NATIONAL ACTION PLAN TO COMBAT DESERTIFICATION IN THE REPUBLIC OF MACEDONIA

gef UNEP

Republic of Macedonia
Ministry of Environment
and Physical Planning

National Action Plan to Combat Desertification in the Republic of Macedonia

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Ministry of Environment and Physical Planning of the Republic of Macedonia

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Ministry of Environment and Physical Planning of the Republic of Macedonia

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GEF Implementation Agency	United Nations Environment – UNEP
GEF Operational Focal Point for FYR Macedonia	Vesna Indova – Head of Unit for Coordination and Technical Implementation of IPA, EU Department - Ministry of Environment and Physical Planning of the Republic of Macedonia
UNCCD Focal Point for FYR Macedonia	Vesna Indova – Head of Unit for Coordination and Technical Implementation of IPA, EU Department - Ministry of Environment and Physical Planning of the Republic of Macedonia

NAP Development Coordinators

Prof. dr. Vlatko Andonovski	Scientific Technical Coordinator, University Ss. Cyril and Methodius – Faculty of Forestry in Skopje.
Vesna Indova	National Focal Point for UNCCD, Ministry of Environment and Physical Planning of the Republic of Macedonia.
Pier Carlo Sandei	Programme Officer, UN Environment, Regional Office for Europe, Programme Office in Vienna.
Sonja Gebert	Consultant, UN Environment, Regional Office for Europe, Programme Office in Vienna.

Working Groups Leaders

Prof. dr. Dusko Mukaetov	University Ss. Cyril and Methodius – Institute of Agriculture in Skopje.
Prof. dr. Ivan Blinkov	University Ss. Cyril and Methodius – Faculty of Forestry in Skopje.
Prof. dr. Ordan Cukaliev	University Ss. Cyril and Methodius – Faculty of Agricultural Sciences and Food in Skopje.
Prof. dr. Silvana Mojsovska	University Ss. Cyril and Methodius – Institute of Economics in Skopje.

Steering Committee

Stevo Temelkovski	Deputy Minister for Environment and Physical Planning and chair of the Project Steering Committee.
Vesna Indova	Head of the department for coordination and technical implementation of IPA, EU Sector, Ministry of Environment and Physical Planning (MOEPP) and National Contact person for UNCCD.
Pier Carlo Sandei	Programme Officer, UN Environment, Regional Office for Europe, Programme Office in Vienna.
Iskra Stojanova	National consultant for coordination of the UNCCD NAP Project.
Jordan Zdravkovski	Head of Forestry and Hunting Department, Ministry of Agriculture, Forestry and Water Economy (MAFWE).
Margarita Cvetkovska	Advisor, Macedonian Information Environmental Center, Ministry of Environment and Physical Planning (MOEPP) and deputy contact person for UNCCD.
Sandra Andovska	Advisor, Cabinet of the Deputy Prime Minister for Economic Affairs, Government of the Republic of Macedonia.
Silvana Stevkova	Head of the sector for climatology and agro-meteorology, National Hydro-meteorological Service.

Contributors

Prof. dr. Nikolco Velkovski	University Ss. Cyril and Methodius – Faculty of Forestry in Skopje.
Prof. dr. Aleksandar Trendafilov	University Ss. Cyril and Methodius – Faculty of Forestry in Skopje.
Dejan Mandjukovski MSc.	Public Enterprise “Macedonian Forests”.
Kosta Parlapanov	Public Enterprise “Macedonian Forests”.
Zlate Bibovski	Public Enterprise “Macedonian Forests”.
Marija Milkova	Crisis Management Center, Republic of Macedonia.
Jeton Kuci	Ministry of Economy.
Kika Spritova	Ministry of Economy.
Fatmir Shaqiri	Advisor for Mineral Resources, Ministry of Economy.
Dragan Jovanovski	Protection and Rescue Directorate of the Republic of Macedonia.
Nina Aleksovska	National Hydro-meteorological Service.
Saska Bogdanova Ajceva	Public Enterprise for State Roads.
Vahit Velija	Ministry of Environment and Physical Planning.
Keljmend Alili	Ministry of Environment and Physical Planning.
Natasha Jovanovska	Ministry of Environment and Physical Planning.
Dejana Todorovska	Ministry of Environment and Physical Planning.
Boris Najdovski MSc.	Balkan Foundation for Sustainable Development, Republic of Macedonia.

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Faculty of Forestry, University Ss. Cyril and Methodius in Skopje

Institute of Economics, University Ss. Cyril and Methodius in Skopje

Faculty of Natural Sciences and Mathematics, University Ss. Cyril and Methodius in Skopje

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Preamble

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LIST OF ACRONYMS

AI Aridity Index

AREC Agency for Real Estate Cadaster

CARDS Assistance for Reconstruction, Development and Stabilization

CBD Convention on Biological Diversity

CLC Capacitive Level Sensor

CMC Crisis Management Centre

COP Convention of Parties

CORINE Coordination of Information on the Environment

CRIC Committee for the Review of the Convention

DFI Direct Foreign Investments

DLDD Desertification, Land Degradation and Drought

DMCSEE Drought Management Centre for South-East Europe

DPSIR Driving forces, pressures, states, impacts, responses

EEA European Environmental Agency

EPA European Partnership Agreement

EU European Union

FAO Food and Agriculture Organization

GAP Good Agricultural Practices

GDP Gross Domestic Product

GEF Global Environmental Facility

GM Global Mechanism

HESI Higher Education Scientific Institutions

IFS Integrated Financial Strategy

IPA Instrument for Pre-Accession Assistance

IUCN International Union for Conservation of Nature and Natural Resources

LEAP Local Environmental Action Plan

LMA Local Municipality Administration

LUCC Land Use and Cover Change

MAFWE - Ministry of Agriculture, Forestry and Water Economy

MES Ministry of Education and Science

MIFF Multi-Annual Indicative Financial Framework

MIPD Multi-Annual Indicative Planning Document

MLS Ministry of Local Self Government

MOEPP - Ministry of Environment and Physical Planning

NAP National Action Plan

NBSAP - National Biodiversity Strategy with an Action Plan

NCSA National Capacity Self-Assessment

NEA National Extension Agency

NEAP National Environmental Action Plan

NFP National Focal Point

NGO Non-Governmental Organization

NHMS National Hydro Meteorological Service

ODA Official Development Assistance

OO Operational Objectives

PACD United Nations Plan of Action to Combat Desertification

P/PET Precipitation/Potential Evapotranspiration

PAM Pedology, Agro-chemistry and Melioration

PE Public Enterprise

PET Potential Evapotranspiration

PRD Protection and Rescue Directorate

PRTR Pollutant Release and Transfer Register

RM Republic of Macedonia

SLM Sustainable Land Management

SOTER Soil and Terrain Database

SPA Spatial Planning Agency

SPI Standardized Precipitation Index

SRAP Sub-Regional Action Program

TPES Total Primary Energy Supply

UN United Nations

UNCCD United Nations Convention to Combat Desertification

UNCED United Nations Conference on Environment and Desertification

UNCOD United Nations Conference on Desertification

UNEP United Nations Environment Program

UNFCCC United Nations Framework Convention on Climate Change

WB World Bank

WMO World Meteorological Organization

BACKGROUND OF NAP DEVELOPMENT

1. BACKGROUND OF NAP DEVELOPMENT

The project "Support to FYR Macedonia for development of National Action Program aligned to the UNCCD 10-Year Strategy and Reporting Process under UNCCD" was initiated through joint efforts of the Ministry of Environment and Physical Planning of the Republic of Macedonia as Global Environmental Facility (GEF) Focal Policy and Operational Point and United Nations Convention to Combat Desertification (UNCCD) Political Focal Point for the Republic of Macedonia, National UNCCD focal point for the Republic of Macedonia and UNEP Vienna Office, with the view of developing a National Action Plan (NAP) for the Republic of Macedonia .

