

Institute of Earthquake Engineering and Engineering Seismology
University "Ss. Cyril and Methodius", Skopje
Republic of Macedonia

Country: REPUBLIC OF MACEDONIA

**NATIONAL REPORTING AND INFORMATION
ON DISASTER REDUCTION**

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Abbreviations Used and a General Note

CP	-	Civil Protection
SaR	-	Search and Rescue
USaR	-	Urban Search and Rescue
PUP	-	Physical (spatial) Plan [at national i.e. state level]
GUP	-	General (Master) Urban Plan [at city/town level]
DUP	-	Detail Urban Plan
GDP	-	Gross Domestic Product
RM	-	Republic of Macedonia, constituted on 17 September 1991
SRM	-	Socialist Republic of Macedonia, refer to the period before 17 September 1991, when Macedonia declared sovereignty and promoted the Constitution
SFRY	-	Socialist Federative Republic of Yugoslavia
Official Gazette of SFRY		Federal Gazette, publishing legislation to be enforced on Federal level.
Official Gazette of SRM		Official Gazette of <u>S</u> ocialist <u>R</u> epublic of <u>M</u> acedonia, publishing legislation adopted on Republic level; could be more rigorous for the specificity of the region, but not below the standards set in Official Gazette of SFRY.
Official Gazette of RM		Official Gazette of <u>R</u> epublic of <u>M</u> acedonia, publishing legislation since 17 September 1991.

A number of laws still in use in Macedonia are from the Socialist period. The terminology used, referring to economic and administrative arrangement of the country [that time Socialist Republic of Macedonia (SRM), but as a Federal unit] and on the names and meaning of political and other political and citizen associations, nowadays is obsolete and not applicable to the new socio-political and economic reality. Formally speaking, they are not appropriate, and consequently the position of a number of professionals is that there is a legislation gap. However, the essence of these laws, irrespectively of the inappropriate terming of various economic, political or even administrative arrangements, is technically correct and well structured, so when necessary they are applied as they are.

There is ongoing process of harmonization of the legislation of Macedonia with a new reality. To avoid the legislation gap, the legal basis of application of all laws from the Socialistic period that are not yet replaced by adequate ones, is assured by the "Constitutional Law for Implementation of the Constitution of Republic of Macedonia", Official Gazette of RM No. 52/91¹. The Article 5 of this Constitutional Law states: "the existing Federal legislation [of former SFR of Yugoslavia] is (should be) adopted as the Republic [Republic of Macedonia, RM], with responsibilities of authorities as defined by the Constitution of Macedonia".

¹ Original title: "Ustaven zakon za sproveduvanje na Ustavot na Republika Makedonija", Sl. Vesnik na RM br. 52/91.

Component 1 Political Commitment and Institutional Aspects

1.1 Are there national policy, strategy and legislation addressing disaster risk reduction?

<YES>

National Concept for Security and Defense (*Off. Gazette No. 40/03, June 23, 2003*)

Excerpts relevant to civil emergencies/disasters are presented in *Annex 1.1*:

1.2 Is there a national body for multi-sectoral coordination and collaboration in disaster risk reduction, which includes ministries in charge of water resource management, agriculture/land use and planning, health, environment, education, development planning and finance?

<YES>

As defined by the *National Concept for Security and Defense (Off. Gazette No. 40/03, June 23, 2003)*:

Section III. POLICY OF NATIONAL SECURITY, *Ch. 3.Crisis Management*

In order to assure permanent consultations and decision making at highest level, maximal coordination, efficiency and adequate utilization of available capability and resources in the case of crisis and crisis situations, as well as in-time, qualitative and realistic assessment of dangers threats in RM against risks and threats, - the crisis management system shell be based on three pillars: Managing Committee [Board], Department for Assessment [estimation] and service [logistic] for supporting first and second pillar, i.e. a Center for Crisis Management (CCM).

The Chairman of Managing Committee is the Prime Minister of RM, and the members are Ministers of Foreign Affaires, Defense, Internal Affairs, Transport and Communications, Health and authorized representative of the President of RM. Depending on the [scale of] crisis situation and of the type of the crisis, if needed, heads of other organs of National Government and Administration will be involved. Recommendations, proposals and decisions of Managing Committee are obligatory for all organs, organizations and institutions, in compliance with and within the frame of their mandate prescribed by Constitution, laws, and other legislation of Republic of Macedonia.

1.3 Are there sectoral plans or initiatives that incorporate risk reduction concepts into each respective development area (such as water resource management, poverty alleviation, climate change adaptation, education and development planning)?

<YES>

National development planning process sets the principal risk reduction [prevention and mitigation] strategy that must be implemented through the processes of: (1) physical and regional planning of the country; (2) general [master] and detail urban planning of settlements; and, (3) development of Urbanistic documentation for semi-rural and large rural settlements. Procedures and modes for elaboration and adoption of plans are prescribed and have been respected in all details over the last five decades.

Since the July 26, 1963 earthquake, the consensus of Macedonian professional community is that "prevention starts with planning" and that failures made during the planning process are potential disaster environments. Since then, both planning lines: (1) spatial planning – configuring disaster-free

space of the country, and (2) urban planning – configuring disaster-free space of cities/towns, have consistently been implemented.

Planning, as a process, in both cases, should define and propose solutions that protect population and planned development against any type of disaster agent affecting the territory. In fact it had to, and should *"provide development that assures preventive protection of population, material property and of the entire living environment of Macedonia against all known natural or man-made disasters"*. To achieve these goals, planning is based on the implementation of standards and principles contained in abundant technical and other legislation that due its multi-disciplinary and multi-sectoral nature falls into agenda of many institutions. The most essential laws governing the planning process in this domain are the following:

- "Law for protection and improvement of living environment"², *Official Gazette of RM Nos. 51/00 and 96/00*;
- "Law for Spatial and Urban Planning", *Official Gazette of RM No. 4/96*³, and *Amendments Nos. 28/97 and 18/99*. [*Excerpt from this Law is presented in Annex 1.3*]
- "Law on Capital Investment Facilities" *Official Gazette of RM Nos. 15/90*⁴ and 11/91;
- "Law on Waters"⁵, *Official Gazette of RM Nos. 4/98 and 19/00*;
- "Law on protection against fires"⁶, *Official Gazette of RM Nos. 43/86, 37/87, 51/88, 36/90 and 12/93*;
- "Law on protection against explosions"⁷, *Official Gazette of RM No. 12/93*;
- "Law on health care"⁸, *Official Gazette of RM Nos. 38/91, 46/93, 55/95 and 17/97*;
- "Law on veterinary health"⁹, *Official Gazette of RM No. 28/98*; and,
- "Law on protection of flora"¹⁰, *Official Gazette of RM No. 25/98 and 6/00*.

Each of the listed laws is accompanied by extensive complementary regulations and ordinances and may be considered as a sectoral plans that incorporate [define] risk reduction concepts into each respective development area. However, the "Law for Protection and improvement of living environment" and "Law for Spatial and Urban Planning" are providing general umbrella and integrating the disaster risk reduction efforts of Macedonia.

Besides the other, the most essential article of the "Law for protection and improvement of living environment", *Official Gazette of RM No. 51/00* is Article 3 stating "the Republic participates in financing of the protection and improvement of living environment and the nature from the Budget of Republic of Macedonia". It identifies the Government as a sponsor of all risk prevention and protection measures to be incorporated through the planning processes.

The planning process requires well-defined emergency/disaster risk reduction legislation. The legislation developed over the last five decades has suited to the natural and socio-economic profile of Macedonia. While in some segments it is not yet adapted to a new political, socio-economic and administrative reality, it still provides rational and relatively clear framework for prevention and protection as well as disaster preparedness and disaster/emergency management. The harmonization of some segments of the legislation is underway, even accelerated due to association of Macedonia to EU. It is expected that identified weaknesses will soon be overcome.

The engineering prevention, which in some segments overlaps with structural mitigation, has been well implemented during the development and urbanization of the country. However, over the last two decades it stagnated, influenced by the economic deterioration of Former Yugoslavia, and then by

² Original title: "Zakon za zastita i unapreduvanje na zivotnata sredina", *Sl. Vesnik na RM br. 51/00 and 96/00*.

³ Original title: "Zakon za prostorno i urbanisticko planiranje", *Sl. Vesnik na RM br. 4/96*; *Amendments 28/97 and 18/99*.

⁴ Original title: " Zakon za izgradba na investicioni objekti", *Sl. Vesnik na RM br. 15/90 and 11/91*.

⁵ Original title: "Zakon za vodite", *Sl. List na RM. Br. 4/98 and 19/00*.

⁶ Original title: "Zakon za zastita od pozari", *Sl. Vesnik na RM br. 43/86, 37/87, 51/88, 36/90 and 12/93*.

⁷ Original title: "Zakon za zastita od eksplozii", *Sl. Vesnik na RM br. 12/93*.

⁸ Original title: "Zakon za zdravstvenata zastita", *Sl. Vesnik na RM br. 38/91, 46/93, 55/95, 17/97*.

