082	43.317,20	831 488,00	710.990,00	47.753.101,00	Data Feder.minis.polj., Vod.i Forestry
2007. - 2012.	**3357**	**70.535,11**	**913.938,94**	**1.115.328,00**	**67.724.385,00**	
2008. - 2012.	**2425**	**56.793,11**	**873.921,94**	**1.082.684,00**	**58.150.122,00**	

Table 4. Categories of protected areas

r/b	CATEGORY OF PROCTECTED AREAS	DESCRIPTION	PURPOSE
1	**2**	3	4
1	**Category 1**	field of nature protection	protected area established for scientific purposes or for the protection of wilderness
2	**Category 2**	National Park	protected area established for the protection of ecosystems and recreation
3	**Category 3**	natural Monument	protected area established for the purpose of conservation of specific natural features
4	**Category 4**	protected Landscape	protected areas established to conserve the inland landscapes and coastal areas and recreation.

Table 5. The levels of threat to forests from fire by points

THE DEGREE OF RISK OF FOREST FIRES		NUMBER OF POINTS	COLOR USED TO INDICATE THE DEGREE OF VULNERABILITY IN THE OVERVIEW MAP
1	2	3	4
I DEGREE	VERY HIGH	480	RED
II DEGREE	HIGH	381 – 480	ORANGE
III DEGREE	MEDIUM(MODERATE)	281 - 380	BRIGHT YELLOW
IV DEGREE	LOW	<280	GREEN

Table 6. WCQD-which determined the degrees of threat to forests from fire

No.	KŠPD	THE DEGREE OF RISK OF FOREST FIRES (ha)			
	CANTON	I	II	III	IV
1	2	3	4	5	6
1	Una-Sana	3.316	15.409	68.494	76.220
2	Posavina	0	0	0	0
3	Tuzla	Not from the estimate	Not from the estimate	Not from the estimate	Not from the estimate
4	Zenica-Doboj	Not from the estimate	Not from the estimate	Not from the estimate	Not from the estimate
5	Bosnia-Podrinje	0	2.168	0	22.807
6	Central Bosnia	10.746	34.623	83.209	82.754
7	Herzegovina-Neretva	0	0	0	0
8	West Herzegovina	3.116	107220	0	0
9	CANTON Sarajevo	Not from the estimate	Not from the estimate	Not from the estimate	Not from the estimate
10	CANTON 10	50	13.178	113.494	138.135
	TOTAL	**17.228**	**172.598**	**265.197**	**319.916**

Table 7. Categorization of forests from fires in degrees

CATEGORY	Natural conditions of the occurrence of forest fires	BELT, SUB BELTS AND CLIMATE	Prevailing forest vegetation
1	2	3	4
I	Low	Lower- mountain plains, high mountains and lower prerrymountain	Semi moist and moist woods and thickets in different vegetation areas (forests of oak trees and willows, oak, Turkey oak, beech and other deciduous forests and scrub).moist
II	Moderate	High mountain and higher perry mountain	Different pine tree, spruce, pine, larch and other conifer forests and thickets
III	High	Mountaini- submedterrian	
IV	Very high	Mountain	Different xerothermophilous and ultra xerophyl forest, maquis and garrigue always green hardwoods (oak id r) and conifers (maritime pine, cypress, juniper, and others.)

Table 8. WCQD-which have developed plans for the protection of forests against fire

No.	CANTON NAME	Plan developed by the forest protection against fire	PROTECTION PLAN FOREST FIRE		NOTE
			DESIGNED	NOT DESIGNED	
1	2	3	4	5	6
1.	Una-Sana	Una-Sana forests	X		
2.	Posavina	Not formed		X	
3.	Tuzla	Forest Tuzla Canton	X		
4.	Zenica- Doboj	Forest Zenica- Doboj	X		
5.	Bosnia-Podrinje	Bosnia- Podrinje forests	X		
6.	Central Bosnia	Central Bosnia forests	X		Elaborated plan includes all the elements required by the Regulations.
7.	Herzegovina- Neretva	Herzegovina-Neretva forest d.o.o.		X	The plan was carried out risk assessment by department, until it made a recap of the entire Canton and general maps re not made.
8.	West Herzegovina	Forest Industrial Company Herzegovina canton	X		The performed plans have not made an assessment of forests from fire, nor made general maps.
9.	CANTON Sarajevo	Sarajevo forest	X		
10.	CANTON 10	Herzegovina-Neretva forest	X		
TOTAL	**10**	**8**	**8**	**2**	

Table No. 9 Overview of Canton who brought Cantonal laws on fire protection and fire fighting, as well as cantons, municipalities / city that have created risk assessment and fire protection plans

Risk assessment of Federation of Bosnia and Herzegovina regarding natural and other disasters

No.	CANTON NAME (no. Of municipalities in a canton)	CANTONAL LAW ON PROTECTION FROM FIR. AND FIREGHT.		RISK ASSESSMENT OF FIRE IN CANTON		PLAN OF FIRE PROTECTION OF CANTON		MUNICIPALITIES IN THE CANTON THAT ADOPTED	
		adopted	not adopted	adopted	not adopted	adopted	Not adopted	Risk assessment of fire	Plan of fireprotection
1	2	3	4	5	6	7	8	9	10
1.	Una- Sana (8)	x		x			x	Bosanska Krupa	Bosanska Krupa
2.	Posavina(3)		x		x		x	Domaljevac-Šamac	
3.	Tuzla (13)	x		x		x		Gračanica Tuzla Gradačac Kalesija Banovići Doboj East Kladanj Lukavac Sapna Srebrenik	Gračanica Tuzla Gradačac Kalesija
4.	Zenica-Doboj (12)	x			x		x	Vareš Zenica Tešanj Zavidovići Maglaj Kakanj	Vareš, Zenica Tešanj
5.	Bosnia-Podrinje(3)		x		x		x	Goražde	Goražde
6.	Central Bosnia (12)	x			x		x	Novi Travnik Travnik	
7.	Herzegovina-Neretva (9)		x		x		x	Jablanica Konjic	Jablanica
8.	West Herzegovina(4)		x		x		x		
9.	Canton Sarajevo (9)	x		x			x	Hadžići Old Town	Hadžići Old Town
10.	Canton 10 (6)		x		x		x		
TOTAL		**5**	**5**	**3**	**7**	**1**	**9**	**25**	**12**