The Project was financed by GEF, while the Ministry of Environment and Physical Planning of the Republic of Macedonia was responsible for coordination of project activities through the National UNCCD focal point.

The aim of this project is to provide support to the Republic of Macedonia in formulation the first National Action Plan (NAP) in accordance with the UNCCD 10-year strategy, resulting in better planning and monitoring of the implementation of the UN Convention on Combating Desertification (UNCCD) at the state level for better decision-making on the issue of desertification, land degradation and drought (DLDD) and sustainable land management.

The project consisted of two components:

A. NAP development in line with the UNCCD 10 - Year Strategy for integration into individual Government sectors in FYR Macedonia

B. Reporting and Review Process related within the framework of the Fifth Reporting and Review Process under the UNCCD Secretariat.

EXECUTIVE SUMMARY

2. EXECUTIVE SUMMARY

The development of the National Action Plan to combat desertification is one of the initial steps of Republic of Macedonia towards implementing the UN Convention to Combat Desertification.

Today, along with the adverse climate change and loss of biodiversity, the land degradation has become one of the major environmental issues challenging the improvement of people's livelihood, food security and sustainable socio-economic development.

The occurrence of more frequent floods and droughts and other disastrous phenomenon are, directly or indirectly, related to severe degradation of land resources.

In the global context, the main causes of land degradation are considered to be the extensive and inappropriate development and use of land resources by human beings, mainly unsustainable agricultural practices, overgrazing, and deforestation.

As they are closely linked with the human's needs for survival including, for example, the demand for food and energy, it is generally recognized that the sustainable socio-economic development could not be achievable without careful consideration of living conditions and interests of local people affected in dealing with the land degradation issues.

Main issues related to desertification in the Republic of Macedonia include: drought and aridity, shortage of irrigation water, water erosion, wind erosion, depletion of soil fertility, unsustainable agricultural practices, deforestation, loss of biodiversity, soil sealing and salinization, flooding, land sliding and socio-economic constraints.

Global challenges such as climate change are a key factor of environmental degradation affecting all development sectors in the Republic of Macedonia. Increased drought risk due to climate change suggests that the country remains highly vulnerable to this global environmental challenge. Just for period from 1987 to 2000 drought and aridity phenomena caused a 50-60 % decrease in crop production in non-irrigated areas. The drought was proclaimed as natural disaster in 1993. The shortage of rainfall and high climatic evaporative demand create water deficiency for normal growth of most crops in rain fed agriculture. In the central (most arid) region of the country it is impossible to grow without irrigation some of the forage crops, cereals and industrial crops. Drought caused about 60 000 ha of riverside forests to vanish.

Increased risk of natural hazards in a changing climate is aggravated by unsustainable agricultural practices and ineffective risk governance. Expansive overexploitation of land resources and poor adaptability of applied agricultural practices along with ineffective risk governance have created an increased and wide-ranging impact of environmental degradation in the Republic of Macedonia related to severe soil fertility decline and reduction in resilience and functional integrity of the ecosystems.

Water resources that provide challenges both related to quality and quantity have been deteriorating rapidly, with severe consequences for all environment and development sectors. However, the most affected sector is agriculture which, in terms of human and economic development, is of vital importance to Macedonia. Increase of frequency of severe droughts, along with the inappropriate soil/water management during the last decades, has promoted a dramatic decline in the resiliency of the agricultural sector.

Increased exposure to land degradation and drought hazard and their translating into a great risk for the Republic of Macedonia can be attributed to high rural vulnerability.
Desertification, land degradation, and drought (DLDD) create a challenging environment for all sectors of development of the Republic of Macedonia.
Taking into consideration high concentration of rural population and weak economic capacity of the most prone areas, improved DLDD risk monitoring and management are critical for supporting sustainable development and poverty reduction in the Republic of Macedonia.
The prevention of land degradation and implementation of rational and sustainable management of land resources could be achieved with success if the processes involve the partnership and collaboration among all stakeholders concerned.
In this context, the National Action Plan (NAP) to combat desertification in the Republic of Macedonia have been developed through the process of active participation from, and close collaboration among, relevant government bodies, scientific institutions, universities and nongovernmental organizations. During the preparation of the NAP, high level of participation of all relevant stakeholders was secured through stakeholder consultative meetings.
It is supported by the comprehensive biophysical and socio-economic baseline information, and identifies the factors contributing to the process of desertification in Macedonia and suggests measures and strategy, using and integrated and coordinated bottom-up approach to combat desertification and mitigate the effects of drought.
At the same time, the national action plan presents the strategic options and activity programs for the implementation of UN Convention to Combat Desertification (UNCCD) in the Republic of Macedonia and will be regularly updated in the process of its implementation in integrated manner with other country's sustainable development strategy and action plans.

INTRODUCTION

3. INTRODUCTION

3.1. UNCCD Background and NAP

Desertification has been a subject of global concern since long. It is estimated that over 250 million peoples are affected directly and with over one billion people are at a risk. Desertification results from complex interactions among physical, chemical, biological, socioeconomic and political problems that were local, national and global in nature. Realizing this, the international community recognized it as a major economic, social and environmental problem.

The formal expression of global concern on desertification starts in late seventies. Initially in 1977, a United Nations Conference on Desertification (UNCOD) was convened in Nairobi, Kenya, which came up with the United Nations Plan of Action to Combat Desertification (PACD).

However, the implementation of PACD is far from satisfactory. Assessments made in 1984, 1987 and 1989 by UNEP indicated that desertification continued to spread. Also, the UN Commission for Sustainable Development Report 1988 observed that desertification had become one of the most serious environmental and socio-economic problems of the world. The World Atlas of Desertification indicates that over the preceding 20 years, the problem of land degradation had continued to worsen (UNEP 1992). The UN Conference on Environment and Development (UNCED) also highlighted the problem of desertification and recommended that the United Nations General Assembly should establish an Intergovernmental Negotiating Committee (INCD) to prepare a Convention to Combat Desertification in those countries experiencing serious drought and/or desertification, particularly in Africa.

As a follow up action, a committee was established in early 1993 and developed the text of the Convention. The Convention was opened for signature on 14-15 October 1994. The UNCCD entered into force on 26 December 1996, 90 days after the fiftieth instrument of Ratification or Accession was deposited. Over 196 countries were Parties as at December 2016. The Conference of the Parties (COP) is the supreme governing body of the Convention.