⁹ Original title: "Zakon za veterinarsko zdravstvo", *Sl. Vesnik na RM br. 28/98*,

¹⁰ Original title: "Zakon za zastita na rastenijata", *Sl. Vesnik na RM br. 25/98 and 6/00 (changes and additions)*.

even worst economic conditions in Republic of Macedonia during the transition period. Although the last two decades were somehow disaster-free period (only several events causing about 2-3.5% GDP loss, each) the professional awareness on the natural disaster potential of the country has not been weakened.

Due to some interruptions in the process of implementation of plans over the last decade some damages, in particular in and around major urban areas, have been caused due to weakened control, inspection and sanctioning of violations made. This resulted in increase of low quality illegal construction, use of lands excluded for standard use [without undertaking special measures for decreasing the identified to acceptable risk levels] and decreased quality of construction.

While the risk to private household property might be considered as slightly increased, there is a feeling that it is still under adequate control for larger residential, public and administrative buildings, industry and other engineered structures and facilities. The reasons are found in: (1) still strong [although weakening due to present economic constrains] historic memory on past disasters affecting Macedonia in 1962 (flooding), 1963 (Skopje earthquake), 1967 (Debar earthquake), 1979 (flooding), and several small earthquakes and flooding events affecting the country over the last three decades; (2) continuity in activities of institutions responsible for planning of space and disaster countermeasures; and, (3) low economic potential of population over the last decade preserving mass construction that prevented mass pressure on the system to violate adopted principles.

1.4 Is disaster risk reduction incorporated into your national plan for implementation of the UN Millennium Development Goals (MDGs), Poverty Reduction Strategy Paper (PRSP), National Adaptation Plans of Action, National Environmental Action Plans and WSSD (World Summit on Sustainable Development) Johannesburg Plan of Implementation?

<NEAP, LEAP YES>

The NEAP (National Environmental Action Plans) and LEAP's (Local Environmental Action Plans) fully address and incorporate the disaster risk reduction necessities, in particular in the domains of: (1) identified planning flaws at national/local levels, and/or (2) domains of identified radical changes of standards used during the planning of development and standards presently in effect.

The recognized areas are usually incorporated in Priority Investment Plans and implemented through programs of line Ministries. Unfortunately, a number of PIPs have not been executed due to economic constraints the Country is experiencing over the last two decades.

At this very moment relations between the disaster risk reduction incentives and MDGs, PRSP, NAPA and WSSD are unknown.

1.5 Does your country have building codes of practice and standards in place, which takes into account seismic risk?

Earthquakes:

Building Codes

Standard legislation defining the procedures and the demands for seismic protection mainly refers to problems of mitigating damages related to buildings, engineering structures and other facilities.

The first standards addressing the seismic requirements are "Temporary Technical Regulations for Loading of Building Structures"¹¹ (1948).

The first Seismic Design Code, the "Temporary Regulations for Construction in Seismic Regions"¹², Official Gazette of SFRY No. 39/64, were enforced in 1964, i.e., immediately after the Skopje earthquake of July 26, 1963.

¹¹ Original title: "Privremeni tehnicki propisi (PTP) za tovarenje konstrukcii", Sveska 2, br. 11730, 12 Juli, 1948.

¹² Original title: "Privremeni tehnicki propisi za gradenje vo seizmicki podracja", Sl. List na SFRJ br. 39/64

Presently in effect are the “Technical Regulations for Construction of Buildings in Seismic Regions”¹³, Official Gazette of SFRY No. 31/81 (including several amendments 49/82, 29/83, 21/88, and 52/90), adopted in 1981.

More details on listed codes, including accompanied seismic zoning maps are presented in [Annex 1.5](#).

Code implementation - Achievements and problems

A strong earthquake has affected Skopje on July 26, 1963. Not the scale of the earthquake itself (M=6.1, h=5-8 km), but the lack of historic experience on such phenomenon in the region has led to use of improper building typology, which collapsed causing 1,070 mortality and 3,300 injury. This event created high public awareness resulting in 'historic memory' that still controls the behavior of the citizens and systems in Macedonia, as well as prevention, mitigation and preparedness efforts.

Since then, the entire construction process (design, construction, material quality control and inspection) have been radically changed and strengthened. The rebuilding of Skopje, as well as construction in other towns of Macedonia, has been made by large construction contractors engaged by public companies for contracting and distribution of residential and commercial space. This mechanism assured the high quality of construction works, its full compliance with seismic safety requirements in effect and monitoring/inspection (physical and financial) during the entire construction process, i.e., from the design up to the final product - the building.

Over the last decade and a half, the quality of construction decreased. There are several contributing factors: (1) decrease of the economic potential of the population fed back by cheaper and lower quality construction; (2) capital transformation reflected in transformation of big public (or governmental) contractors into smaller private companies with limited mechanization and equipment for such activities, (3) weakened system of quality control and inspection. Just recently, there is a sign that system is recovering. However, it is still unclear whether it is the true recovery, or just a political marketing.

The low economic potential of the country, and of the population as well, fortunately preserved mass construction of large buildings over the last decade and a half, i.e. during the period of transition characterized by weakened systematic control and monitoring.

Traditionally the small private contractors have usually been constructing the family dwellings houses, or the family members by themselves. The owner, as the most concerned person, by himself has been performing the inspection during the all stages of construction assuring relatively good quality of these houses. This process has not been interrupted, in fact has been strengthened over the last two decades.

In general, the overall seismic safety of the construction has not been substantially decreased. Since 1964 the Seismic Code and other standards have always been respected and strictly implemented. The problems created during the transition period are diminishing, and if the present improvements are considered as the permanent, it is expected that the quality and seismic safety of construction will again reach the state as legally prescribed.

Floods:

The protection against 'adverse' influence of [surface] waters is regulated by the “Law on Waters”⁵, Official Gazette No. 4/98. Under 'adverse' influence, the law assumes floods (13 articles), erosion and regulation of torrents (8 articles) and pollution (12 articles).

In the domain of prevention, the Law foresees: construction of protective facilities (dykes, water retention basins, river regulation, regulation of torrent channels, land protection from erosion, forestation, etc.). Planning of engineering prevention measures against 'adverse' water influences is the responsibility of Public Water management Company. The measures foreseen and proposed, in terms of a program, should be submitted for adoption to the Local Government (Municipality, and/or City of Skopje- as the only City consisting of several Municipalities).

¹³ Original title: “Pravilnik za tehničke normative za izgradba na objekti na visokogradba vo seizmicki podracja”, Sl. List na SFRJ br. 31/81.

Landslides:

There is no a single law defining engineering prevention measures for flood and landslide hazards. They are both assessed indirectly by the “Low for Spatial and Urban Planning”, Official Gazette of RM No. 4/96, and Amendments No. 28/97 and 18/99 and the “Law for Capital Investment Facilities”, Official Gazette of SRM No. 15/90.

The Low for Spatial and Urban Planning prescribes elaboration of the synthesis of environmental conditions, which identifies the flood and landslide prone areas. This is particular task of GUP plans. The identified flood or landslide susceptible areas are usually excluded for construction for minimizing the land arrangement investments. This is particularly true in areas of high seismic threat (expected intensities VIII and higher).

While legally regulated, it is not always the case in the reality because the city development dynamics pushes regularly the city limits out of the GUP borders (GUP border = area studied in all possible details for possible multihazard impact) approaching those areas that are excluded for urbanization. To overcome this particular constrain legally, there is a standard procedure, that based on specific and problem oriented studies performed usually by specialized or academic [university] institutions defines parameters and criteria for land use. On this basis the engineering community, planers and construction contractors undertake all necessary engineering prevention and other measures to assure feasible use of these lands.

Use of out-of-urban area lands for construction of large investments is regulated by the “Law for Capital Investment Facilities”, Official Gazette of SRM No. 15/90, which requires elaboration of ‘siting’ documentation that qualifies and quantifies all environmental problems pertinent to the wider (macro) region of the location of interest (regional effect study = Environmental Impact Study). Siting documentation also requires elaboration of adequate microzonation studies. Based on that data, the adequate protection measures are designed and implemented.

However, the excluded lands (dominantly flood or landslide prone areas, or areas of unfavorable soil-bearing conditions requiring special foundation measures) are quite attractive area for illegal construction because; (1) they are, if not in, close to the urban centers; (2) there is no regular communal tax for construction; and (3) no specific construction requirements are legally in effect allowing quite 'liberal' land-uses. Due to the weakened inspection system, and other urban protection policies during the last 10 years of transition, illegal construction bloomed in such areas posing the major risk to occupants. On top of everything, the population involved is mostly a population of low economic potential, in many cases pure poverty, constructing, in fact improvising low quality (substandard) buildings¹⁴.

1.6 Do you have any annual budget for disaster risk reduction?

<YES>

In general, the disaster risk reduction commitment is treated as project oriented.

National development planning process sets the principal disaster risk reduction [prevention and mitigation] strategy that should be implemented through the processes of: (1) physical and regional planning of the country; (2) general [master] and detail urban planning of settlements; and, (3) development of Urbanistic documentation for semi-rural and large rural settlements. Procedures and modes for elaboration and adoption of plans are prescribed and have been respected in all details over the last five decades.

