“2P2R” process in Macedonia
“Prevent, Prepare, Respond and Recover”

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Republic of Macedonia

<p>| AREA:                        | 25,713 sq.km. |
| PLAINS:                      | 19.1%         |
| MOUNTAINS:                   | 80.9%         |
| WATERSHEDS:                  |               |
| r. Vardar                    | 20,535 sq.km. |
| r. Crni Drin                 | 3,350 sq.km.  |
| r. Strumica                  | 1,535 sq.km.  |
| LAKES:                       |               |
| Tectonic                     | 3             |
| Glacial                      | 25            |
| Dam reservoir                | 15            |
| CLIMATE:                     |               |
| Temperate Mediterranean      |               |
| Moderate Continental         |               |
| RAINFALL:                    | 500 - 700 mm/year |
| TEMPERATURE:                 | +40°C (summer) -30°C (winter) |
| POPULATION:                  | Census 1994/2001: 2,000,000 |
| HOUSEHOLDS:                  | 479,808       |
| SETTLEMENTS:                 | 1,753         |
| CAPITAL:                     | Skopje (450,000) |
| LARGER URBAN AREAS:          | 28            |
| Bitola                       | 64,000        |
| Kumanovo                     | 70,000        |
| T. Veles                     | 51,000        |
| Ohrid                        | 43,000        |
| etc.                         |               |</p>
<table>
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<tr>
<th>Major Hazards by Social and Economic Impact</th>
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<td>Earthquakes</td>
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<td>Minor Hazards</td>
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1998, Party to the UNFCCC 
Non-Annex I Party

2004, Kyoto Protocol ratified 
Non-Annex B Party

2005, Party to the Kyoto Protocol

7,16 t CO₂ - eq/capita (2000)

2005, Hyogo Framework for Action

Positioned in one of the most vulnerable region
NATIONAL DOCTRINE FOR DISASTER RISK REDUCTION

BASIC DOCTRINAL POSTULATE:
PREVENTION & EARLY WARNING ARE THE BASIS FOR PREVENTING IN TOTAL OR FOR PREVENTION OF DISASTEROUS CONSEQUENCES BY NATURAL HAZARDS OR MAN-MADE ACCIDENTS. WHILE THE PREPAREDNESS OF EACH STAKEHOLDER & THE CAPABILITY FOR THEIR COORDINATED & RAPID RESPOND ARE A PRECONDITION FOR REDUCTION OF THE CONSEQUENCES & RAPID MITIGATION.

EXAMPLE: RISK: FLOODS

GENERAL STRATEGY REGARDING THE SPECIFIC RISK
(how the doctrine will be implemented in relation to the specific risk)

FUNCTIONAL STRATEGIES

PREVENTION STRATEGY
How will the general strategy be implemented in terms of prevention

REACTION STRATEGY
How will the general strategy be implemented in terms of respond to the occurred situation

REHABILITATION STRATEGY
How will the general strategy be implemented in terms of rehabilitation

POLICIES
(how will the strategies be implemented in relation to the specific domains, or, how will they transform in specific steps)

PREVENTION POLICIES

REACTION POLICIES

REHABILITATION POLICIES

POLICY IMPLEMENTATION STRATEGIES

POLICY IMPLEMENTING PROGRAMMES & PROJECTS

LEGISLATIVE (PASSING LAWS AND REGULATIONS)
(transformation of the policies in laws and regulations)

PREVENTION RELATED LEGISLATIVE

REACTION RELATED LEGISLATIVE

REHABILITATION RELATED LEGISLATIVE
DISASTER RISK REDUCTION – METHODOLOGIES, ASSESSMENTS, SCENARIOS, PLANS & S.O.P
(IN THE CONTEXT OF EACH OF THE SPECIALIZED PLATFORMS)
Macedonian relevant sectors in CC issues

Figure 2.2.1. Flow-chart of the relevant sectors included in climate change issues
Strategic framework

- **National sustainable development strategy** - energy sector and climate changes identified as main contributors towards national sustainable development - adopted in 01/2010

- **National Platform for DRR** - adopted in 2009

- **Second NEAP** - climate change problems and solutions identified


- **National strategy for adoption of Environmental Aquies**

- **National Environmental investment strategy** - carbon financing recognized as potential for attraction of foreign investments

- **National climate change indicators** - developed

- **Draft National Strategy for adaptation of Health Sector**
Climate scenarios
- According to the results, the average increase of temperature is between 1.0°C in 2025, 1.9°C in 2050, 2.9°C in 2075, and 3.8°C in 2100.
- The average decrease of precipitation ranges from -3% in 2025, -5% in 2050, -8% in 2075 to -13% in 2100, in comparison with the reference period 1961-1990.