3.2. UNCCD Approach for NAP Preparation

Countries affected by desertification are implementing the Convention by developing and carrying out national, sub-regional, and regional action programs. Criteria for 'preparing these programs are detailed in the treaty's - five "regional implementation annexes": Africa (considered a priority because that is where desertification is most severe), Asia, Latin America and the Caribbean, the Northern Mediterranean, and Central and Eastern Europe. Drawing on past lessons, the Convention states that these programs must adopt a democratic, bottom-up approach. They should emphasize popular participation and the creation of an "enabling environment" designed to allow local people to help themselves to reverse land degradation. Of course, governments remain responsible for creating this enabling environment. They must make politically sensitive changes, such as decentralizing authority, improving land-tenure systems, and empowering women, farmers, and pastoralists. They should also permit non-governmental organizations to play a strong role in preparing and implementing the action programs. In contrast to many past efforts, these action programs are to be fully integrated into other national policies for sustainable development. They should be flexible and modified as circumstances change.

The Convention's action programs are being developed through consultations among affected countries, donors, and intergovernmental and non-governmental organizations. This process will improve coordination and channel development assistance to where it can be most effective. It will also produce partnership agreements that spell out the respective contributions of both affected and donor states and of international organizations. Developed countries are expected to encourage the mobilization of substantial funding for the action programs. They should also promote access to appropriate technologies, knowledge, and know-how. The need for coordination among donors and recipients is stressed because each program's various activities need to be complementary and mutually reinforcing.

The Convention opens an important new phase in the battle against desertification, but it is just a beginning. In particular, governments are regularly reviewing the action programs. They also focus on awareness-raising, education, and training, both in developing and developed countries.

Desertification can only be reversed through profound changes in local and international behavior. Step by step, these changes will ultimately lead to sustainable land use and food security for a growing world population. Combating desertification, then, is really just part of a much broader objective: the sustainable development of countries affected by drought and desertification.

The Convention will be implemented through action programs. At the national level, the program will address the underlying causes of desertification and drought and identify measures of preventing and reversing it. National programs will be complemented by sub-regional and regional programs, particularly when trans-boundary resources such as lakes and rivers are involved. Action programs are detailed in the five regional implementation annexes to the Convention -- Africa, Asia, Latin America and the Caribbean, the Northern Mediterranean, and Central and Eastern Europe.

The purpose of NAPs is to identify the factors that contribute to land degradation as well as practical measures needed to curb it and mitigate the effects of drought. NAP should establish adequate roles of government, local communities and land users as well as necessary and available resources. Among other things, NAP also:

- develops a long-term strategy to curb land degradation and mitigate the effects of drought as well as an implementation plan, and it is integrated in the national sustainable development policies;

- enables alterations to address any changes that may occur and, at the local level, it is flexible enough to deal with various socio-economic, biological and geo-physical conditions;

- pays specific attention to implementation of preventive measures for undegraded or slightly degraded land;

- improves national climatological and hydro-meteorological capacities and drought-related early warning resources;

- promotes policies and strengthening of institutional framework that develop partnership-based cooperation and coordination between donors, governments at all levels, local population and community, and facilitates public access to adequate information and technology;

- ensures effective participation of non-governmental institutions and local population, both men and women, beneficiaries of the resources in particular, including farmers and stockbreeders and organizations representing them, in policy planning and decision-making processes as well as in the implementation and review of APs at the local, national and regional levels; and

- requires regular reviews and reports on their implementation.

AP to combat land desertification/degradation describes general guidelines and mechanisms that should be taken into consideration in the future. At the same time, AP does not state concrete measures that should be undertaken in every specific case, as many of them require a consistent scientific review.

3.3. UNCCD Strategy and Strategic Objectives

The Convention aims to promote effective action through innovative local programs and supportive international partnerships. The treaty acknowledges that the struggle to protect drylands will be a long one - there will be no quick fix. This is because the causes of desertification are many and complex, ranging from international trade patterns to unsustainable land management practices.

Developed as a result of the Rio Summit, the United Nations Convention to Combat Desertification (UNCCD) is a unique instrument that has brought attention to land degradation in the dry lands where some of the most vulnerable ecosystems and people in the world exist. Ten years after its coming into force, the UNCCD benefits from universal membership and is increasingly recognized as an instrument which can make a lasting contribution to the achievement of sustainable development and poverty reduction globally. The goal is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability.

At Conference of the Parties (COP8), held in Madrid in September 2007, the Parties to the Convention adopted the 10-year strategic plan and framework to enhance the implementation of the Convention for 2008-2018 (The Strategy). The Strategy contains the “strategic objectives” to be achieved over the 10 years, and the “operational objectives” that guide the actions of short and medium-term effects.

The COP decision on The Strategy (Decision 3/COP.8) requests the Parties to operationalize the implementation of The Strategy, inter alia, by addressing the outcomes under the five operational objectives outlined in the same.

Further, Parties are requested to report on progress made with their implementation of the Strategy, while the Committee for the Review of the Convention (CRIC) is given the responsibility of reviewing its implementation based on the reports by Parties, as well as those from other reporting entities.

As a full-fledged UNCCD member, the Republic of Macedonia took the commitment to ensure implementation of the Strategic Plan and Framework to Enhance the Implementation of the UNCCD 2008-2018, in its strategic and planning documents, both at the state and local level.

<u>The vision behind the 10-year Strategic plan is outlined in the same as follows:</u>

The aim for the future is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability.

The strategic objectives are:

- **Strategic objective 1:** To improve the living conditions of affected populations
- **Strategic objective 2:** To improve the condition of affected ecosystems
- **Strategic objective 3:** To generate global benefits through effective implementation of the UNCCD
- **Strategic objective 4:** To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors

The "strategic objectives" listed above will guide the actions of all the UNCCD stakeholders and partners in the period 2008–2018, including the enhancement of political will. The achievement of these long-term objectives will contribute to the above vision. The expected impacts are the long-term effects of the strategic objectives.

The mission of the 10-year Strategic Plan is as follows:

To provide a global framework to support the development and implementation of national and regional policies, programs and measures to prevent, control and reverse desertification/land degradation and mitigate the effects of drought through scientific and technological excellence, raising public awareness, standard setting, advocacy and resource mobilization, thereby contributing to poverty reduction.

The Operational Objectives which are to support the attainment of the vision and Strategic Objectives of The Strategy are:

A. Operational objective 1: Advocacy, awareness raising and education
B. Operational objective 2: Policy framework
C. Operational objective 3: Science, technology and knowledge
D. Operational objective 4: Capacity-building
E. Operational objective 5: Financing and technology transfer

The "operational objectives" listed above will guide the actions of short and medium term effects of all the UNCCD stakeholders and partners supporting the achievement of the above vision and strategic objectives. The results/outcomes are short and medium term effects of the operational objectives.
In this regard, each Party is required to submit annual reports to show its contribution to the achievement of the Convention objectives through the implementation of NAP. For the reporting purposes, there is a defined set of performance indicators.