¹⁴ In 1995 torrential floods in Kavadarci and Negotino (Central Macedonia) dominantly and most hardly affected the illegal construction erected on excluded lands. Presently, about 200 buildings are heavily affected by active landsliding in the vicinity of the City of Veles (about 50 km south-east from Skopje), again erected as illegal construction. This landslide (100 x 350m in size, area of about 26,000 sq.m and volume of about 400 cubic meters) activated by improper construction and the lack of sewer system (direct discharge in landslide scarp) is threatening to affect the legally urbanized part of the City of Veles as well as to block the River Vardar (major river in Macedonia).

Consequently, there is not a budgeted line that specifically allocates a part of the [national/local] budget to disaster risk reduction. When the planning process recognizes the specific need, it should be incorporated in the national development program, and then, if endorsed by the Government, be executed either by sectorally responsible ministry or an agency created for that particular need/project.

The “Law for Protection and Improvement of Living Environment”, Official Gazette of RM No. 51/00, Article 3, identifies the Government of Republic of Macedonia as principle sponsor of all risk prevention and protection measures indispensable for improvement of living environment and the nature of Republic of Macedonia.

The budget for disaster risk reduction, in particularly in the domain of prevention, mitigation, development and preparedness is dispersed. The same is for the case of impending disaster conditions (for example onsetting flood) or operative response. No Budget line integrates and makes a summary presentation on annual appropriations used, or to be used for such needs.

1.7 Are the private sector, civil society, NGOs, academia and media participating in disaster risk reduction efforts?

Private sector <NO>

The private sector in Macedonia is still too weak to participate such efforts in particular in terms of joint programming and/or financing disaster reduction efforts. However, they are legally obliged to implement the legislation regulating the land-use policies and building construction, as well as all other laws regulating the environmental safety and sustainability.

NGO's <NO/YES>

Except in creating a sort of public awareness on specific local environmental problems, the contribution of NGOs in overall disaster risk reduction efforts of the Country is negligible.

More details are presented in Annex 1.7-1.

The only NGO mandated and participating permanently in Country's Disaster risk reduction efforts is the Macedonian Red Cross. The Law on the “Mandate of the Macedonian Red Cross”, Articles 19, 20 and 21 (*Annex 1.7-2*) regulate the activities and the level of coordination of the activities of the Macedonian Red Cross.

Other national NGOs with relevant capacities to take part in disaster response and rescue activities include: the Republic Fire Union, the Scouts, Mountain associations, and Hunters' organization.

Media <NO>

Only as a part of Public informing and alarming system. No other role is assigned to media in regular time, and their involvement is sporadic and based on their own program policy. Their role is passive (post-event) rather than pro-active (prior to event).

Civil society, Academia <YES>

In a way as presented in 1.3; i.e. creating and defining the National development strategy and participating in all planning phases - from hazard identification, risk assessment up to defining the measures and legal framework for implementing decided risk reduction and environmental protection strategies.

Component 2 Risk Identification

2.1 Has your country carried out hazard mapping/assessment?

<YES>

Major disaster risks affecting the country are detailed in [Annex 2.1-1](#). Disaster prone areas of the country are detailed in [Annex 2.1-2](#).

Seismic hazard is regularly updated. Zonation maps are produced on national scale. Trans-border effects are included considering an area of 100 km from the borders of the country. All historic data are used, records of past damages (building by building damage inspection and inventory forms) are achieved and kept in electronic format. Aggregate loss estimates exist, as well as loss figures disaggregated by sectoral organization of the government (needed for adequate rebalance of the budget).

Flood potential is mapped at river basin scale, as well as estimated for larger urban areas. Based on these estimates, for example, elaborated is the Flood Defense plan of the City of Skopje, as well as other major towns of Macedonia. All available data are used for estimating flood potential.

Phenomena's are treated isolately. Multi-hazard approach has not yet been used, except as academic exercises.

Results of hazard assessments are used by planners (spatial and general urban planning), engineers (for design and construction), operators of public utility systems, national and local authorities, ministries, specialized systems for operative management of emergencies, as well as other professionals.

2.2 Has your country carried out vulnerability and capacity assessment?

<YES>

A number of vulnerability assessments have been made over last decade in Macedonia for qualitatively understanding and quantification of contingency planning elements (Civil Protection, Health Care System, Education System, Public Utility Operators, Local Governments, etc) as well as elements for spatial and general urban planning, etc.

A list of reports presenting the domain of expertise and competence of the Institute of Earthquake Engineering and Engineering Seismology, IZIS-Skopje, University "Ss. Cyril and Methodius", Skopje is presented in [Annex 2.2](#).

Various qualitative and quantitative analyses have also been made by other Institutions and departments of the University "Ss. Cyril and Methodius", Skopje for the needs of spatial planning of the Country, general urban planning of Macedonian towns, as well as development the NEAPs, LEAPs and Priority Investment strategies.

The analyses carried out by IZIS-Skopje have used conventional Maximum Probable Loss (MPL) methods. Loss figures, in terms of expected human casualty (morbidity and mortality) and direct physical damage to built environment are quantified for various characteristic return periods of adverse natural phenomena.

Environments under the study have been: built environment of Macedonia, population, education system (school buildings), characteristic components of health care system, cultural and historic heritage, lifelines (road, railway, recently constructed trunk-gas pipeline, etc).

Operative capacity assessment is regularly performed by Civil Protection and other specialized first response systems (firefighting, police, first aid, and others) and incorporated in various level emergency management/contingency plans.

Principle contacts for such studies are:

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*Directorate for Protection Against Fires, Explosions and Hazardous materials
Ministry of Interior*

bb, Dimce Mircev St.
Skopje, Macedonia 1000

*Department of Civil Defense and Crisis Management
Ministry of Defense*

bb, Orce Nikolov St.
Skopje, Macedonia 1000

*Republic Committee for Estimating Losses from Elementary Disasters
Ministry of Finance*

9, 11 Oktomvri St.
Skopje, Macedonia 1000
Tel: (+389-2) 11.91.28

*Republic Hydrometeorological Institute
Division of Hydrology*

bb, Skupi St.
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<http://www.meteo.gov.mk>

as well as various level (national, regional, city) governmental and private planning Institutions.

2.3 Does your country have any mechanisms for risk monitoring and risk mapping? If yes, who is responsible?

<YES>

In the domain of their competence, all three below listed Institutions are responsible for risk mapping.

Seismic monitoring

Monitoring, recording and analysis of seismic effects, acquisition and processing of data on the manifestations of seismic phenomena upon the surface geological formations, the soil, the engineering and other structures as well as elaboration of seismological maps are regulated by the "Law for Participation of the Republic in Financing the Seismological and Engineering Seismological Investigations"¹⁵, Official Gazette of SRM No. 18/83, as well as the "Programs for Development and Improvement of Seismological and Engineering-Seismological Activities" in the period 1986 – 2005, renewed by law every 5 years¹⁶.

Seismic monitoring of dynamic behavior of the ground [free-field], dam body and foundation under strong earthquakes, i.e., the seismic monitoring of induced seismicity is regulated by the "Technical

¹⁵ Original title: "Zakon za seizmologija", Sl. Vesnik na SRM br. 18/83.

¹⁶ Original title: "Programa za razvoj i unapreduvanje na seizmoloskite i inzenersko-seizmoloskite aktivnosti", Sl. Vesnik na SRM br. 9/86, 12/91,

Regulations for Seismic Monitoring of Large Dams¹⁷, Official Gazette of SFRY No. 6/88. Monitoring of this type of engineering structures in normal conditions is regulated by the "Regulations for Monitoring of Large Dams"¹⁸, Official Gazette of SRM No. 6/66.

The seismological network of Macedonia consists of 5 permanent and 16 temporary stations. Out of 7 additional stations planned for installment, three are under the construction.

The strong motion network consists of 106 SMA-1 accelerographs, out of which 9 are located on bedrock (up to –120 m in depth), 19 are free-field instruments and 78 are placed in structures (10 buildings – 32 SMA-1's, 11 dams – 34 SMA-1's, and 3 bridges - 12 SMA-1's).

Institutions responsible for seismic monitoring:

Accelerograph network, 3D Strong motion array in Ohrid:

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The seismological network:

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<http://194.149.147.3>

Flood monitoring

Monitoring, recording and analysis of hydrologic phenomena, acquisition and processing of data on their manifestations as well as elaboration of related maps are regulated by the "Law on Hydro-Meteorological Activities"¹⁹, Official Gazette of RM No. 19/92.

Flood gauge system

The basic network for flood monitoring and suppression consists of 15 stations, out of which 3 are installed for monitoring of the water table of three major Macedonian lakes (Ohrid, Prespa and Dojran). Other 12 are river flood gauge stations, out which 2 are telemetric (flood protection and defense system of Skopje – signal transmitted via METEOSAT satellite, and the other is located in Demir Kapija gorge of Vardar river - signal transmitted via ARGOS satellite). Other 12 stations are equipped with conventional gauges: (1) latches (????)²⁰ and (2) limnograph for automatic recording of water level fluctuations.

Other 95 are equipped with latches (????) (100%), while about 50% of stations include limnograph. Observed water levels are reported on daily base, using the standard telephone line. In impending high water/flood situation, the daily frequency of reporting is increased, reaching hourly frequency.

Radar system

The Institute of Hydrometeorology operates three radars for hail suppression and precipitation forecasts (Fig. D.1). Two of them are 500 km range radars, while the third one is 200 km range radar.