Vulnerability assessment
- Agriculture, Forestry, Biodiversity Sector, Water Resources Sector

Intersectoral Action Plan on Adaptation
In Stip region, where most important crop is winter wheat, yield decrease could reach up to 17% in 2050.

In Bitola region, yield decrease of alfalfa could reach 62% in 2050.

Yield decrease of apples in Resen and grape in Kavadarci region could reach up to 50% in 2050.

Most dramatic are projections for yield decrease of tomato in Gevgelija region (81% in 2050).

Results are obtained under the assumption that crops would be planted without irrigation.
The total direct economical damage for yield decrease of winter heat, alfalfa and grapes would be almost €30 million in 2025 and it would increase up to €40 million in 2100.

Most vulnerable agriculture region is Central Povardarie (Kavadarci, Negotino, Gradsko, especially catchment areas of Crna Reka and Bregalnica).
Vulnerability assessment
Sector Forestry

- Decline of health condition for oak and fir, intensified forest dieback

- Increased population of pests (especially insects and fungi), due to the decline of health condition

- Migration of certain tree species at the highest altitudes and change of forest tree

- Increase of number of forest fires and burned area due to expected rise of air temperature
Vulnerability assessment
Biodiversity Sector

- Alpine zone is most vulnerable to climate changes.

- Loss of the alpine belt can be expected; for example Mt. Pelister is expected to have lost its alpine belt within 50 years. Molika-pine forest belt will move upwards.

- Dojran lake ecosystem and surrounding swamps can experience most negative effects from climate changes, especially in already disturbed water regime.

- Vertical movement of vegetation belts, problems in food chains of some vertebrates and their
Vulnerability assessment
Human health Sector

- Increased risk from food or vector-translated diseases, increased frequency and duration of heat stress, increased mortality from cardiovascular diseases
- For some of the winter months decrease of total mortality (expressed as a monthly average) is expected in the country
- For the summer months increase of the monthly mortality rate in the country of 10% average is expected, compared to the period 1996-2000
It is estimated that the climate change will have detrimental effect to water quality, regarding the following aspects:

a) Reduced water quantities decrease the capacity to dilute pollutants, leading to worsening of the water quality;

b) Higher temperatures reduce the dissolved oxygen in water bodies; and

c) In conditions of climate change, the use of water, especially in agriculture, may reduce the water quality by discharge of pollutants
The percentage of decrease of mean annual discharges in the period 2000–2003 is 36 – 58% as compared to the average in the period 1961 – 1971.

The quantity of water outflow from the country varies significantly in the last 40 years, with a downward trend, decreasing steadily by 70 millions m$^3$ annually.
Estimates of future climate change impact to Vardar, Treska and Bregalnica rivers

- Application of MIKE SHE software model indicates decreasing trend of annual average discharges of approximately 4% for Treska and approximately 11-16% for Vardar and Bregalnica rivers by 2050.

- Available water resources in year 2100 in the catchment of Bregalnica river will decrease for 24%, as compared to 7% decrease estimated for Treska river basin.

- It is expected that periods of dry spells will occur more often and with higher intensity; on the other hand, flash floods with increased intensity are expected.

- Overall water availability in the country (Vardar River catchment) will be decreased for around 18% in year 2100.
Intersectoral Adaptation Action Plan

- Problem identified ✓
- Measures ✓
- Actions ✓
- Responsible party ✓
- Time frame ✓
- Budget ✓

www.moepp.gov.mk - Climate change part;
www.unfccc.org.mk
Future needs for the Republic of Macedonia

- Building a stronger knowledge base
- Taking climate change impacts into consideration in key policies
- Financial needs to be identified – combining different policy measures to the best effect
- Supporting wider international efforts on adaptation
The Copenhagen Communication proposes that all countries developed and developing alike, should be required to draft comprehensive national adaptation strategies to ensure that costly and recurring climate impacts can be prevented as far as possible.

Better tools and know-how to design and implement adaptation strategies need to be developed. National institutions and international cooperation should be strengthened to disseminate knowledge and technologies for adaptation and climate resilient development.