3.4. UNCCD Implementation in the Republic of Macedonia

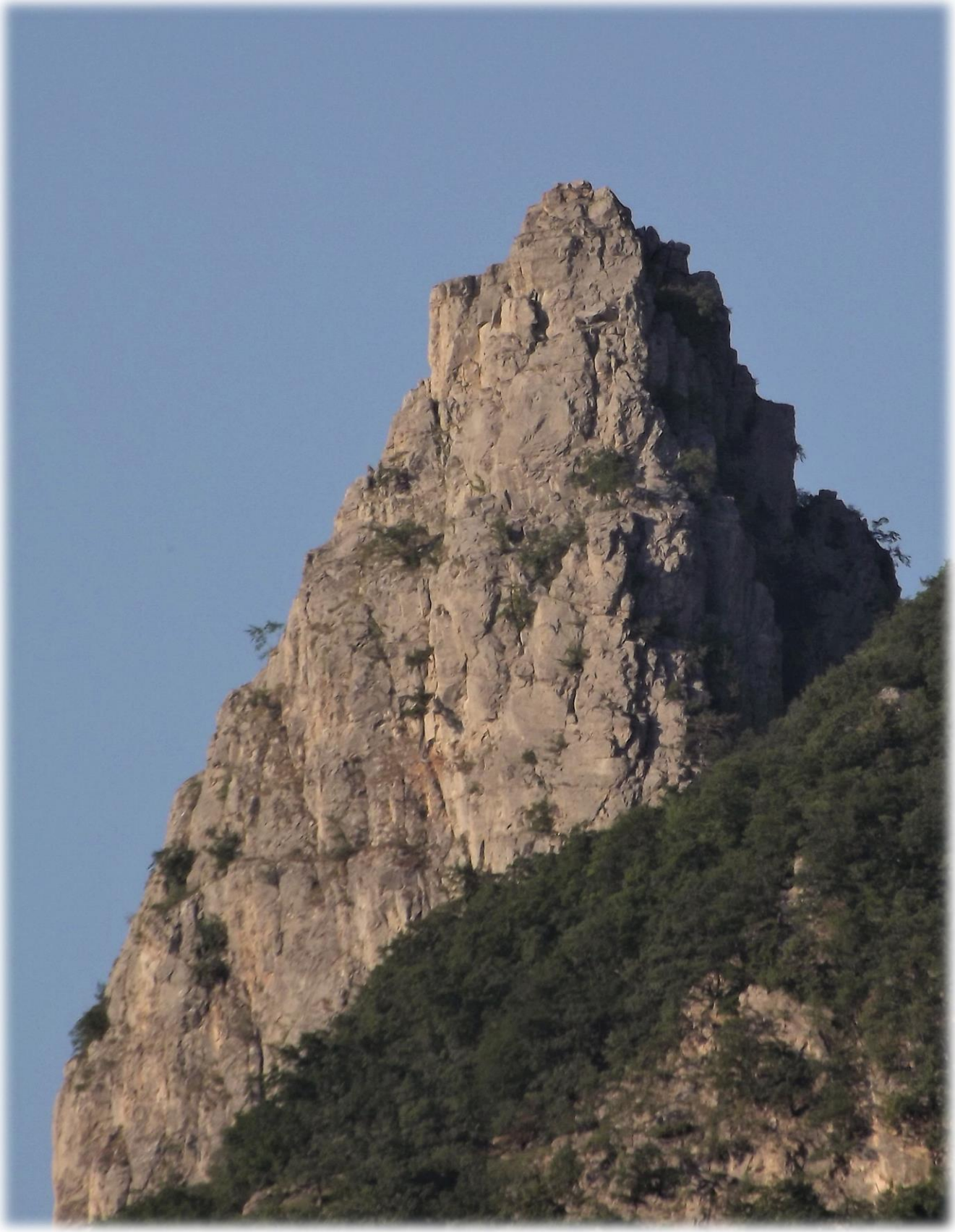
Republic of Macedonia has ratified the UN Convention to Combat Desertification in 2002 by the Law for ratification ("Official Gazette'' No.13/2002) and since then has made several important steps towards the implementation of the Convention. In 2006, Republic of Macedonia submitted its First UNCCD National Report which was a result of joint efforts of several state institutions. Following reports were submitted in 2010, 2012 and 2014 within the frame of the UNNCD reporting cycles. The next reporting cycle is in 2018.

The need of developing NAP to combat land degradation and to integrate it into the National Development Strategy, Poverty Reduction Strategy Paper and other UNCCD related strategies and documents was pointed out in the First National Report on the Implementation of UNCCD in Macedonia, as one of the urgent measures for solving the land degradation issues.

The Law on Environment, ("Official Gazette'' No.53/2005) contains the fundamental environmental protection principles, which provide a basis for determining procedures for environmental management.

Chapter XIX ''Sustainable Development and Global Environmental Issues", of the Law, more specifically, Articles 191, 192 and 193 on National Plan for Combating Desertification and Mitigating the Effects of Drought, Action Program for Combating Desertification and Mitigating the Effects of Drought and Implementation of the National Plan and Reporting on the Implementation describe the required activities to be undertaken for the purpose of combating desertification and mitigation of drought effects and outputs from developed National Action Program. The Articles were developed in accordance with the principle of international cooperation, the principle of integrity and in accordance with the objectives of national social and economic development.

METHODOLOGY



4. METHODOLOGY

4.1. NAP Development Process

The project "Support to FYR Macedonia for development of National Action Program aligned to the UNCCD 10-Year Strategy and Reporting Process under UNCCD" was implemented in Macedonia in accordance with the methodology suggested in a set of UNCCD guidelines. The Methodology consists of 10 simple and practical steps that should be taken in order to successfully develop a NAP and align it with UNCCD 10-Year Strategy.

Pursuant to the above-mentioned guidelines, the project framework was defined on several levels, both in terms of project management and project implementation, and implemented through two components:

A. Development of the NAP in line with the 10-Year Strategy
B. Reporting and Review Process

In accordance with the UNCCD Secretariat guidelines and 10 practical steps for the implementation of NAP, NAP development had 5 phases:

I. **Inception** – organization of the administrative, management and advisory arrangements for the Project and preparation of a work plan;
The inception phase included formation of a team of experts hired for the purpose of NAP development, preparation of a work plan and proposed NAP content.

II. **Data colleting phase** – complete situation analysis, an "inventory" of the existing data and completed activities;
In addition to data collection, this phase included a successful completion of an analysis and assessment of political, institutional, financial and socio-economic triggers of land degradation and obstacles for sustainable land management, which were used as a basis for a review of land pressures by sectors.

III. **Thematic Assessments** – evaluation and analysis of commitments arising out of the international agreement and the activities carried out by Macedonia so far under the Convention;
This phase included assessment and analysis of present commitments of Macedonia under UNCCD.

IV. **Cross-Cutting Analysis** – assessment of capacities, needs and possibilities in relation to the duties of defined priority thematic areas;
This phase assessed institutional, scientific, human and legislative resources/capacities for land management.

V. **Action Plan** – relies on estimates given by thematic assessments and cross-cutting analyses for the purpose of identification of capacity development plans and activities that are necessary in accordance with the Strategic and Operative Objectives of the 10-year UNCCD Strategy.
The established pressures on land by sectors, and cross-cutting analysis were used to develop an action plan. The Action Plan indicates defined priorities in the area of sustainable land management, and possible sources of funding for defined actions and measures.

VI. **NAP Adoption** – after NAP has been reviewed by relevant stakeholders and Strategic Environmental Assessment (SEA) is being elaborated it should be submitted for adoption by the Government of the Republic of Macedonia.