Table no. 10. Summary overview of fire brigades and firefighters in muncipalities and cantons in FBH

R/b	CANTON NAME (number of muncipality in Canton)	PVJ in municapality (number of members)	TOTAL NUMBER		DVD/DVJ in MUNCIPALITIES (number of members)	TOTAL NUMBER		FIRE UNITS IN LEGAL ENTITIES (number of members)	TOTAL NUMBER		MUNICIPALITY THAT DO NOT HAVE PVJ NOR DVD/DVJ	NOTE
			PVJ-a	PROF. FIREFIGH..		DVD/DVJ-a	FIREBR.		VJ-a legal subjects	MEMBERS		
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	**UNA-SANA (8)**	**PVJ BHać (27)** **PVJ Cazin (16)** **PVJ V. Kladuša (14)** **PVJ S. Most (13)** **PVJ B. Krupa (11)** **PVJ Bužim (10)** **PVJ Ključ (9)** **PVJ B. Petrovac (5)**	8	105	VD Otoka B.Krupa (23), DVD Pećigrad (17) DVD Kulen Vakuf (23)	3	63	-	-	-	-	All municipalities in the canton have the formation PVJ-e and the same are within the municipal civil defense services. Bihac, Cazin, Bosanska Krupa have formed PVJ's and DVJ-e.
2.	**POSAVINA (3)**		0	0	DVD Odžak (6) DVD Orašje (3) DVD Tolisa (3) DVD Matići (3) DVD Donja Mahala (3) DVD Vidovice (3) DVD Domaljevac - Šamac (5)	7	26	-	-	-	-	The plan is the formation of IPV between the Posavina Canton and the municipality Orašje.
3.	**TUZLA (13)**	**PVJ Tuzla (69)** **PVJ Lukavac (18)** **PVJ Srebrenik (14)** **PVJ Gračanica (13)** **PVJ Banovići (13)** **PVJ Kalesija (9)** **PVJ Gradačac (1)** **PVJ Kladanj (not expressed)**	8	137	VD Gradačac (30) VD Srebrenik (27) VD Čelić (25) DVD Kladanj (8) DVD Tuzla (25) DVD Gornja Tuzla (13) DVD „Amer Handanović-Puračić“ Lukavac (20)	7	148	PE Elektroprivreda BH doo subsidiary TPP "Tuzla" (8) ZD RMU „Đurđevik“, Đurđevik (11) Mine „Dubrave“, Dubrave (19) „GLOBAL ISPAT“ Lukavac (26) „SISECAM SODA“ Lukavac (19)	5	83	Sapna Teočak Živinice Doboj - Istok	6 of 13 in the Municipality of Canton, a formation PVJ-e, which are part of the municipal civil protection services. Gradacac, Kladanj have formed DVD / J, while PVJ in the process of formation (passed act is not filled). Fire units formed in the coal mine "Đurđevik" in Đurđevik operates in Zivinice municipality, in accordance with the signed agreement of the municipality Zivinice and above RMU. Lukavac, Srebrenik, Tuzla, Gradacac, Kladanj, have formed PVJ and DVJ-e.

Risk assessment of Federation of Bosnia and Herzegovina regarding natural and other disasters

R/b	CANTON NAME (number of muncipality in Canton)	PVJ in municapality (number of members)	TOTAL NUMBER		DVD/DVJ in MUNCIPALITIES (number of members)	TOTAL NUMBER		FIRE UNITS IN LEGAL ENTITIES (number of members)	TOTAL NUMBER		MUNICIPALITY THAT DO NOT HAVE PVJ NOR DVD/DVJ	NOTE
			PVJ-a	PROF. FIREFIGH..		DVD/DVJ-a	FIREBR.		VJ-a legal subjects	MEMBERS		
1	2	3	4	5	6	7	8	9	10	11	12	13
4.	**ZENICA-DOBOJ (12)**	**PVJ Zenica (58)** **PVJ Zavidovići (22)** **PVJ Žepče (15)** **PVJ Kakanj (16)** **PVJ Vareš (9)** **PVJ Visoko (8)** **PVJ Maglaj (13)** **PVJ Tešanj (12)** **PVJ Olovo (6)**	9	159	DVD Jelah Tešanj (21) DVD Tešanj 1905 (20) VD Kakanj (21) VD Maglaj (no data)DVD Doboj - Jug (no data) DVD Olovo (9) DVD Visoko (no data)	7	71	NATRON HAYAT Maglaj (26), ZD RMU „Breza“ Breza (15).	2	41	Breza Usora	9 of 12 in the Municipality of Canton, a formation PVJ-e, which are part of the municipal civil protection services. Tesanj and Kakanj, have formed and PVJ and DVJ's, Birch, Usora and Doboj Jug have formed PVJ-e, or DVJ-e. Fire unit that was formed in the US RMU Breza, performs fire activity at the municipal level Birch. Kakanj, Visoko, Maglaj, Tesanj, Lead have formed PVJ's and DVJ-e.
5.	**BOSNIA-PODRINJE (3)**	**PVJ Goražde (15)** **PVJ Pale-Prača (4)**	2	19		-	-	UNIS GINEX d.d. Goražde (15)	1	15	Foča - Ustikolina	
6.	**CENTRAL BOSNIA (12)**	PVJ Travnik (24) **PVJ Kiseljak (17)** **PVJ Jajce (9)** **PVJ Novi Travnik (9)** **PVJ Gornji Vakuf - Uskoplje (5)**	5	64	VD Bugojno (38) DVD Kreševo (20) DVD Kiseljak (7) VD Busovača (5) DVD Vitez (5) i DVD Stari Vitez (25) VD Donji Vakuf (18), VD Fojnica (6), DVD Turbe (2) i DVD Nova Bila (2) Travnik DVD Gornji Vakuf – Uskoplje (no data) DVD Jajce (no data)	12	128	ŠPD Central Bosnia forrests d.o.o. PJ Šumarija Travnik (21), BINAS d.o.o Bugojno (18) FIS d.o.o. (13) BINAS d.o.o. Bugojno (17)	4	69	Dobretići	4 of 12 in the Municipality of Canton, are forming PVJ-e, which are part of the municipal civil protection services. Bugojno, Donji Vakuf and Gornji Vakuf - Uskoplje are discussing the possibility of forming ZPVJ. Donji Vakuf, of Fojnica, Vitez, Busovaca and Bugojno have PVJ-e, and have formed DVJ-e. Fire units formed in the forests of Central ŠPD Ltd. PJ Šumarija Travnik, works in the area Muncipality Travnik, Busovača, Donji Vakuf. In Travnik PVJ formed and still acts as the administrative organization of Territorial fire brigade. Travnik, Kiseljak, Jajce, Gornji Vakuf-Uskoplje have formed PVJ's and DVJ-e.