The civil aviation authorities, Army and NATO, operate other radar systems. Information on the position and power of these radars are unavailable.

Institution responsible for flood monitoring

¹⁷ Original title: Pravilnik o tehnickim normativima za seizmicko osmatranje visokih brana: SI. List SFRJ br. 6/88.

¹⁸ Original title: "Tehnicki normativi za nabljuduvanje na visokite brani", SI. Vesnik na SRM br. SRM 6/66

¹⁹ Original title: Zakon za vrsenje na hidrometeorolski raboti", SI. Vesnik na RM 19/92.

²⁰ It is made from wood (or plastic) looks like vertical ruler, with gradation for measuring the water level. Old and conventional water level measuring technology. I couldn't find the term, and will appreciate it very much for it.

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The “Law on Hydrometeorological Activities”, Official Gazette of RM No. 19/92 regulates the mandate and principal activities of the Republic Hydrometeorological Institute in this domain, i.e.:

- measurements of hydrological parameters;
- permanent monitoring of surface and groundwater level;
- monitoring of rivers’ and lakes’ sediment;
- monitoring of rivers’ and lakes water’ temperature;
- data acquisition, control, updating and archiving of hydrological data base;
- public informing and warning on onset and development of hazardous hydrological phenomena;
- elaboration and adoption of hydrological maps, elaboration of the reports, information, forecasts and other publications for various users.

2.4 Is there a systematic socio-economic and environmental impact and loss analysis in your country after each major disaster?

<YES>

The Law prescribes that the effects of every adverse natural or man-made (technogenic) has to be declared in accordance with the “Unique Methodology for Estimation of Damages form Elementary and other Disasters”, Official Gazette of RM No. 5/01²¹.

For implementing the procedure at the local (Municipal) level mandated is the Municipal Committee for Estimation of Losses from Elementary Disasters.

At National level, the mandate is given to the Republic Committee for Estimation of Losses from Elementary Disasters. The role of the Republic Committee is to integrate the losses from all municipalities affected, calculate the aggregate physical and economic loss elements, declare the aggregate losses to the Government of Macedonia, propose financial instruments for short, medium and long term recovery.

Losses (physical and economic) shall be declared by sectors (each sector corresponds to competences of particular ministry of the Government of Macedonia), and in aggregate form. Sectoral estimates are needed for planning the budget rebalances the aggregate figures for planning the financial mechanisms and instruments for recovery and population compensation.

²¹ Term ‘Elementary’ disasters cover the natural, biologic and technogenic disasters. In a way, it is a substitution for a term ‘environmental’ disasters. The ‘Elementary’ disasters are defined by the “Instructions for the Unique Methodology for Estimation of Damages form Elementary Disasters”, Official Gazette of SFRY No. 17/79 and 27/87 and the “Decree for Unique Methodology for Estimation of Damages form Elementary and other Disasters”, Official Gazette of RM No. 5/01. As ‘Elementary’ disasters, Laws 17/79 and 27/87 identify: earthquakes, floods, flooding by increase of underground waters, torrents, draughts, storms, hail, frost, landsliding, other natural disasters (high snows, snow avalanches, rock avalanches, excessive erosion, etc), epidemics, epizooties, epiphytes, forest and range fires, excessive land, water and air pollution, various kind of technologic = technogenic disasters and the composite disasters. Since all of the single appearance disasters are an element of the composite disaster (that is usually the case) the Low terms them as ‘elementary’. Low 5/01 additionally includes public unrest conditions and terrorism (terrorism itself, armed upraise, sabotage, diversion, kidnapping, assassination).

For spatially limited small-scale disasters the period for loss inventory, analysis, synthesis and declaration is one month from the disaster onset. For large-scale disasters (more than one municipality affected) the declaration period is two months.

[Annex 2.4](#) presents a list of reports available from the Republic Committee for Estimation of Losses from Elementary Disasters, the Institute of Earthquake Engineering and Engineering Seismology, University "Ss. Cyril and Methodius", and The Macedonian Red Cross.

The Local Committee for Estimation of Losses from Elementary Disasters are involved only if at the particular area of the Municipality, or over the entire Municipality, the state of 'elementary disaster' is recognized by the Council of the Local Self-Government (Municipal Council).

The Republic Committee for Estimation of Losses from Elementary Disasters is involved only if the state of emergency is recognized by the Parliament of Macedonia for the particular area of the Country.

The Institute of Earthquake Engineering and Engineering Seismology, University "Ss. Cyril and Methodius" is by default involved in both cases. Its competences are frequently extended to all disaster domains, not only for the earthquakes.

Involvement of The Macedonian Red Cross in this domain is limited to very small events which are not recognized legally as disasters.

2.5 Are there early warning systems in place?

<YES>

The early warning system is a part of the system for public informing and alarming in emergencies.

Informing and public alarming of population, as well as the operation of the entire system is regulated by "Regulations for Conditions and Procedure for Informing and Alarming in Emergencies"²², Official Gazette of RM No. 55/97.

Relevant Excerpt from the "Regulations for Conditions and Procedure for Informing and Alarming in Emergencies" is presented in [Annex 2.5](#).

²² Original title: Pravilnik za uslovite i nacinot na izvestuvanje i trevozenjeto vo vonredna sostojba", Sl. Vesnik na RM br. 55/97.

Component 3 Knowledge Management

3.1 Does your country have disaster risk information management systems (governmental and/or non-governmental)?

<NO>

The DPP-Center of Macedonian Red Cross has developed sort of information management system for their needs and activities. Though feasible for their own use, it is quite naïve for other professional uses.

There is consensus that elaboration and installment of countrywide National GIS based disaster management information system is of utmost importance for emergency functioning of all subjects involved in disaster and emergency management. Although recognized, and consensused as a need, the lack of finances preserved has prevented its development.

3.2 Are the academic and research communities in the country linked to national or local institutions dealing with disaster reduction?

<YES>

As discussed in 1.3 and 1.7.

The general cooperative umbrella is development and planning process (Development plan of Macedonia, spatial plan of Macedonia, General /GUP/ and detail /DUP/ Urban Plans of larger settlements), cooperative frameworks set by the specialized systems for protection of population and material property, etc.

The decentralization process (to be completed by January 2005) in the domain of planning will transfer substantial part of the competences of the Central Government to local (Municipal) level, strengthening cooperative links between academic and research communities with Local self-governments.

The permanent members of the Republic Committee for Estimating the Losses from Elementary Disasters are also representatives from the Institute of Earthquake Engineering and Engineering Seismology, University "Ss. Cyril and Methodius", Skopje, and of the Republic Hydrometeorological Institute. In such a way the link between top professionals and the Government at all levels (National/Local) is assured.

It is expected that a pending Law for Crisis Management will further regulate this area, providing strengthened legal framework for cooperative links between academic and research communities and national and local institutions dealing with disaster reduction, in particular with the National Center for Crisis Management.

3.3 Are there educational programmes related to disaster risk reduction in your public school system? If yes, for what age-range?

<YES>

In the elementary school education, a some contents and activities in the domain of risk prevention and protection (risk prevention culture) has been designed and incorporated in the new curricula for the fifth to the eighth grade (age 10 - 14). The curricula should be mastered through the regular teaching process within a number of teaching subjects as follows:

- *technical education*, gas as source of energy, handling gas apparatuses and protection in case of a disaster; traffic accidents and protection in traffic; fire and protection against fire; apparatuses and other devices used in households and school; personal protection during work; technological disasters; simulation of danger signs and procedures in case of their emission; electric shock - dangers and protection;

- *geography*, earthquakes, floods, lightning, storms, draughts, eruption and alike - procedures for protection against such catastrophes and storms.
- *physics*, radioactive elements, procedures for protection;
- *chemistry*, poisonous chemicals and other types of poisoning - procedures for protection;
- *biology*, protection of living environment, first aid, disruption of the healthy food chain, biological weapons, epidemics and other contagious diseases, procedures for prevention and protection;
- *physical and health care education*, evacuation drills, use of shelters and natural places for protection, immobilization, saving and transportation of injured.

In the high school education in Republic of Macedonia (age 14-18), there is the subject of Peace, Defense and Protection (in the reformed high school education) with 36 lecture hours. It is an optional obligatory activity through which the students acquire knowledge, skills and capability of self and collective protection and safety.

In the second grade vocational school, there is an obligatory subject entitled "Defense and Protection". It is covered by two lecture hours per week and enables the students acquire the necessary knowledge in safety and protection. The PHARE project has not anticipated the study curricula, planned activities and their realization so most of the high school youths that have attended lectures within this Project have not gained adequate knowledge in the above field.

Institutional framework for development of methods, techniques and standards, as well as training of professionals (Master of Sc. and Doctoral study level) for reducing seismic and flooding risk exists (Institute of Earthquake Engineering and Engineering Seismology, IZIS-Skopje, Seismological Observatory, Faculty of Natural Sciences and Mathematics, both under the University "Ss. Cyril and Methodius", Skopje; and, the Republic Hydrometeorological Institute).

The Institute organizes master courses in the field of Earthquake Engineering, Engineering Seismology, and Planning for Integrated Disaster Risk Reduction.