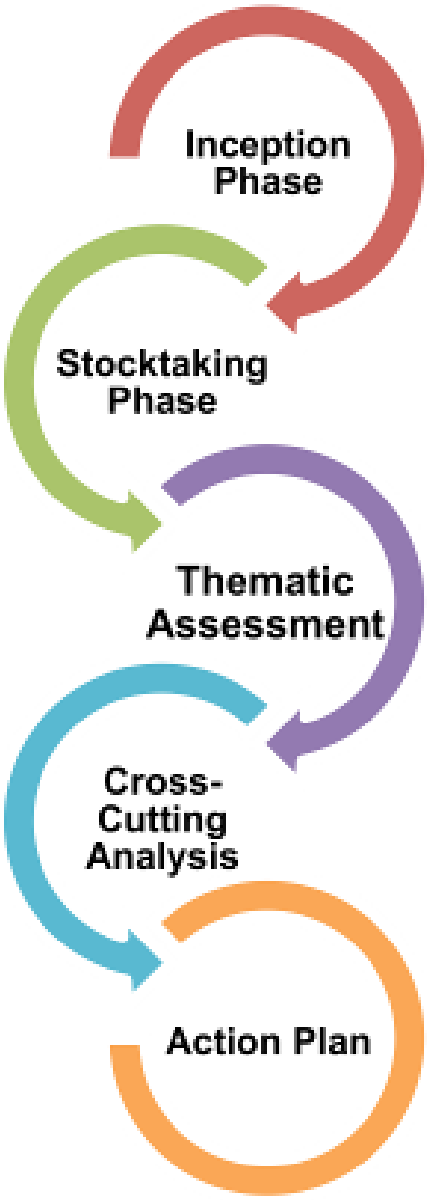


Figure 1 -NAP development implementation approach

The Action Plan Implementation will establish the basis for UNCCD reporting and thus facilitate achievement of the basic objectives defined in the UNCCD Strategy.

4.2. Implementation Structure

UNEP was the Implementing Agency for this GEF funded project and in its role provided project oversight to ensure that GEF policies and criteria are adhered to and that the project meets its objectives and achieves expected outcomes in an efficient and effective manner.

The Ministry of Environment and Physical Planning of the Republic of Macedonia undertook responsibility for the execution of the project in accordance with the objectives, activities and

budget and deliver the outputs and demonstrate its best efforts in achieving the project outcomes. It has also coordinated the activities through the National UNCCD Focal Point.
The Steering Committee (SC) of the Project „Support to FYR Macedonia for Development of Action Programs in compliance with the UNCCD 10-Year Strategy and Reporting Process under UNCCD" (PSC) included representatives of the different institutions and specialists. The SC supervised the work of the hired Team of Experts throughout, reviewed and approved the Work Plan, monitored the developments and deadlines for certain activities, provided its contribution to workshop planning and organization, ensuring elaborate consultations with all relevant stakeholders (government and non-governmental) during the entire NAP development process.
As for the NAP preparation, the Project hired two Coordinators for the NAP development process, who monitored the Project activities and had the roles of implementation supervisors at the AP development level. In addition to the two Coordinators, a local coordination body, in form of civil society association, was engaged and it had the task to provide technical assistance for the Project implementation activities.

The project was implemented through an established partnership and cooperation with all relevant government bodies, national and international institutions and entities, which supports successful preparation and will support future implementation of the NAP.

GENERAL DATA ON THE COUNTRY

5. Administrative, political and socioeconomic characteristics of the Republic of Macedonia

5.1. Location

Macedonia is a landlocked country located in the central part of the Balkan peninsula with area of 25 713 km^2. It is bordered by Serbia and Kosovo to the north, Bulgaria to the east, Greece to the south, and Albania to the west (Annex I).

5.2. Administrative and Political situation

The Republic of Macedonia is a democratic parliamentary republic, as stipulated in the Constitution. The Government system has two levels – State (central) and Local self-government. The responsible Ministry for the elaboration and implantation of this NAP is the Ministry of Environment and Physical Planning (MOEPP) in cooperation with the Ministry of Agriculture, Forestry and Water Economy (MAFWE).

The Local self-government system consist of 80 municipalities. Ten (10) of the municipalities constitute the City of Skopje, a distinct unit of local self-government and the country's capital.

According the Nomenclature of Territorial Units for Statistics (NUTS) on the NUTS 1 and NUTS 2 level, the Republic of Macedonia counts as a single region. On NUTS 3 level, the country territory is divided in 8 statistical regions: Vardar, East, Southwest, Southeast, Pelagonia, Polog, Northeast and Skopje (Figure 2).

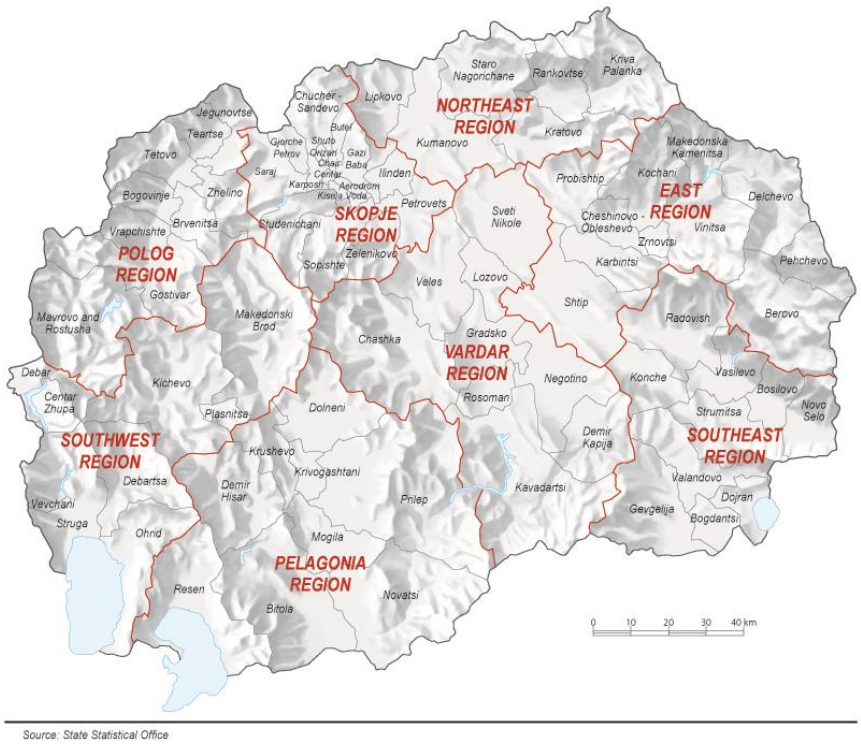


Figure 2. Position and NUTS3 in the Republic of Macedonia

5.3. Population

According to the last census held in 2002, the total population of Macedonia was 2.022.547, while the population density was 78.66 inhabitants/km^2. The latest available assessment of the State Statistical Office indicated that the population of the country grew to 2.064.032 in 2013, while population density was 80.3inh/km^2. Almost 1/3 of the population in the Republic of Macedonia has been concentrated in the Skopje resulting into almost 10 times higher density of the population compared to the least populated Vardar region.

5.4. Main macroeconomic indicators

The main macroeconomic indicators show certain recovery of the economy in the last decade (2003-2013), with particularly high rates of GDP growth up to the start of the global economic crisis in 2008 when country GDP significantly declines (Table 3), but is still higher than the average of EU27. However, the positive trend in GDP does not mean that the overall financial situation in the country is favorable. The country is lagging far behind the EU with GDP per capita of about 30%, compared with the EU 27 average.