Risk assessment of Federation of Bosnia and Herzegovina regarding natural and other disasters

R/b	CANTON NAME (number of muncipality in Canton)	PVJ in municapality (number of members)	TOTAL NUMBER		DVD/DVJ in MUNCIPALITIES (number of members)	TOTAL NUMBER		FIRE UNITS IN LEGAL ENTITIES (number of members)	TOTAL NUMBER		MUNICIPALITY THAT DO NOT HAVE PVJ NOR DVD/DVJ	NOTE
			PVJ-a	PROF. FIREFIGH..		DVD/DVJ-a	FIREBR.		VJ-a legal subjects	MEMBERS		
1	2	3	4	5	6	7	8	9	10	11	12	13
7.	**HERZEGOVINA-NERETVA (9)**	**PVJ Mostar (80)** **PVJ Konjic (14)** PVJ Jablanica (4) **PVJ Čapljina (6)** **PVJ Čitluk (not expressed)** **PVJ Neum (8)**	6	104	VD Čitluk (10) DVD Stolac (21) DVD Ravno (4) DVD Rama (8) DVD Risovac Jablanica (5) DVD Konjic (20) VD Čapljina no data () DVD Neum (no data)	8	76	-	-	-	-	3 of 9 in Canton Municipality, have formation PVJ-e, which are part of the municipal civil protection services. Except for the municipality of Jablanica, Konjic and Prozor-Rama, presented data from 2009, because this CANTON in 2012 and 2014, did not provide the requested information, even after multiple requests sent by the Federal administration of Civil protection. Citluk has formed DVD / J while PVJ in the process of formation (passed act is not filled). Konjic, Jablanica, Čapljina, Čitluk and Neum, have formed PVJ's and DVJ-e.
8.	**WEST HERZEGOVINA (4)**	PVJ Posušje (6) PVJ Ljubuški (5)	2	11	DVD Široki Brijeg (13) VD Grude (3)	2	26	-	-	-	-	Data for the DVD were obtained in 2009.
9.	**CANTON SARAJEVO (9)**	**ZPVJ Kantona Sarajevo (191)**	9	191	DVD Vratnik - Stari Grad (68) DVD Kenan Slinić, Ilidža (71) VD Tarčin Hadžići (25) DVD Bjelave Centar (50) DVD Novo Sarajevo 1934 (21) VD Alipašin Most - Novi Grad (54) VD Vogošća (no data)	6	289	INA TERMINAL d.o.o Ilijas (not expressed) ENERGOPETROL Blažuj (not expressed)	2	-	-	In early 2013, formed from PVB IPV HP HP, with still no sign agreement Sarajevo Canton Government and heads of municipalities Muncipality that are part of this unit. Data for the DVD were obtained in 2009. Stari Grad, Ilidza, Hadzici, Centar, Novo Sarajevo, Novi Grad, Vogosca have formed PVJ's and DVJ-e.
10.	**CANTON 10 (6)**	**PVJ Glamoč (5)** PVJ Livno (7) **PVJ Drvar** (not expresed)	3	12	DVD Tomislavgrad (8) DVD Kupres (12) DVD Livno (no data)	3	20	ŠGD "Hercegbosna forest" doo Kupres PJ "Šumarija" Glamoc (17) PJ Šumarija Livno (31)	2	48	Bosansko Grahovo	Drvar has passed an act on the establishment PVJ (not filled)
TOTAL: 10			**43 + 1ZPVJ KS**	**802**		**56**	**847**		**16**	**256**	**9**	

Risk assessment of Federation of Bosnia and Herzegovina regarding natural and other disasters

NOTE:

The table marked professional firefighting units that are part of the municipal civil protection services, and within the Cantonal Administration of Civil protection Sarajevo Canton.
Abbreviations in the table below:
ZPVJ-common professional fire brigade, prof.firefight.. - Professional firefighter
PVJ-professional fire brigade, volunteer.firefight. - Volunteer fireman
DVD / J-volunteer fire department / volunteer fire units
PVB HP-professional fire brigade of the Sarajevo Canton

Annex 7

OVERVIEW
OF GAS STATIONS IN THE FEDERATION OF BOSNIA AND HERZEGOVINA BY CANTONS

Red. number	C A N T O N	Number
1	2	3
1	UNA-SANA	89
2	POSAVINA	14
3	TUZLA	113
4	ZENICA-DOBOJ	99
5	BOSNIA-PODRINJE	5
6	CENTRAL BOSNIA	99
7	HERZEGOVINA-NERETVA	79
8	WEST HERZEGOVINA	47
9	CANTON 10	25
10	CANTON SARAJEVO	69
	TOTAL	**639**