3.4 Are there any training programs available?

<YES>

Civil Society Training

The Ministry of Education and Science of RM, i.e., the Bureau for Development of Education realized and is realizing certain projects in this field. Among these are:

- *Let us be Acquainted with Natural Catastrophes 1997/98*, from the first to the fourth grade (age 7 to 10);
- *Intervention in Crises 1999/2000*, within the frames of the European network of schools contributing to advances in health care. This programme has been realized in 23 schools of RM by the support of the Swiss Embassy.
- During the 1999 Kosovo crisis, the Bureau for Development of Education organized seminars for directors, educators and psychologists from Tetovo, Gostivar, Kumanovo and Skopje on "*Emergency Situation Management*" (acceptance of children refugees by schools);
- *Safe School in Communities at Risk 2002/2003* is a project which is being realized under the partnership and cooperation between the Bureau for Development of Education along with the Centre for Action in Psychological-Social Crisis and the Swiss Embassy. The project has been realized in all the elementary schools in Tetovo (7). The first phase has already been accomplished. The second started with the academic 2002/2003 year.
- *International Cooperation and Connection of Schools in Southeast Europe through Internet*. This project is currently being realized in 9 high schools in Macedonia, connected with 10 schools from each of 10 countries of Southeast Europe. Elaborated within this project shall be, inter alias,

common themes in the sphere of prevention and protection against natural and technological catastrophes.

Advanced curricula for training of teachers and didactic materials for training of junior/senior high school students (age 11-18) are in development under the IZIIS/UNICEF Project Physical and Psychological Management of Earthquake Related Emergencies in Schools in Macedonia.

The Macedonian Red Cross (MRC)

The City of Skopje, at local level has an operational Emergency Reaction Unit (ERU) developed under Disaster Preparedness Programme (DPP) with support from the IFRC and the German Red Cross (1994-95). It is operated by the Macedonian Red Cross and comprises of 4 specialist teams with 40 volunteers. The 4 teams within the ERU include: a management team to organize and manage operations; a rescue team; a medical team; and a technical support team. Similar, but smaller size ERU-teams are constituted in other larger towns of Macedonia, however, their operational capacity is quite limited.

MRC operates a Disaster Preparedness Training Center to train ERU staff and MRC volunteers, as well as to raise community awareness and public education on disaster preparedness.

Training of Specialized Maneuver CP forces and local CP forces

The local universal forces are assembled for the following specialized tasks: (1) first medical aid, (2) firefighting, (3) rescue of threatened and trapped population from shallow ruins and surface victims, (4) participate in sheltering, evacuation and care of population.

The local specialized forces are assembled for the following tasks: (1) firefighting, (2) first medical aid, (3) protection of communal infrastructure, (4) protection and rescue of animals and products from animal origin, (5) protection and rescue of plants and products from plant origin, (6) RCB decontamination, (7) terrain asanation.

Both type of CP forces are assembled from the members of the local community. In accordance with the most recent Decree of April 10, 2003 training of this forces is regularly provided and it is the responsibility of Central Government.

By default the training and exercise of Specialized Maneuver CP forces is the responsibility of the Central Government, as well.

Training of the CP forces is organized and performed in the Center for Defense Training, and in other education facilities. Training of CP forces is made through courses, seminars and other forms of training.

Practical testing of CP forces for attained skills is made by musters, triages, competitions and drills.

The programs (subjects and number of hours) for training the maneuver CP forces exist and are elaborated in all theoretical and practical details. All programs are of classified nature.

[Note: The previous Decree (51/92) has foreseen only the education and training of maneuver forces as the responsibility of national government. The maneuver forces are assembled for performing the following specialized tasks: (1) firefighting, (2) first medical aid, (3) rescue from ruins, (4) ruins demolition, ruins removal and terrain clearance, (5) rescue from tall buildings and facilities, (6) water rescue, (7) mountain rescue, (8) rescue in mass traffic accidents, (9) rescue in chemical accidents, (10) reconnaissance, (11) RCB decontamination, (12) terrain asanation, (13) protection from unexploded devices, (14) sheltering of threatened and affected population, (15) protection and rescue of animals and products from animal origin, (16) protection and rescue of plants and products from plant origin, and (17) logistic support.

The most recent Decree (April 10, 2003) foresees that (article 33) 'education and training should be performed for all CP members', thus all CP forces (maneuver, local-universal and local-specialized). Since it is the decreed obligation, the government, i.e., the Ministry of Defense, should organize it.]

3.5 What kind of traditional indigenous knowledge and wisdom is used in disaster-related practices or training programmes on disaster risk reduction in your country?

<NOTHING PARTICULAR>

3.6 Do you have any national public awareness programmes or campaigns on disaster risk reduction?

<NO>

Component 4 Risk Management Applications/Instruments

4.1 Is there any good examples of linking environmental management and risk reduction practices in your country?

<YES>

All large river management construction works in Macedonia are such examples.

The typical ones are:

- Regulation of the River Vardar in Skopje completed by beginning of 1970's.
- Construction of Dam/Reservoir System "Kozjak", completed by end of 2003.
- Regulation of torrent riverbeds in a number of Macedonian towns
- System of irrigation channels in Skopje plain, Gevgelia (Southeastern Macedonia, heavily affected by June 2004 flooding), Bitola (South Macedonia), Polog plain (Tetovo, 40 km Southwestern from Skopje, affected by June 2004 flooding) and many other similar systems of regional/local scale.

The need for such interrelated river management/environment protection/risk reduction large construction projects is usually identified by the National development strategy, then incorporated in development plans of the regions and finally spatially configured through the process of national and regional spatial planning.

4.2 Are financial instruments utilized in your country as a measure to reduce the impact of disasters?

Insurance

<Earthquakes, NO>

<Floods, Fires, other hazards, YES>

Earthquake insurance existed in Macedonia up to the end of 1990, i.e. the Gevgelija 1990 Earthquake. Since then, the earthquake insurance has been abandoned. Presently there is no sign that Macedonian insurance companies will enter again in earthquake insurance business.

Insurance in private sector is very low, in fact negligible. For large scale disasters (earthquakes) or costly disasters (flooding) the government is acting as final reinsurer of losses, providing compensation through the local self-government of municipalities affected. The compensation is made in accordance with locally adopted [by municipality and the Municipal Committee for Estimating the Losses from Elementary Disasters] criteria that must be approved by the Republic Committee for Estimating the Losses from Elementary Disasters and the Ministry of Finances as the representative of the Government of Macedonia.

Other financial instruments (catastrophe bonds, micro-credit finance, community funds)

The listed financial instruments have been used in the case of large-scale disasters affecting the territory of Former Yugoslavia, and Macedonia as well.

Examples: Skopje (Macedonia) flood of 1962, Skopje (Macedonia) earthquake of 1963, Debar (Macedonia) earthquake of 1967, Banja Luka (Bosnia and Herzegovina) earthquake of 1969, Montenegro (Serbia and Montenegro) earthquake of 1979, and other disasters (floods) causing significant economic losses. Tax relief (tax exempt for the certain period of affected population and economic subjects) has been also used as an additional instrument.

Calamity funds

There is permanent Solidarity Fund defined by the “Law for Establishing the Solidarity Fund of Republic of Macedonia for Eliminating the Consequences of Elementary²³ Disasters and Introduction of ‘Week of Solidarity’ ”, Official Gazette of RM No. 39/78.

While basically used for compensating the losses from hail, draughts, storms, agricultural and livestock (epizooties, epiphytes) hazards, losses from torrents and similar size adverse annual problems, the regular Solidarity fund is usually insufficient for compensation of disaster victims of larger scale disasters (strong earthquake, massive flooding).

4.3 Please identify specific examples of technical measures or programmes on disaster risk reduction that have been carried out in your country?

- Management of 1994 Bitola Earthquake
- Construction of Dam/Reservoir System "Kozjak", completed by end of 2003
- Other systems for flood control/irrigation/watering/industrial and potable water

²³ Term ‘Elementary’ disasters cover the natural, biologic and technogenic disasters. In a way, it is a substitution for a term ‘environmental’ disasters. The ‘Elementary’ disasters are defined by the “Instructions for the Unique Methodology for Estimation of Damages form Elementary Disasters”, Official Gazette of SFRY No. 17/79 and 27/87 and the “Decree for Unique Methodology for Estimation of Damages form Elementary and other Disasters”, Official Gazette of RM No. 5/01. As ‘Elementary’ disasters, Laws 17/79 and 27/87 identify: earthquakes, floods, flooding by increase of underground waters, torrents, draughts, storms, hail, frost, landsliding, other natural disasters (high snows, snow avalanches, rock avalanches, excessive erosion, etc), epidemics, epizooties, epiphytes, forest and range fires, excessive land, water and air pollution, various kind of technologic = technogenic disasters and the composite disasters. Since all of the single appearance disasters are an element of the composite disaster (that is usually the case) the Law terms them as ‘elementary’. Law 5/01 additionally includes public unrest conditions and terrorism (terrorism itself, armed upraise, sabotage, diversion, kidnapping, assassination).