Table 1 - GDP growth rate in the Republic of Macedonia

GDP growth rate	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
R. of Macedonia	2,5	4,3	4,1	4,9	6,0	4,8	-1,1	2,7	2,6	-0,4	3,1
EU 27	1,0	2,1	1,6	2,9	2,8	-0,1	-4,6	1,7	1,3	n.a	n.a.

Source: State Statistical Office of the Republic of Macedonia

The Country has suffered from serious economic hardship during the 1990s, which left serious economic consequences, visible through high rate of unemployment and insufficient level of investment.

The rate of unemployment has been constantly over 30% in the first decade of 21st century. Certain decrease can be noted in the past few years, as the unemployment dropped up to 28.6%. Although decreasing, this is still alarmingly high unemployment rate. On regions level, Northeast region shows extremely high unemployment rate of 44.9% in 2013, followed by Southwest region (36.7%) and Polog region with 33.6% in 2013.

Table 2 - Major development indicators of the planning regions in Macedonia (2012-2013)

Region	GDP (in million Euro) in 2013	Share in national GDP creation for 2013 (in%)	GDP per capita (in euros) in 2013	Share in total value added in industrial sector (covering quarrying and energy) in 2012	Share in total value added in agriculture, fishery and forestry in 2012	Unemployment rate in 2013	Share in gross capital formation in 2012	Transport infrastructure (local roads in km) in 2013
Macedonia	7359.8	100.0	3565.7	100.0	100	28.6	100.0	9471
Vardar	580.8	7.9	3784.3	11.2	12.1	29.8	4.5	1005
East	593.5	8.1	3329.2	14.9	10.7	19.5	5.2	1187
Southwest	564.6	7.7	2562.7	8.0	14.1	36.7	4.7	1278
Southeast	575.7	7.8	3320.4	6.4	10.9	18.8	4.3	888
Pelagonia	798.9	10.6	3438.3	19.1	14.5	22.2	9.1	1211
Polog	505.6	6.9	1590.1	4.5	12.4	33.6	8.3	1483
Northeast	430.2	5.8	2448.1	3.4	12.1	44.9	2.3	1035
Skopje	3310.5	44.9	5404.8	32.5	13.2	29.3	61.6	1384

Source: Regional statistic database, State Statistical Office of the Republic of Macedonia (http://www.stat.gov.mk/pxweb2007bazi/Database/Статистика%20по%20региони/databasetree.asp)

The other economic indicators presented in Table 2 outlines certain development disparities among the regions. For instance, Skopje region participates with 44.9% in the creation of total GDP in the country in 2013, while the share of this region in the industrial production (including mining and energy) has been 32.5%. Implicitly, the GDP per capita in Skopje region has been over 3 times higher compared to the least developed region (in terms of GDP per capita) – Polog region. Opposite to that, different distribution of the share with regards to the agricultural activities has been noted among the regions, as Pelagonia and Southwest region participate with over 14% each, while Skopje region has share of about 13%.
It should be noted that agriculture does not contribute significantly to the economic growth of the regions. This is result to the relatively low share of this sector in the total GDP, and the declining trend in recent years.

5.5. Social inclusion and poverty

The economic situation in the Republic of Macedonia is also reflected through the social indicators. According to the latest available State Statistical Office (SSO) data on poverty, the percent of people at the risk of poverty was 27.1% (out of total) in 2011, measurement based on 60% of median equivalent expenditures (Laeken indicators). The inequality of income distribution in the country, measured through the S80/S20 quintile ratio of income was 12 in 2011, meaning that the income of richest 20% of the population was 12 times higher than the income of the poorest 20%. The same indicator for EU 27 was 5.1 in 2011. In addition, the

inequality according to the Gini coefficient for the Republic of Macedonia was 39.2% in 2011, confirming the inequality of income distribution in the country.
According to the SSO data for 2011, particularly high was the rate of people at risk of poverty before social transfers and pensions, amounting up to 47.1%. The rate of the people after social transfers dropped to 27.1%, indicating the dependence of the many households from the social assistance and pensions. As expected, the unemployed persons were at highest risk of poverty with share of 48.7% out of the total, while poverty has been mostly located at young population (age 0-17) with share of 35.6% out of total. Provided that this category belongs to the dependents in the households, many of them live in the families without employed persons and depending on social benefits.

5.6. Legal and institutional framework related to DLDD

Out of the numerous legal acts, plans, strategies and institutions, only the most relevant items are listed here below:

5.6.1. Legal framework

Nature and Environment:

- Law on Environment ("Official Gazette of the Republic of Macedonia" no. 53/05, 81/05, 24/07, 159/08, 48/10, 124/10, 51/11, 123/12, 93/13, 187/13 and 42/14)
- Law on Nature Protection ("Official Gazette of the Republic of Macedonia" no. 67/04, 14/06, 84/07, 35/10, 47/11, 148/11,59/12, 13/13, 163/12 and 41/14)

Water management

- Law on Waters ("Official Gazette of the Republic of Macedonia" no. 87/08, 6/09, 161/09, 83/10, 51/11, 44/12, 23/13 and 163/13)
- Law on Water Management ("Official Gazette of the Republic of Macedonia" no. 85/03, 95/05,103/08, 1/12 and 95/12)
- Law on Water Communities ("Official Gazette of the Republic of Macedonia" no. 51/03, 95/05, 113/07 and 136/11)
- Law on Inland Waterways ("Official Gazette of the Republic of Macedonia" no. 55/07, 26/09, 22/10, 23/11, 53/11, 155/12, 15/13, 137/13, 163/13 and 42/14);
- Law on Drinking Water Supply and Urban Waste Water Treatment ("Official Gazette of the Republic of Macedonia" no. 68/05, 28/06, 103/08, 17/11, 54/11 and 163/13);

Agriculture and fisheries:

- Law on Organic Agriculture ("Official Gazette of the Republic of Macedonia" no.146/09, 53/11)
- Law on Quality and Safety of Fertilizers, bio-Stimulators and Improvers of Soil Characteristics ("Official Gazette of the Republic of Macedonia" no. 27/14)
- Law on Agricultural Land ("Official Gazette of the Republic of Macedonia" no. 135/07, 18/11, 148/11, 95/12, 79/13, 87/13, 106/13, 164/13 and 39/14)
- Law on Agriculture and Rural Development ("Official Gazette of the Republic of Macedonia" no. 49/10, 53/11, 126/12, 15/13, 69/13 and 106/13).