Annex 8

OVERVIEW OF BRIDGES AND VIADUCTS VC

THAT ARE CONSTRUCTED OR WILL BE CONSTRUCTED BY THE END OF 2014

No.	Bridge name	Share	Stationing	Lenght	Overall wideth	Hight
1	A1 - PJ - M01 - D	Podlugovi - Jošanica	39+919	142,40	9,90	7 m
	A1 - PJ - M01 - L		39+919	142,40	9,90	
2	A1 - PJ - M02 - D	Podlugovi - Jošanica	41+888	111,50	9,90	10 m
	A1 - PJ - M02 - L		41+888	117,08	9,90	
3	A1 - PJ - M03 - D	Podlugovi - Jošanica	44+042	143,00	9,90	5 m
	A1 - PJ - M03 - L		44+050	142,40	9,90	
4	A1 - PJ - M04 - D	Podlugovi - Jošanica	46+087	105,75	9,90	5,5 m
	A1 - PJ - M04 - L		46+084	104,00	9,90	
5	A1 - PJ - M05 - D	Podlugovi - Jošanica	46+371	176,65	9,90	7 m
	A1 - PJ - M05 - L		46+371	165,80	9,90	
6	A1 - PJ - M06 - D	Podlugovi - Jošanica	46+760	599,45	9,90	5,5 m
	A1 - PJ - M06 - L		46+760	598,18	9,90	
7	A1 - PJ - M07 - D	Podlugovi - Jošanica	47+434	105,60	9,90	6,5 m
	A1 - PJ - M07 - L		47+434	105,40	9,90	
8	A1 - PJ - M08 - D	Podlugovi - Jošanica	47+878	107,60	9,90	6,5 m
	A1 - PJ - M08 - L		47+878	108,10	9,90	
9	A1 - VP - M01 - D	Visoko - Podlugovi	30+850	120,54	14,10	7 m
	A1 - VP - M01 - L		30+850	117,75	14,10	
10	A1 - VP - M02 - D	Visoko - Podlugovi	31+500	138,40	10,40	8 m
	A1 - VP - M02 - L		31+500	109,67	10,40	
11	A1 - VP - M03 - D	Visoko - Podlugovi	33+704	264,35	10,40	12,5 m
	A1 - VP - M03 - L		33+704	229,56	10,40	
12	A1 - VP - M04 - D	Visoko - Podlugovi	38+222	105,80	9,90	10 m

	A1 - VP - M04 - L		38+222	110,90	9,90	
13	A1 - VP - M05 - D	Visoko - Podlugovi	38+633	69,70	12,10	7 m
	A1 - VP - M05 - L		38+612	80,83	12,10	
14	A1 - KV - M02 - D	Kakanj - Visoko	22+977	167,97	12,80	8,5 m
	A1 - KV - M02 - L		22+978	132,20	10,40	
15	A1 - KV - M03 - D	Kakanj - Visoko	23+912	132,20	10,70	8,5 m
	A1 - KV - M03 - L		23+920	132,24	12,80	
16	Vijaduct Bojnik - D	Butila - Vlakovo	5+892,14	115,00	12,40	from 5 m to 7 m
	Vijaduct Bojnik - L		5+898,14	115,00	12,40	
17	Vijaduct Ramp 1	Vlakovo - Lepenica	0+038	248,48	6,90	from 5,5 m to 10 m
18	Vijaduct Ramp 2	Vlakovo - Lepenica	0+038	239,50	6,90	from 4,5 m to 8 m
19	Vijaduct Vlakovo - D	Vlakovo - Lepenica	0+038	393,07	12,40	from 5 m to 12 m
	Vijaduct Vlakovo - L		0+038	388,93	12,40	
20	Vijaduct Gladno Polje - D	Vlakovo - Lepenica	1+858,75	347,09	12,40	from 9 m to 15 m
	Vijaduct Gladno Polje – L		1+858,75	349,82	12,40	
21	Vijaduct Šamin Gaj - D	Vlakovo - Lepenica	4+010,77	348,00	12,40	from 11 m to 18 m

Vijaduct Šamin Gaj - D	Vlakovo - Lepenica	4+010,77	348,00	12,40	from 11 m to 18 m
Vijaduct Šamin Gaj - L		4+010,77	348,00	12,40	
Bridge Lepenica M1 - D	Lepenica - Suhodol	21+603	238,00	12,60	from 8 m to 12 m
Bridge Lepenica M1 - L		21+603	238,00	12,60	
Bridge Lepenica M2 - D	Lepenica - Suhodol	23+033,88	219,00	12,60	from 6 m to 30 m
Bridge Lepenica M2 - L		23+044,90	186,00	12,60	
Bridge Bijala M3 - D	Suhodol - Tarčin	26+987,489	90,00	12,60	from 4 m to 22 m
Bridge Bijala M3 - L		26+987,489	90,00	12,60	
A1 - LT - M03 - L	Lepenica - Tarčin	26+997,762	100,1	12,6	24,5 m
A1 - LT - M03 - D		27+032,489	100,1	12,6	
Bridge M1 - D	Drivuša - Gorica	2+266,76	459,0	12,9	
Bridge M1 - L		2+266,72	459,0	12,9	6,0 m
Bridge M2 - D	Drivuša - Gorica	2+431,60	356,0	12,6	
Bridge M2 - L		2+413,50	356,0	12,6	13 m
Bridge M3 - D	Drivuša - Gorica	3+901,50	511,0	12,6	28,5 m
Bridge M3 - L		3+944,45	395,0	12,6	
Drivuša	Drivuša - Gorica	1+642,50	73,0	13,20	8,0 m
Bridge M – bridge over river Bosne	Drivuša - Gorica		132,0	10,0	10,5 m
Bridge Studenčica D	Počitelj - Bijača,subsection Zvirovići - Kravice	12+986	555,00	12,42	87,00 m
Bridge Studenčica L		12+986	555,00	12,42	
Pavlovića Vijaduct D	Počitelj - Bijača,subsection Zvirovići - Kravice	12+832	362,00	12,42	37,00 m
Pavlovića Vijaduct L		13+828	367,00	12,42	
Bridge Trebižat D	Počitelj - Bijača,subsection Zvirovići - Kravice	15+095	365,00	12,42	65,00 m
BridgeTrebižat L		15+040	380,00	12,42	

Annex 9

SUMMARY OF DAMAGE

Caused by floods and landslides, snow, due to the drought, hail, wind storms and frost in the Federation of BH for the period 2010 - 2012.
Overview of damages caused by floods and landslides in the Federation of Bosnia and Herzegovina for the period 2010 - 2012.