Component 5 Preparedness and Contingency Planning

5.1 Do you have disaster contingency plans in place? Are they prepared for both national and community levels?

<YES>

Macedonia possesses structured emergency management system defined by the Constitution of the country. Primary responsibility and management mandate for civil emergencies is given to Civil Protection, which in cooperation of all line ministries should assure effective and efficient management. The Constitution foresees the involvement of the Army also, but upon the order of the President of the country and in a way prescribed by the Minister of Defense. Presently the Civil Protection is under the Ministry of Defense. The coordination of activities of both systems in regular conditions is at Undersecretary level.

Civil emergency planning (preparedness and operative response) is under the Civil Protection. Operative emergency management planning is performed at several levels: (1) national, (2) regional, (3) municipal, (4) enterprises, administration, public companies, and (5) local units. Plans are classified and available only for use of Civil Protection and other forces directly responsible for protection of population and material property and involved in operative management of emergencies (army, police, firefighting service).

The principal content of emergency plans is: (1) Evaluation, (2) Preventive measures, (3) Operational measures, and (4) Annexes focused on operations logistic, safety assurance and protection, and other specific site-dependent measures. Evaluation is based on the assessed characteristics of the exposure and its vulnerability to natural and man-made hazards, i.e.: (1) Physical and geological survey, (2) Rivers, (3) Climate conditions, (4) Population, (5) Infrastructure, (6) Urban areas and construction features, (7) Transportation infrastructure, (8) Environment protection requirements, and/or (9) any particular site-dependent disaster agent.

Vulnerability of the territory to certain natural disasters (earthquakes, floods, high shows, dam outbursts, hailstorms, fires, explosions, epidemics, animal diseases, pest diseases mine disasters), and related quantifications, consider the following elements at risk: (1) transportation network, (2) communication system, (3) railway network, (4) electric power network, (5) urban built environment, (6) humans, (7) in some cases livestock and food reserves, etc.

Depending on the scale of the event, the CP responds by Local (small scale) or Local and Maneuver (large scale disaster) CP Forces. Local (local-universal and local-specialized) CP forces are mobilized from the local population and assembled within the territory affected. Maneuver forces are assembled anywhere within the territory of the Country, and deployed to the affected region. Member of both CP forces are civilians, mobilized for management of emergency.

The maneuver forces are assembled for performing specialized tasks: (1) firefighting, (2) first medical aid, (3) rescue from ruins, (4) ruins demolition, ruins removal and terrain clearance, (5) rescue from tall buildings and facilities, (6) water rescue, (7) mountain rescue, (8) rescue in mass traffic accidents, (9) rescue in chemical accidents, (10) reconnaissance, (11) RCB decontamination, (12) terrain asanation, (13) protection from unexploded devices, (14) sheltering of threatened and affected population, (15) protection and rescue of animals and products from animal origin, (16) protection and rescue of plants and products from plant origin, and (17) logistic support. Members of the specialized maneuver CP units are civilians, professionals in a particular field, with a regular job and professional activities in normal circumstances.

Education and training of both CP forces (maneuver, local-universal and local-specialized) is the responsibility of the Government, i.e., the Ministry of Defense. Training is organized and performed in the Center for Defense Training, and in other education facilities. Training of CP forces is made through courses, seminars and other forms of training. Practical testing of CP forces for attained skills is made by musters, triages, competitions and drills.

Role and responsibilities of local (Self-government), as regulated by Law are: (1) To continue performing all regular-time duties as prescribed by the "Law for Local Self-Government", (2) To assure adequate preparedness and undertake all necessary measures for protection and rescue of citizens and material property within their territory against war destructions, effects of natural disasters and other calamities and from the effects caused by their occurrence; (3) To form professional bodies

(committees or working groups) that should contribute to implementation of preventive and operative measures for protection and rescue of population and material property; and, (4) To assure and coordinate the logistic for operation of local CP forces.

The primary role of local communities (population) is self-protection, as the basic mode of protection of population for surviving the war effects, emergency situations, disasters and other threats.

Self-protection is the most massive form of participation of citizens in undertaking measures and activities in the domain of preventive self-protection, self-aid, mutual aid and first aid to victims and sick population, as well as of protection and rescue of population and material property. It is organized and implemented within every household and/or family, residential or commercial building, school, settlement, building block, street, company, public institution and service and at all other places the citizens leave, work or gather.

Self-protection prepares/trains citizens of Macedonia for first medical aid, primary decontamination, localization and extinguishments of initial (forest, agricultural and other) fires, rescue of surface or shallow (earthquake, or other buildings' collapse) victims and informing and alarming on pending threats, as well as for passive participation in protection and rescue, sheltering, dislocation, evacuation, catering, etc.

Responsibility for activation of Operative emergency plans is within the level that performed the planning, i.e., the enterprises, administration and public companies, the municipality in cooperation with Civil Protection, and the Civil Protection for higher planning levels (regional and national).

In the domain of logistic and mobilization scheme, the plans are updated regularly. The segments related to potential disaster effects and the capacity needed for containment are updated only when knowledge and research provide new planning (either qualitative or quantitative) elements that radically differ from those already incorporated.

Higher level Operative emergency plans have not been put in effect since 1963 Skopje and 1969 Debar earthquakes. Municipal Operative emergency plans have been used several times following moderate scale earthquakes (Gevgelija 1990 and Bitola 1994) and/or following larger forest fires.

The results were quite satisfactory, in particular during the initial response phase.

Floods:

For operative protection and defense against floods, Municipalities and the City of Skopje adopt specific plans, i.e., the Plan of Operations for Protection and Defense against Floods of Threatened Areas. Operative Plans contain: topographical, hydrology, hydrotechnical, demographic, economy and other plans and data, outlines the borders of threatened area, measures and activities to be undertaken prior to flooding, and defines the authorities responsible for operative protection and defense against floods. The Plan of operations foresees operative measures and other actions for protection and defense against floods, and appropriations necessary for its operative implementation. If the foreseen measures are insufficient for eliminating the threat, the Authority leading the protection and defense against floods can request other necessary measures.

Copy of the Plan of Operations must be submitted to the Ministry of Agriculture, Forestry and Water management.

In case of pending threat of dam failure, breakage of protective dykes, or discharge of larger quantities or topping of water from retention reservoirs that can cause flooding, public Water management Company and other subjects involved, must assure adequate public informing and alerting in areas to be affected.

The Minister of Agriculture, Forestry and Water management, in agreement with the Minister of Defense and the Minister of Urbanism, Construction and protection of Environment, establish the Permanent Operating Committee responsible for coordinating all necessary activities. *[Note: While the law precisely defines the involvement of the Minister of Urbanism, Construction and protection of Environment, this ministry do not exist presently. The mandate of that ministry is presently allocated to several ministries, but dominantly to the Ministries of: (1) Transport and communication, (2) Ecology and Environmental protection.]*

Prior to the arrival of critical water levels, the Republic Institute of Hydrometeorology is responsible to providing all relevant information to the Republic Center for Public Informing and Alarming, assure real time forecasting on the flood arrival and of expected height of the flooding waves.

During the flooding threat, the responsibility of authority leading the flood defense is to inform all downstream flood defense authorities for effects recorded in his sector, undertaken measures relevant for defense of downstream sectors, and to cooperate with them.

5.2 Has your government established emergency funds for disaster response and are there national or community storage facilities for emergency relief items – mainly food medicine, tents/shelters?

<YES>

Emergency funds

The basic Law defining the emergency funds is enforced in 1978 as “Law for Establishing the Solidarity Fund of Republic of Macedonia for Eliminating the Consequences of Elementary²³ Disasters and Introduction of ‘Week of Solidarity’ ”, Official Gazette of RM No. 39/78.

The Law defines the following, annually collected, inputs: (1) Week of Solidarity, (July 26 – Date of 1963 Skopje Earthquake – August 1), (2) income collected from the special emission of ‘Stamps of Solidarity’ used during the Week of Solidarity [stamp of a certain value added to regular postal fee], (3) interest on the loans [annuities] provided by that time Federation [now the Republic of Macedonia] for mitigating the effects of disasters, (4) part [prescribed] of the income of all legal [companies] and private [citizens employed by themselves , like farmers, small craft shops, private restaurants and pubs, etc.], (5) donations, and (6) other similar sources.

Collected solidarity funds are tax-exempt. In kind donations and finances collected from stamps are put on the disposal of Macedonian Red Cross.

Since 1978 several amendments to this Law are made and they refer to: Instructions on procedure for calculating and billing the Solidarity assets, and correct the value of the Solidarity stamp and some terminological and linguistic issues, however, the essence of the Law has not been modified.

In regular conditions, the prescribed part of the income (4) is one gross daily salary for companies and 0.2% of the cadastral income of self-employed population. These funds, put on the special account of companies and other legal subjects, are annually transferred to Solidarity fund based on the order of the Minister of finances that is also published as an Ordinance in the Official Gazette of RM.

In the case that ‘disaster and/or civil emergency’ condition is declared for affected area, the number of gross daily salaries needed as short-to-medium term assistance to affected population is calculated based on the losses estimated according to the ‘Unique Methodology’. Separate law, the ‘Solidarity Compensation Law’ enforced solely for that particular purpose [disaster] defines the number of gross daily salaries and the period for which they should be provided.

The regular Solidarity fund is usually insufficient for compensation of disaster victims in case of larger scale disaster (strong earthquake or large flooding). It is basically used for compensating the losses from hail, draughts, storms, agricultural and livestock (epizooties, epiphytes) hazards, losses from torrents and similar size annual problems [for this, term disaster cannot be used].