Forestry and Hunting:

- Law on Forests ("Official Gazette of the Republic of Macedonia" no. 64/09,24/11, 53/11, 25/13, 79/13, 147/13 and 43/14)
- Law on Reproductive Material of Forest Trees ("Official Gazette of the Republic of Macedonia" no. 55/07 and 148/11)

Other related legislation

- Law on Spatial and Urban Planning ("Official Gazette of the Republic of Macedonia" no. 51/05, 137/07, 24/08, 91/09, 124/10, 18/11, 53/11, 144/12, 55/13, 163/13 and 42/14)
- Law on Hydro-meteorological service ("Official Gazette of the Republic of Macedonia" no.103/08,115/08 and 53/11,)

- Law on firefighting Service ("Official Gazette of the Republic of Macedonia" no.67/04, 81/07 and 55/13)
- Law on Crises Management ("Official Gazette of the Republic of Macedonia" no.29/05, 36/11 and 47/14)
- Law on Protection and Rescue ("Official Gazette of the Republic of Macedonia" no.36/04, 49/04, 86/08, 124/10, 18/11 and 41/14)
- Law on Mineral Resources ("Official Gazette of the Republic of Macedonia" no. 136/12, 25/13, 93/13 and 44/14)
- Law on Local Self-Government ("Official Gazette of the Republic of Macedonia" no. 5/02)

5.6.2. Most relevant National Strategies/National plans/ Other plans

- National Strategy for Sustainable Development of the Republic of Macedonia 2009-2030
- National Water Strategy, 2011-2041
- National Strategy for Biodiversity Protection and Action Plan (new under preparation)
- National Strategy for Agriculture and Rural Development 2014-2020
- National Strategy for Consolidation of Agricultural land 2012-2020
- National Strategy for Sustainable Forestry Development (NSSFD), 2006-2026
- Waste Management Strategy of Republic of Macedonia (2008-2020)
- Third National Communication on Climate Change – 2014
- Spatial Plan of RM, 2002-2020

5.6.3. Institutional framework

5.6.3.1. Governmental institutions responsible for NAP implementation

- Ministry of Environment and Physical Planning (MOEPP)
- Ministry of Agriculture, Forestry and Water Economy (MAFWE)
- Ministry of Education and Science
- Ministry of Local Self-Governments
- National Extension Agency (NEA)
- Agency for financial support of agriculture and rural development (AFSARD)
- Agency for Real Estate Cadastre (AREC)
- Spatial Planning Agency (SPA)
- Crisis Management Centre (CMC)
- Protection and Rescue Directorate (PRD)

5.6.3.2. *Local Self-government*

- Municipalities

5.6.3.3. *Public and other Institutions*

- Universities
- Public enterprise "Macedonian Forests" (PEMF)
- Water economies
- Private companies,
- Individual farmers and private forest owners,
- Civil Society Organizations.

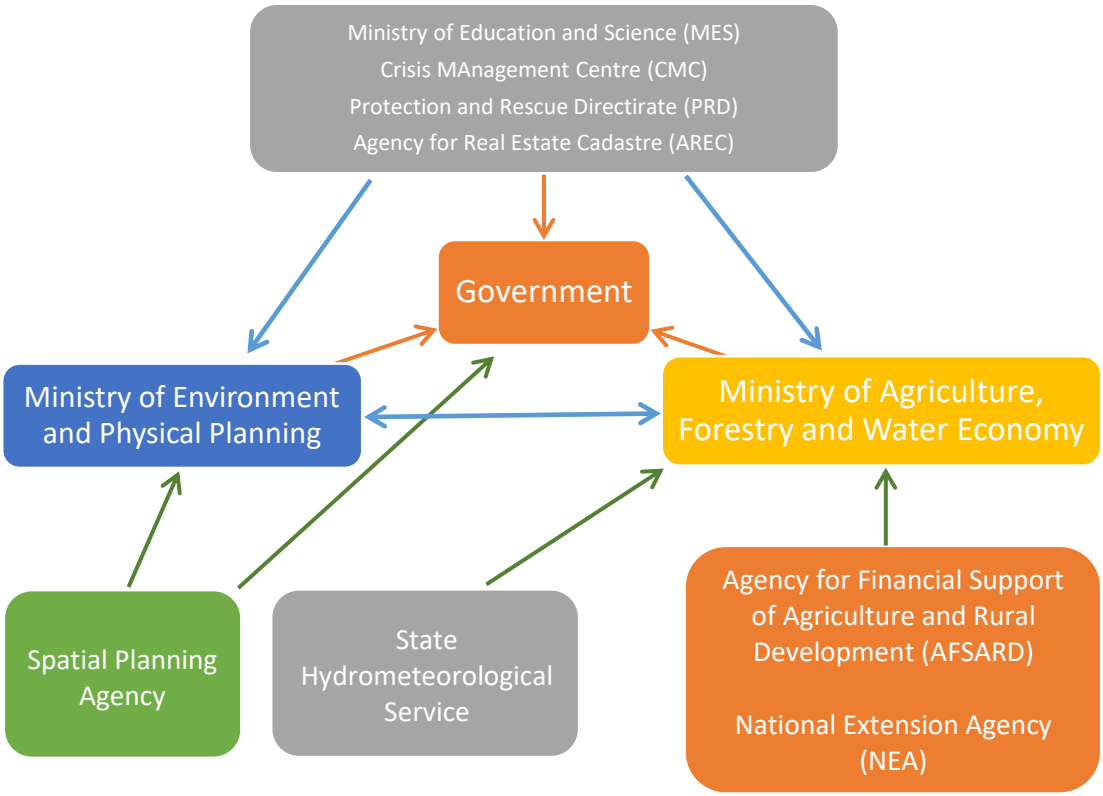


Figure 3 – Intersectional institutional Organogram

LAND DEGRADATION IN THE REPUBLIC OF MACEDONIA

6. Natural Factors that contribute to DLDD

6.1. Topography

Large and high mountainous massifs characterize the country's topography. The average elevation is 829,7 m above sea level. Mean slope is 15,1° (33,56%). Country has 14 mountain peaks higher then 2 000 m. The highest peak, the 2 764 meter-high Golem Korab is situated on the Albanian border. The slope in the valleys is gentle, but on the mountains, there is very steep slope (more than 30%). The lowest point of the country (40 m a.s.l.) is situated on the border with Greece.
A wide variety of relief types exists in Macedonia.
Great relief forms like: mountains, valleys, and gorges are mixed with smaller relief forms with paleo-relief, abrasive, glacial, and karst relief forms.

6.2. Geomorphology, Geology, Petrography, Soils and DLDD

6.2.1. Geomorphology and Geology

The Republic of Macedonia can be divided into four geotectonic regions: the Serbian-Macedonian massif, the Povardarie area, the Pelagonia massif and the Western Macedonia zone. All geotectonic zones are characterised with diverse landforms and processes that shape them.

6.2.2. Petrography

Numerous different geological formations, which differ with their age, mineralogical and petrologic composition on small distances, predefine the high heterogeneity of the soil cover. Although, very heterogeneous the geological formations in the mountainous regions, seriously differ from those in valleys. (Geology map – Annex I -1). The mountainous region is generally composed of compact (solid) rocks with eruptive or metamorphic origin. Only a small part of our mountains consists of clastic (loose and weakly connected) sediments. Valleys are mainly filled with clastic mechanical sediments.
This lithographic variability in combination with the relief have a strong influence on soil formation and its further resilience or vulnerability to various types of land degradation.