No.	CANTON	Year of the damage incurred and the amount of estimated damage in BAM			Total of damage 2010 - 2012.
		2010.	2011.	2012.	
1	2	3	4	5	6
Federation BH					
1	Una-Sana	2.842.900,00	0,00	1.499.750,00	4.342.650,00
2	Posavina	10.635.847,98	0,00	0,00	10.635.847,98
3	Tuzla	39.496.703,82	1.154.282,50	230.000,00	40.880.986,32
4	Zenica-Doboj	3.375.997,45	118.000,00	10.000,00	3.503.997,45
5	Bosnia-Podravina	10.706.715,10	0,00	0,00	10.706.715,10
6	Central Bosnia	7.948.189,74	814.694,45	1.250,40	8.764.134,59
7	Herzegovina-Neretva	5.085.629,40	52.806,98	0,00	5.138.436,38
8	West-Herzegovina	0,00	0,00	0,00	0,00
9	CANTON Sarajevo	760.184,17	0,00	0,00	760.184,17
10	CANTON 10	2.005.150,00	557.500,00	0,00	2.562.650,00
TOTAL		**82.857.317,66**	**2.697.283,93**	**1.741.000,40**	**87.295.601,99**

Overview of damages caused by snowfall in the Federation of Bosnia and Herzegovina, for the period 2010 - 2012

No.	CANTON	Year of the damage incurred and the amount of estimated damage in BAM			Total damages 2010. - 2012.
		2010.	2011.	2012.	
1	2	3	4	5	6
	Federation BH				
1	Una-Sana	0,00	0,00	102.256,00	102.256,00
2	Posavina	0,00	0,00	469.750,00	469.750,00
3	Tuzla	0,00	0,00	1.833.114,12	1.833.114,12
4	Zenica-Doboj	27.195,72	0,00	2.127.323,16	2.154.518,88
5	Bosnia-Podravina	0,00	0,00	884.791,21	884.791,21
6	Central Bosnia	0,00	0,00	1.546.278,52	1.546.278,52
7	Herzegovina-Neretva	0,00	0,00	25.728.969,62	25.728.969,62
8	West-Herzegovina	0,00	0,00	16.041.656,72	16.041.656,72
9	CANTON Sarajevo	0,00	0,00	9.242.309,22	9.242.309,22
10	CANTON 10	0,00	0,00	2.203.952,00	2.203.952,00
TOTAL		**27.195,72**	**0,00**	**60.180.400,57**	**60.207.596,29**

Overview of damages caused by drought in the Federation of Bosnia and Herzegovina, for the period 2010 - 2012

No.	CANTON	Year of the damage incurred and the amount of estimated damage in BAM			Total damage caused 2010-2012
		2010.	2011.	2012.	
1	2	3	4	5	6
Federation BH					
1	Una-Sana	0,00	0,00	21.926.865,30	21.926.865,30
2	Posavina	0,00	0,00	4.500.000,00	4.500.000,00
3	Tuzla	0,00	375.300,00	98.205.140,00	98.580.440,00
4	Zenica-Doboj	0,00	350.000,00	5.884.788,50	6.234.788,50
5	Bosnia-Podrinje	0,00	0,00	3.938.827,00	3.938.827,00
6	Central Bosnia	0,00	315,00	20.890.117,00	20.890.432,00
7	Herzegovina-Neretva	0,00	0,00	0,00	0,00
8	West Herzegovina	0,00	0,00	0,00	0,00
9	CANTON Sarajevo	0,00	0,00	0,00	0,00
10	CANTON 10	0,00	0,00	0,00	0,00
TOTAL		**0,00**	**725.615,00**	**155.345.737,80**	**156.071.352,80**

Overview of damages caused by drought in the Federation of Bosnia and Herzegovina, for the period 2010 - 2012

No.	CANTON	Year of the damage incurred and the amount of estimated damage in BAM			Total damage caused 2010-2012
		2010.	2011.	2012.	
1	2	3	4	5	6
Federation BH					
1	Una-Sana	2.060.750,05	0,00	0,00	2.060.750,05
2	Posavina	0,00	0,00	0,00	0,00
3	Tuzla	50.500,00	1.000,00	12.479.267,00	12.530.767,00
4	Zenica-Doboj	5.000,00	17.000,00	72.550,10	94.550,10
5	Bosnia-Podrinje	0,00	0,00	0,00	0,00
6	Central Bosnia	0,00	0,00	0,00	0,00
7	Herzegovina-Neretva	0,00	2.217.000,00	0,00	2.217.000,00
8	West Herzegovina	0,00	2.256.672,61	0,00	2.256.672,61
9	CANTON Sarajevo	0,00	0,00	0,00	0,00
10	CANTON 10	0,00	0,00	0,00	0,00
TOTAL		**2.116.250,05**	**4.491.672,61**	**12.551.817,10**	**19.159.739,76**

Risk assessment of Federation of Bosnia and Herzegovina regarding natural and other disasters

Overview of damages caused by wind storms in the Federation of Bosnia and Herzegovina, for the period 2010 - 2012