In the case of the disaster, the first response during the emergency impact phase is to activate a part of the Government budget reserve, and then, based on the estimation of the aggregate losses, to enforce the Special Solidarity Law [for example: “Law for Assuring the Appropriations for Eliminating the Consequences of the Earthquake in Municipalities of Gevgelija and Valandovo”²⁴, Official Gazette of SRM No. 17/91] defining the number of gross daily salaries needed to mitigate the losses, the period in which they shall be collected and the mechanism of collection. This law treats no other, but only the financial aspects of the disaster.

The disaster compensation is provided only in the case when the government recognizes and declares the existence of the state of the emergency [or disaster] in the territory affected. Compensation is regulated by the separate law, “Law for Conditions and a Mechanism of Using the

²⁴ Original title: Zakon za obezbeduvanje sredstva za odstranuvanje na posledicite od zemjotresot vo opstinite Gevgelija i Valandovo, Sl. Vesnik na SRM br. 17/91.

Solidarity Assets for Mitigating the Consequences of Elementary Disasters in Republic of Macedonia”, Official Gazette of SRM No. 18/76, 30/77 and 18/79.

In this case, all [or a part] of assets collected in Solidarity fund are put on the disposal of affected municipalit(y)ies only if the losses exceeds 5% of previous-year-municipal GDP. Assuming that the responsibility of the affected municipality is to participate by itself in compensations up to 5%, the Solidarity fund assets are used to cover the difference between the real estimated loss and the municipal participation.

In such a case, the part from 5 to 10% of municipal GDP is provided as non-interest loan with a payback period of 5 years, and the part from 10% up to real estimated loss is provided as nonrefundable (solidarity aid).

The responsibility of the Municipal Committee for Estimating the Losses from Elementary Disasters and the local self-government is to set the criteria and the mechanism of compensation in accordance to the dynamics the solidarity assets are collected in the Special Solidarity Fund.

The Solidarity fund and the Special Solidarity Fund are in fact the same fund [same budget line]. The difference makes the law according to which the assets are collected. Regularly, it is the Law defined by Official Gazette of RM No. 39/78, but in the disaster conditions it is a Special Solidarity Law enforced for that particular adverse event.

The Republic Committee for Estimating the Losses from Elementary Disasters, set as the Permanent Committee of the Ministry of Finances, monitors the use of the Solidarity and the Special Solidarity Funds, as well as the entire process of damage and loss estimation regulated in all details by the ‘Unique Methodology’.

National or community storage facilities

There are no national or community storage facilities specifically for disaster response purpose. In such cases stockpiled material reserves of the country are used. There is a Law prescribing a quantity that certain companies (or industries) should stockpile as well as the way and the time how and when these reserves (food products in particular) should be refreshed.

Tents and to some extent shelter reserves are stockpiled by Army of R. of Macedonia and Civil Protection of R. Macedonia.

Medicines and other health care necessities are stockpiled in larger regional medical centers of Macedonia (10 in total) as well as in warehouses of medical supply provides. Planning and stockpiling of this kind of reserves is under direct responsibility of the Ministry of Health. Army and CP also stockpile some operational reserves, dominantly for their own use.

5.3 Who is responsible for the coordination of disaster response preparedness and is the coordination body equipped with enough human and financial resources for the job?

When the state of emergency is declared for the part, or for the entire territory of Republic of Macedonia, the following laws define the response procedure:

- “Law on Protection Against Elementary Disasters”, Official Gazette of SRM No. 39/77;
- “Directions on a Mode and Procedure for Using the Civil Protection Forces and Headquarters Formed by the Republic in Emergencies and Other Peace-Time Calamities”, Official Gazette of RM No. 51/92 [27/03]
- “Ordinance for Organization, Preparedness and Execution of Activities and Duties of Civil Protection in War Conditions and for Establishing and Preparing Units and Headquarters of Civil Protection”, official Gazette of RM No. 51/92 [Replaced by the “Ordinance for Organization, Preparation and Use of Civil Protection Forces”, Official Gazette of RM No. 27/03, April 10, 2003].

- "Decree for Using the units of Civil Protection"²⁵, Official Gazette of RM No. 26/93.
- "Regulations for Conditions and Procedure for Public Informing and Alarming in Emergencies"²⁶, Official Gazette of RM No. 55/97.

The Constitution of Republic of Macedonia²⁷, Official Gazette of RM No. 51/92 [27/03] defines the state, the procedure of invoking it and the duration of [the state of] emergency ([Annex 5.3](#)).

During the state of the emergency, the Government of Macedonia is responsible for organizing protection of population and material property and the coordination of all sectoral activities. It directs all measures for protection and orders participation and involvement of all human and material resources.

The Local Government, when the territory under its jurisdiction is threatened or affected, assembles (calls a meeting of) Municipal Committee for Estimating the Losses from Elementary Disasters. This Committee is of permanent nature. The Committee (in cooperation with the Local government and Civil Protection) governs all the actions within the municipal territory, including organization, coordination and reporting of needs and loss assessments.

The Municipal Committee reports to the Republic Committee for Estimating the Losses from Elementary Disasters. It is also a Permanent Committee, set under the Ministry of Finances and it is the effective link between the local and national levels. The Republic Committee allocates and monitors the use of disaster funds (the Solidarity and the Special Solidarity Funds) allocated for managing the disaster effects, as well as the entire process of damage and loss assessment.

The Republic Committee for Estimating the Losses from Elementary Disasters reports to the Government of Macedonia which authorizes the use of disaster funds as well as all measures necessary to contain and/or mitigate the disaster effects.

In the case of large disaster, in particular the disaster associated with large casualty of population, the first response coordination responsibility will immediately be allocated to the Civil Protection of Macedonia. The allocation of principle coordinating role to the Civil Protection does not suspend the involvement and roles of the Municipal and Republic Committees for Estimating the Losses from Elementary Disasters

[Note: The presented system, although formally still in effect, soon will be changed in accordance with Newly established National Concept for Security and Defense (Off. Gazette No. 40/03, June 23, 2003), which foresees (Ch. 3. Crisis Management):

...

In order to assure permanent consultations and decision making at highest level, maximal coordination, efficiency and adequate utilization of available capability and resources in the case of crisis and crisis situations, as well as in-time, qualitative and realistic assessment of dangers threats in RM against risks and threats, - the crisis management system shell be based on three pillars: Managing Committee [Board], Department for Assessment [estimation] and service [logistic] for supporting first and second pillar, i.e. a Center for Crisis Management (CCM).

...

To juridically regulate this area, under the preparation are the following Laws:

- *Law for Crisis Management*
- *Law for Search and Rescue*
- *Law for Elementary Disasters*

Law for Search and Rescue has passed on the session of the Parliament of Macedonia held on May 26 2004 (Official Gazette of RM, No. 26/04, June 10, 2004). The preparation of Law for Elementary Disasters has been postponed until the Law for Crisis Management is adopted. The Law for Crisis

²⁵ Original title: Odluka za angaziranje na edinicite na Civilan zastita", Sl. Vesnik na RM br. 26/93

²⁶ Original title: "Pravilnik za uslovite i nacinot na izvestuvanje i trevozenje vo vonredna sostojba", Sl. Vesnik na RM br. 55/97.

²⁷ Original title: Ustav na Republika Makedonija, Sl. Vesnik na RM br. 52/91.

Management has also been presented at the session of the Parliament of Macedonia held on May 26 2004, but it was returned for further adjustments and refinements. However, the process of adopting this Law will soon be completed. The Law in itself is supposed to provide the clear framework for the mandate and all level coordination of disaster preparedness planning and operative response.]

Component 6 Call for good practices in disaster risk management

Case 1: Flooding, City of Skopje- Environmental Management and Risk Reduction

Background: Flooding affecting Macedonia in November 1962 were caused by rivers Vardar, Crna Reka and Strumica, whereas in November 1979 by rivers Vardar, Pena, Crna Reka, Strumica, Treska and Pcinja. In 1962 and 1979, about 65,000 and 53,245 hectares have been flooded respectively. The aggregate losses of both floods have been estimated at about 7.2-7.4% of GDP of SRM, each.

Skopje, the capital of Republic of Macedonia and its largest political and administrative center has heavily been affected by 1962 flooding. Out of 7,478 flooded hectares, 150 were flooded in the central part of the city. Large portion of residential, administrative and educational buildings as well as transportation system and other infrastructure facilities have been flooded.

In 1979 Skopje was threatened again. The floodplain developed was for 34% larger than the floodplain developed in 1962. The already regulated riverbed of Vardar enabled fast drainage of flooding wave through the central part of the city, so only negligible parts of the marginal city urban area have been flooded.

Threat: Skopje is exposed to flood wave from three rivers: (1) Upper Vardar, (2) Treska, and (3) Lepenec. In the case of very intensive frontal rainfall (April-May, October-November) or coincidence of rapid snow melting (March-April) in the catchments of Upper Vardar, Treska and Lepenec rivers, the high water levels or flood waves are affecting the city of Skopje within 12 hours.