No.	CANTON	Year of the damage incurred and the amount of estimated damage in BAM			Total damage caused 2010-2012
		2010.	2011.	2012.	
1	2	3	4	5	6
Federation BH					
1	Una-Sana	0,00	0,00	24.181,00	24.181,00
2	Posavina	0,00	0,00	0,00	0,00
3	Tuzla	0,00	1.370,00	4.350,00	5.720,00
4	Zenica-Doboj	0,00	0,00	0,00	0,00
5	Bosnia-Podrinje	0,00	0,00	0,00	0,00
6	Central Bosnia	0,00	0,00	0,00	0,00
7	Herzegovina-Neretva	0,00	0,00	0,00	0,00
8	West Herzegovina	0,00	0,00	0,00	0,00
9	CANTON Sarajevo	35.750,00	0,00	6.795,50	42.545,50
10	CANTON 10	0,00	0,00	0,00	0,00
TOTAL		**35.750,00**	**1.370,00**	**35.326,50**	**72.446,50**

Overview of damages caused by wind storms in the Federation of Bosnia and Herzegovina, for the period 2010 - 2012

CANTON	Total damage caused 2010-2012			Total damage caused 2010-2012.
	2010.	2011.	2012.	
2	3	4	5	6
Federation BH				
Una-Sana	0,00	0,00	0,00	0,00
Posavina	0,00	0,00	0,00	0,00
Tuzla	0,00	0,00	8.000.000,00	8.000.000,00
Zenica-Doboj	0,00	0,00	0,00	0,00
Bosnia-Podrinje	0,00	0,00	0,00	0,00
Central Bosnia	0,00	0,00	0,00	0,00
Herzegovina-Neretva	0,00	0,00	0,00	0,00
West Herzegovina	0,00	0,00	0,00	0,00
CANTON Sarajevo	0,00	0,00	0,00	0,00
CANTON 10	0,00	0,00	0,00	0,00
TOTAL	**0,00**	**0,00**	**8.000.000,00**	**8.000.000,00**

Annex 10

Overview of damage in the Federation of Bosnia and Herzegovina from May 2014 due to periodic disasters (floods and landslides)

CANTON no. of municipalities	MUNICIPALITY AFFECTED BY FLOOD AND/OR LANDSLIDE	AFFECTED PERSONS		DEAD ANIMALS	NO. OF LANDSLIDES	RESIDENTIAL BUILDINGS		FLOODED AREAS (ha)	NO. OF EVACUATED PERSONS	RECEPTION CENTRES		AMOUNTS OF PRELIMINARY DAMAGE
		DECEASED	INJURED/ SICK			NO. OF DAMAGED	NO. OF DEMOLISHED			NO. OF CENTERS	NO. OF PLACED PERSONS	
1	2	3	4	5	6	7	8	9	10	11	12	13
USK (8)	Ključ				39	65		400	400			2.715.500,00
	S. Most					1245		1531	600	1	14	11.537.200,00
	B. Petrovac					4		310	4			1.063.000,00
	Bihać											40.572,00
	Total				**39**	**1314**		**2241**	**1004**	**1**	**14**	**15.356.272,00**
PK (3)	D. Šamac	1		8.165 cattle, 253.350 poultry and 483 beehives		1639		2849	4592			84.200.000,00
	Orašje	1	50			1595	80	5219	4510	1	85	80.264.350,00
	Odžak					1800		5000	5000	2	34	96.186.000,00
	Total	**2**	**50**			**5034**	**80**	**13068**	**14102**	**3**	**119**	**260.650.350,00**
TK (13)	Banovići		4		131	114	20	40	43	1	6	5.460.000,00
	Kalesija				331	146	25	776	1113	1	85	24.802.000,00

	Doboj - Istok				164	130	0	700	500			14.800.000,00
	Gračanica				112	16	277	756	504	1	79	44.182.600,00
	Gradačac				280	109	0	4560	200			19.900.000,00
	Srebrenik				426	1200	0	700	209	2	43	14.985.000,00
	Čelić				159	30	2	200	120			10.135.000,00
	Kladanj			123 cattle	200	76	2	68	82	2	11	8.031.000,00
	Lukavac		40		167	500	1	1160	2000		8	13.768.200,00
	Sapna		40		136	192	36	250	325	1	169	14.355.000,00
	Teočak				90	56	7	76	72	1	6	6.165.000,00
	Živinice			20 cattle	115	615	1	2500	185			9.286.300,00
	Tuzla		2		1826	688	328	1900	538	7	91	352.760.000,00
	Total		**86**		**4137**	**3872**	**699**	**13686**	**5891**	**16**	**498**	**538.630.100,00**

ZDK (12)	Breza			50 cattle and 2.630 poultry	24	70			8			4.500.000,00
	Maglaj	1			600	1551	20	405	1151			67.759.600,00
	Olovo		9		10	200	16	60	40			19.620.000,00
	Tešanj				37	130		50	288			2.804.000,00

	Usora				12	50		148	25			1.200.517,20
	Zavidovići				270	388	8	210	1477			12.780.000,00
	Kakanj				81	500	10	32	112	1	27	20.000.000,00
	Doboj - Jug				10	319		73	23			14.009.450,00
	Žepče				4	300	80	380	2162	3	550	23.770.000,00
	Visoko				5	23	3	70	80			1.400.000,00
	Zenica				200	610	97	25	2500	4	178	85.300.000,00
	Vareš				49	24	2	3	11	1	5	2.220.000,00
	Total	**1**	**9**		**1302**	**4165**	**236**	**1456**	**7877**	**9**	**760**	**255.363.567,20**
SBK (12)	Travnik				71							4.216.600,00
	Dobretići				13							
	Novi Travnik				2							
	Donji Vakuf				16							
	Jajce				107							
	Kiseljak				14							
	Bugojno				5							
	Vitez				11							
	Busovača				19							
	Total				**258**							**4.216.600,00**
KS (9)	Ilijaš											1.110.000,00

	Ilidža											543.900,00
	Stari Grad											183.000,00
	Vogošća		3		103	25	15	12	252	2	85	7.220.350,00
	Total		**3**		**103**	**25**	**15**	**12**	**252**	**2**	**85**	**9.057.250,00**
BPK (3)	Goražde				2	4		15				79.985,00
	Foča - Ustikolina											171.000,00
	Pale - Prača								5			100.000,00
	Total				**2**	**4**		**15**	**5**			**350.985,00**
OVERALL		**3**	**148**	**8.358 cattle, 255.980 poultry, 483 beehives**	**5841**	**14414**	**1030**	**30478**	**29131**	**31**	**1466**	**1.083.625.124,20**

Note: The Decision to declare a state of natural disaster, in addition to the Government of the Federation of Bosnia and Herzegovina and 32 heads of these municipalities also have enacted and the government of Zenica-Doboj and Tuzla Canton (15.05.2014.) and Posavina Canton (16.06.2014.). The recorded data relating to damage to residential buildings, damaged agricultural areas, evacuees and damage amounts, the preliminary data from the forms submitted by the Cantonal or municipal commission to assess the damage. The exceptions are the data for the number of landslides, which are reported on the basis of data from regular reports of the Operational Centre of the Federal Administration of Civil protection for all cantons, except for Central Bosnia, where the data are based on data submitted by KUCZ SBK. Data for reception centers provided by the Institute for Public Health of the Sarajevo Canton, the Red Cross of the Tuzla Canton and the Federation of Bosnia and Herzegovina, Ministry of health, Posavina canton and municipal departments of civil protection.

The terms - definitions - explanation

Risk

a) What is the risk?

It is likely suffering / some / damage or loss / material or human / in case of natural or other disasters.

b) What is an acceptable risk?

Every individual and every community must learn to live with some form of risk. It is impossible to eliminate all risks, and the Government of the Federation of Bosnia and Herzegovina in areas that are exposed to hazards must decide which is the level of risk is "acceptable" at the federal level. The cost of repeated appeals for assistance and rehabilitation must be matched with the cost of investing in mitigation and preparedness before the event. Acceptance or tolerance of risk is a dynamic socio-political process that takes place within another dynamic process, and that is the changing nature of risk and exposure.

What will be acceptable for one canton or municipality may not be acceptable to the others, what is acceptable in one phase of community development and value systems can significantly change at a later stage.

Risk analysis requires a comparison of the sequence data in various fields. An example is the understanding of long-term and short-term effects of floods and for drawing up appropriate plans it is necessary to combine data from meteorology, topography, soil structure, vegetation, hydrology, settlements, water level that the country cannot absorb, infrastructure, transport, population, socio-economic and material resources.

Maps are one of the most effective ways of displaying this information. In this context, the map showing the hazards, exposure and risk can be gathered and strung together on each other in the form of layers. Layers refer to the risk and exposure to them. Usually in that way you get an image with areas that are at greatest risk and thus allow identification of areas that provides the best cost-benefit ratio, the so-called "very profitable" areas.

Danger

a) What is the danger?

The danger is the common denominator "of **possible events**" that can cause loss of life or cause damage to property and the environment.

Natural and other disasters resulting from action of a threat. Therefore, the assessment should include and identify hazards that will be analyzed, to any event likely to occur (natural or civilization).

Risk assessment is a process in which we deal with the characteristics of the risk, for example, cyclones, earthquakes, storms, chemical accidents, industrial fires, but not their effect on the community and environment. This is the topic of exposure to hazards.

Analysis should cover the following: what is the nature, ferocity and frequency of hazards; that the area affected; during the formation and duration; spreading risk - if nothing is done - will be the same worsen; collecting data and recording on the map; keeping records of past events and previous experience (in the said area or elsewhere); recording and appreciation of knowledge of the local population; the use of scientific research and the like.

b) What is the exposure to the hazard?

It is the degree to which the issue, people, objects of all kinds or economic assets exposed to loss, injury or damage caused by shock hazards.

Exposure assessment is a representation of the physical, social and economic exposure to a hazard; estimate population density of population and highlight the particularly vulnerable groups. You need to assess the possibilities for accommodation group of the population due to the danger; possible effects on the economy - direct, secondary, financial; collecting data regarding: infrastructure, environment, demography, culture, economy.

c) What is the ability to manage?

This is the level (indicator of the strength and skills) to which a particular community can intervene and manage risk in order to reduce the possible effects of hazards, and it is awareness of the dangers; sanctioned the same in the law and implementing regulations and standards; that the necessary preventive measures and mitigation (e.g. making plans, the formation of appropriate services and units, equipment and resources, education and training); predicting the emergence of risks and alerting the population; the organization of power in standby; the ability of the intervention (forces and resources), and the planned inclusion and participation of public, governmental and non-governmental bodies in the management of the accident.

Due to the unpredictability of the danger, and because of the complexity and importance of the consequences of natural and other disasters have on the life and health of humans, animals and plants, and the safety of their assets, risk analysis and the possible consequences of reasonably deserves full attention.

Given the fact that the consequences occur as a result of natural and other disasters, and they usually do not affect only a narrow area but reflect on the wider region, there must be a need for stronger and more intensive cooperation between all authorities and institutions in the community to deal with this issue as well as mutual cooperation between countries in the region.

In this sense, defines three main lines of action:

- Preventive action,
- Action in the event of natural and other disasters,
- Dealing with the consequences.

The most common natural disasters which cause damage to property and endanger human lives, which are so far registered in the Federation of Bosnia and Herzegovina, related to: earthquakes, mining accident, a storm accompanied by hail, winds and devastating intensity electrical discharge, snow storm, rain, high intensity and short duration that cause flash floods and floods in the grip of the watercourse, landslides and mudslides, drought, early and late frosts, and forest fires.

The emergence of several natural and other disasters have negative impact on the overall situation of society, whose readiness for appropriate response in a given moment extremely small.