In both floods the peak streamflows (peak discharges = PD) of three rivers have been slightly shifted in time. In 1962 the peak discharge of Upper Vardar was shifted from the PD of Lepenec and Treska. In 1979 the PD of Upper Vardar (388 m³/s), Treska (503 m³/s) and Lepenec (372 m³/s) were shifted in time. If they coincided (PD in Skopje would be 1,263 m³/s) the occurred water level of 522 cm in Skopje would overtop the regulated riverbanks of Vardar designed for water level of 511 cm (i.e. for 100 years PD of 1,119 m³/s).

Solution: Phase I: Regulation of the riverbanks and the river bed of Vardar through Skopje
Phase II: Construction of dam-reservoir for collection of flooding wave. The topography of the country allows cost-effective collecting of flood wave of Treska river in its upper stream part of already existing Matka Dam (15 km southwestern from the city center).

The *Directorate for reconstruction and regulation of Vardar riverbanks* (established following the flood of 1962) and assisting UN agencies proposed (1962/1963) such flood defense Plan for Skopje, including listed technical measures. The Phase I was completed by end of 1960's, Phase II has been postponed due to economic reasons.

The flood control solution - cascade system of 3 dams, proposed following the Skopje Flood of 1962 is finally realized in 2003.

Constructed system (2 newly constructed dams: Kozjak and Matka 2 including the existing Matka dam) enables: (1) efficient flood protection of the City of Skopje; (2) capturing of dispersed small-river waters; (3) supply of industry with non-processed (technical) water; (4) irrigation of Skopje valley; (5) production of electric power; (6) improvement of microclimate conditions in the region; and, (7) erosion control.

The principle flood-protection role is assigned to dam-reservoir Kozjak. The volume between the levels 466.00 and 469.60 m is designed as nominal flood control retention volume. Out of totally designed retention capacity of 550 million m³, 100 million m³ are designed as an additional flood control volume. This volume shall be used for storing the floodwaters of Treska river for the period the peak discharges of upper Vardar and Lepenec rivers are draining through the regulated riverbed of Vardar river in Skopje.

Case 2: Earthquake, Town of Bitola - Response and Recovery

Background: On 1.09.1994, Thursday, 18:12h local time, an earthquake ($M=5.2$, $I_0=VII+$ MCS) affected municipalities of Bitola, Demir Hisar, Resen and Ohrid. The town (~85,000 inhabitants) and Municipality of Bitola (~145,000 inhabitants) were most heavily affected. Aggregate earthquake Losses: 3.4% of 1993 GDP of RM.

2/09/1994	Urgent meeting of CToB ¹ , contact with IZIIS-Skopje, call to citizens with damaged property [dwelling houses, buildings, etc.] to declare 'suffered loss'. Information points: on duty service of the Municipality of Bitola, branch office of the Ministry of Defense. Arrival of IZIIS specialist team.
2-4/09/1994	Rapid check of all schools and health care system buildings in affected region for potential structural damages, exclusion from use of structurally damaged buildings, inspection of: (1) power system facilities and lines, (2) water supply system and quality of potable water, and (3) other essential facilities; needs assessment; Activation of appropriations accumulated in Solidarity Fund.
6/09/1994	Establishment (MCELED ² and IZIIS) of 36 DIUC ⁴ teams (1 engineer, 1 architect or technician, 1 citizen of Bitola) for detail DIUC of buildings declared to be damaged; sectorization of the City and the region; allocation of working area to each team; establishment of damage and loss assessment coordinating body of 7 members (2 from IZIIS).
8-30/09/1994	Deployment of portable seismograph station in Municipality building (15/09); Inspection of: (1) 9,829 buildings and dwelling houses (town of Bitola: 4,927; 4,901 in total 127/ rural settlements), (2) facilities of 80 industrial and other companies; elaboration and submission of the summary report to RCELED ³)
12/10/1994	Establishment (MCELED and RCELED) of specialists teams (IZIIS) for verification of assessments and estimates made by DIUC teams.
17/11/1994	Establishment (CToB) of Council for assurance and use of funds for eliminating the consequences caused by the earthquake (President, Secretary plus 15 members; 2 representatives from IZIIS in)
8/12/1994	Government of RM adopts the "Resolution for allocating solidarity funds of Republic of Macedonia for elimination of consequences from elementary disasters", Official Gazette of RM, No 64/94. This resolution allocated € 29.26 Million to Municipality of [Mo] Bitola, € 2.82 Million to Mo Demir Hisar and € 4.26 Million to Mo Resen.
19/07/1995	Government of RM adopts a special "Ordinance on the way and the procedure for calculating and transferring of solidarity funds for elimination of the earthquake consequences in Municipalities of Bitola, Demir Hisar, Ohrid and Resen", Official Gazette of RM No. 35/95; the Municipality of Ohrid, although mentioned in this Ordinance has not received any compensation since the aggregate municipal losses have been below 5% of the Municipal GDP for the previous (1993) year, thus had been obliged to manage the effects from it own Municipal budget. This Law provided a mechanism of collecting the funds, i.e., prescribed the number (2) and the period when (1 in June and the other one in September 1995) average daily salaries should be collected.

During 1995, the collected appropriations, in two allotments, were distributed to owners of damaged buildings for: (1) 2,259 buildings and dwelling houses of damage degree 3 /light structural damages/; (2) 709 of damage degree 4 /heavy structural damages/; and, (3) 56 of damage degree 5 /partially or totally collapsed/.

The entire process has been carried out and monitored by the *Council for assurance and use of funds for eliminating the consequences caused by the earthquake* which created three Committees: (1) Committee for control and verification of the ownership and pre-earthquake use of damaged buildings, (2) Committee for distribution of funds for elimination of earthquake consequences, and (3) Committee for controlling the use of funds (compensations) transferred to each owner of damaged building/dwelling house.

Compensations were made in accordance with the Criteria developed by the *Council for assurance and use of funds for eliminating the consequences caused by the earthquake* with assistance of the Government of RM.

Key decisions: Communal tax relief (until 31.12.1995) for all owners receiving compensation for damaged building; 70% of funds to be used for repair and strengthening of dwelling houses and buildings in private and 30% in public and Governmental sector; owners of the buildings experiencing damages corresponding to: (1) damage degree 3 have been compensated by 20%, (2) damage degree 4 by 60%, and (3) damage degree 5 by 80% of estimated and verified losses. For temporary used buildings compensations were made up to 25% of estimated losses and for illegally erected (no construction permit) up to 50%.

During 1995 the Town of Bitola was a large construction site. Compensations provided on solidarity basis increased the economic potential of building owners encouraging and helping them to undertake repair and strengthening of damaged buildings. Management/Recovery policy, accompanied with thorough monitoring of utilization of allocated funds and compensations transferred to population, assured substantial improvement of individual living standard of the population and the public standard of the city itself.

¹) CToB = Council of the Town of Bitola; ²) MCELED = Municipal Committee for Estimating the Losses from Elementary Disasters; ³) RCELED = Republic Committee for Estimating the Losses from Elementary Disasters, ⁴) DIUC = Damage inspection and usability classification

Component 7 Priorities to be addressed at World Conference on Disaster Reduction

Broader Scale Priorities

- Fostering scientific and research interaction among the vast community of researchers and institutions contributing to environmental management and disaster risk reduction.
- Encourage the Balkan, European and Euro-Mediterranean research and professional (scientific, managing and decision making) community in implementing the innovative technologies (Satellite imagery, remote sensing, GPS, GIS, Laser scanning) for environmental management, disaster onset monitoring and management of disaster risks.
- Needs for regional cooperation of specialized systems and institutions responsible for operative disaster/emergency management in particular in the domain of establishing bilateral/multilateral border-passing protocols indispensable for integrating multinational neighborhoods efforts for effective and efficient management/response to transborder disasters.
- Identification of: (1) regional cooperative needs and targets for bridging the identified gaps in domain of integrated disaster risk and environmental management; (2) present priorities and ongoing projects and incentives of multinational regional interest; and, (3) available mechanisms of cooperation.
- Lack of capacity of small countries to cope with large in-territory disaster risks, needs for international cooperation and assistance.

Specific National Priorities

Development and installment of countrywide GIS based disaster risk information and environment management system as a basis for: (1) substantial improvement of all-level planning processes; (2) aggregate preparedness planning; (3) effective and efficient operative management of daily problems [at city level in particular]; (4) operative management and relief demands during disaster impact phase; (5) continuous acquisition, analysis, archiving and interlinking of all necessary data and information for better understanding and qualification of Macedonian risk environment.

Improvement of existing monitoring technology and integration in corresponding European and Euro-Mediterranean monitoring systems. Specific and urgent needs are in the following domains:

- Extension and modernization of Seismological instrument network operated by the Seismological Observatory, Faculty of Natural Sciences and Mathematics, University “Ss. Cyril and Methodius”, Skopje;
- Extension and modernization of obsolete (SMA-1) Strong motion instrument network operated by the Institute of Earthquake Engineering and Engineering Seismology, University “Ss. Cyril and Methodius”, Skopje;
- Extension and modernization of Flood gauge system and the network of meteorological stations operated by the Republic Hydrometeorological Institute, Skopje.
- Quantitative upgrading and modernization of operations tools of Civil Protection and other emergency services of Macedonia, in particular for SaR and USaR operations.