Given that Bosnia and Herzegovina is administratively divided into two entities, the Federation of Bosnia and Herzegovina (50.638%) and the Republic of Srpska (48.386%) and the Brcko District of Bosnia and Herzegovina (0.976%) - and the fact that there is no good - isolated data for the Federation of Bosnia and Herzegovina on all elements of estimates, in the part of this assessment will be used data for the whole of Bosnia and Herzegovina, which is natural, because the territory of Bosnia and Herzegovina and in this regard is indivisible.

Risk assessment of Federation of Bosnia and Herzegovina regarding natural and other disasters

Differences

a) The difference between hazard and disaster

Clearly speaking, there is a thing called natural disasters, but there is a natural hazard. The disaster is the result of the effects of hazards on society. Thus, the effects of the disaster determined by the size of the vulnerability of society at risk (or, conversely, its ability, or the capacity to deal with the threat). This vulnerability is not natural, but the result of the whole volume of constantly changing physical, social, economic, cultural, political and even psychological factors that shape human life and create an environment where people live. "Natural" disasters are the court nature of what people have done.

b) What is a natural hazard?

Natural disasters include phenomena such as earthquakes, volcanic activity, landslides, tsunamis, tropical cyclones and other severe storms, tornadoes and high winds, floods on the rivers and coastal flooding, wild fires and similar phenomena, droughts, dust storms, the devastation of the action insect as a biological disaster. Other types of hazards include human induced events, such as technological hazards and environmental degradation.

c) What is a disaster?

Serious distortion of the functioning of a community or society caused widespread human, material, economic or environmental losses which exceed the ability of the community / society to deal with them using its own resources.

d) What is the vulnerability to disasters?

Vulnerability to disasters is a process that results from human action or inaction or the inherent situation such as poverty. It describes the degree to which the company is threatened by the impact of natural hazards in the social, economic, political and environmental spheres. The degree of vulnerability depends, among other things, on the state of human settlements and their infrastructure.

e) Why target the vulnerability of societies to disaster?

Although the societies have always been exposed to natural disasters, they have, in recent years, been more exposed to the impact of their negative impacts. Only at the beginning of 2001, three consecutive earthquakes in El Salvador and one in India, together with repeated flooding in Mozambique, caused significant losses in lives and great damage to the economic and social infrastructure in these countries. This global development is directly linked to a number of trends such as the increase of wealth and poverty, growth of population and its density, especially in the context of rapid urbanization, environmental degradation and climate change.

f) What is disaster reduction (risk)?

Solutions against the increased impact of natural hazards exist. The knowledge and technology to be applied in these solutions are widely available. Reducing disaster - or rather disaster risk reduction - is the sum of all the measures that can be taken to reduce the vulnerability of socio-economic system to natural hazards. The measures cover a wide spectrum of activities ranging from disaster prevention to measures aimed at limiting the seriousness of the disaster when it has already happened. Clear information and political commitment are the basis of successful measures to prevent a disaster.

TERMS (Abbreviations)[71]

Abbreviations	International humanitarian et al. organization	NOTE
1	2	3
AIRBASE	**Central European databases**	
BHMAC	Mine action centre Bosnia and Herzegovina	
CAP	Consolidated appeal process	
CK FBH	Red cross Federation BH	
CORINAIR	International organization	
DHA	Deparment of humanitarin affairs– precursor OCHA	
DHMZ RH	Meteorological and Hydrological Service of the Republic of Croatia	
DMTP	Disaster management training program	
DPPI	The initiative on disaster preparedness and prevention	
DRB / OCHA	Department (OCHA) in disaster-response	
EADRCC	Euro-Atlantic Disaster Response Coordination Centre	
EEA	European environment agency	
FAO	Food and agriculture organization	1. technical advice to reduce exposure; 2. helping to restart food production; 3. conditions predictions for providing special nutritional help.
FCSU	Unit (UN) to support coordination on the ground	
FHMZ	Federal hydrometrical institute BH	
GPS	Global positioning system	
GSS	Mountain Rescue Service	
ICDO	Internation civil defence organization	
ICRC	The International Committee of the Red Cross	
IFRC	The International Federation of Red Cross and Red Crescent Societies	
INSARAG	Internation search and rescue advisory group(INSARAG)	
INTERFAIS	Internation food aid information system	
IPCC	Intenrational organization	
LEMA	The authorities responsible for the management of local emergencies	
MCDA	Multi-Criteria Decision Analyis	
MCDU	Military-civilian units for disaster relief	

[71] Additional terms in the Glossary of Civil Protection, edition 2004.

MES	Explosives devices	
MIS	Management information system	
MOR	Memorandum of understanding	
MTS	Equipment for mechanical testing and simulation	
NATO	North Atlantic Treaty Organization	
NUS	Unexploded ordnance	
NVO	Non government organizations	
O.I.E.	International Office of Epizooties Paris	
OCHA/ DHA	OCHA(Office for the Coordination of Humanitarian Affairs)	1. involves reducing disasters in development planning; 2.financing agreements for disaster management; 3.helps co-ordinator on the ground and the UN disaster management team;
OSOCC	The On-Site opearations Coordination Centre	
PHARE	EU programme	
RHMZ S	Republic Hydrometeorological Service of Serbia	
SAR	Search and rescue	
TOC	Total organic carbon	
TRZ	Technical Repair Institute	
UN CIMIC	Civil-military cooperation of the United Nations / Nations	
UNDAC	UN nations disaster assessment and coordination	
UNDP	UN development programme	1.involves reducing disasters in development planning; 2.financing agreements for disaster management; 3.helps co-ordinator on the ground and the UN disaster management team;
UNEP	UN enviroment programme	
UNHCR	UN High comissioner for refugees	1.protect refugees; 2. seeks durable solutions to the refugee problem; 3.assist in providing emergency assistance;
UNICEF	UN Children's Fund	
US AID	United Nations Agency for intenrational development	
WFP	World food programme	
WHO	World health organization	1 .would provide assistance in all aspects of prevention and treatment of health conditions including the willingness of health services for rapid intervention in case of disaster;