6.2.3. Soil conditions

There are several major factors which have the crucial influence on soil formation processes, e.g. geology, relief, vegetation, climate and human impact. Each of these factors determines the direction of soil genesis and the intensity of pedogenetic processes. As a result, a different soil types are formed with very variable chemical physical and mechanical properties. Changing of one of these soils forming factors coupled with human activities e.g. agriculture, industry, solid waste management and destroying of natural vegetation influence the appearance of different processed of land degradation processes and its intensity.
Certain soil types have different sensitiveness to various types of degradation which is related to their location, parent material, vegetation and use, but in terms of human induced and human accelerated degradation processes all soil types can be affected with various types of soil degradation (Soil map – Annex I -2, Soil distribution – table 1, Annex I). Most dominant soil types in the **mountainous regions,** are: *Leptosols*, Regosols, *Chromic leptic luvisols on hard limestone,* and *Cambisols.*
On the **lake terraces and hilly relief** forms, the following soil types covers the majority of the area: *Regosols, Leptosols Rendzinas*, Chromic luvisols on saprolite. Significant areas of the hilly reliefs are under Delluvial soil and small areas are under Chernozems and Albic luvisols.

In the **plains,** are mostly covered with *Fluviatile soils,* Molic fluvisols, and Gleysosl. Very small areas are covered with Histosols.

6.3. Hydrography and water resources and DLDD

Country territory falls within following four catchment areas: Vardar, Crn Drim, Strumica, and Juzna (South) Morava. The area of Vardar and Strumica catchments gravitate towards Aegean Sea, Crn Drim catchment towards Adriatic Sea, and Juzna Morava catchment towards Black sea. The Vardar river catchment is estimated at 80.4 % of the country territory. The Strumica catchment area covers an area of 6.5 % of the total territory of Macedonia, Crn Drim catchment covers almost 13,0 %, while Juzna Morava catchment is only 44 km^2 (or 0.2%).

Figure 4 - *Major river basins*

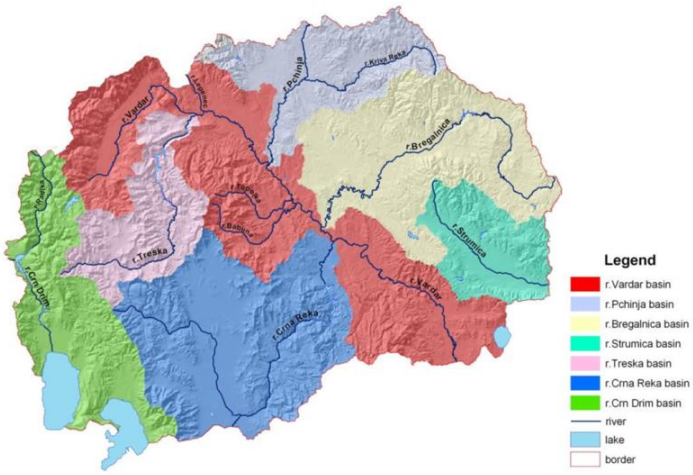


Figure 5 - *Major sub-basins*

Total water resources of the country are estimated at 6,37 billion m^3 in a normal year and 4,80 billion m^3 in a dry year, out of which 80% are carried within River Vardar catchment.

6.3.1. Hydrological monitoring network

State Hydrometeorological Service is responsible institution for hydrological monitoring. The hydrological monitoring network consists of:
Surface Water Station
-Water level (H) – 110 Stations, 60% operational; -Discharge (Q) – 35 Stations,
-Water Temperature (T) – 15 stations operational; -Suspended Sediments (S) – 13 stations;
Ground Water Stations
-Water level (H) -115 Stations, 33% operational, -Water Temperature (T) – 10 Stations.
(Maps Annex I – 3)

6.4. Climate (temperature, precipitation) and DLDD

6.4.1. Climatological monitoring

Responsible institution for measurement, collecting and managing meteorological and hydrological data is the Hydrometeorological Service (HMS) established in 1947. Systematic observation of surface water quality has been performed since 1964, while monitoring network on air quality dates from 1974.
Meteorological network in the country is permanently reduced in the past few decades. The National Meteorological Network currently consists of 14 main stations, 16 climatological stations, 150 precipitation stations and 24 phenological stations, (Annex I-4) The availability of historical meteorological data are available upon request and are very costly. Yearly and periodical publications foreseen by the law are not published regularly. Moreover, an transparent and public available hydro meteorological information system foreseen by the law is still not operative.

6.4.2. Climatic elements

Climate exerts a strong influence over vegetation type, biomass production and diversity. Precipitation and temperature determine the potential distribution of terrestrial vegetation and constitute the principal factors in the genesis and evolution of soil.
In general, high temperatures and low precipitation lead to poor organic matter production and rapid oxidation, particularly of soil organic matter (SOM). Low soil organic matter leads to poor aggregation and low aggregate stability leading to a high potential for erosion, due to what, about 36,5% of the total land is prone to higher erosion hazard.
Severity, frequency, and extent of erosion are likely to be altered by changes in rainfall amount and intensity and changes in wind. Land management will continue to be the principal determinant of the soil organic matter content and susceptibility to erosion and other forms of land degradation during the next few decades.
Climatic stresses can highly influence processes of land degradation. These climatic stress include: *high soil temperature, seasonal shortage of water, short duration of low and long duration of very high temperature, and extended drought.*

Rainfall is the most important climatic factor in determining areas at risk of land degradation and potential desertification. Rainfall plays a vital role in the development and distribution of plant life, but the variability and extremes of rainfall can lead to land degradation. If unchecked for a period of time, this land degradation can lead to desertification.

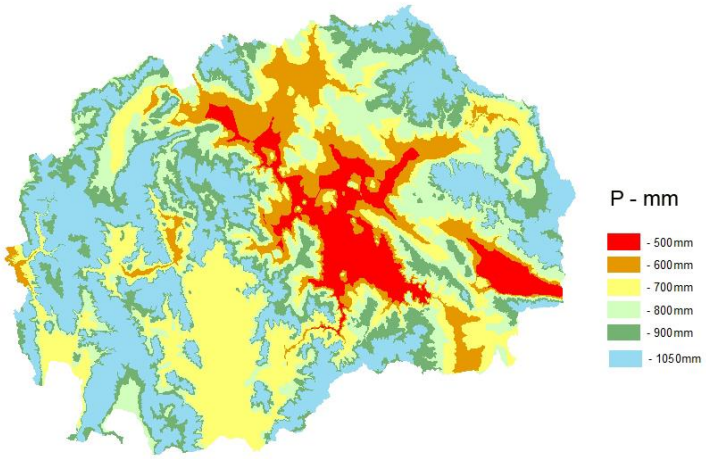


Figure 6 - *Yearly rainfalls for R. of Macedonia (1951-2000)*

The precipitation in the country is inherently variable in amounts and intensities and so is the subsequent runoff. Surface runoff is often high due to the tendency of dry land soils to form impermeable crusts under the impact of intense thunderstorms and in the absence of significant plant cover or litter. The sparser the plant cover, the more vulnerable the topsoil is to dislodgement and removal by raindrop impact and surface runoff.
Mean annual rainfall accumulation in Macedonia is slightly higher than 700 mm. However there is large region with precipitation below 500 mm or slightly above 500 mm (Table 2- Annex – II).

Solar radiation, temperature and evaporation are climate factors that highly influence land degradation and desertification processes. Solar radiation is highly correlated with cloudiness, and in most areas where there are little or no clouds, solar radiation can be quite intense.
Along with rainfall, temperature is the main factor determining climate and therefore the distribution of vegetation and soil formation.
According the available historical data, both decades, 1991-2000 and 2001-2010 were hotter than average 1951-1990. The temperature in the country is increasing, particularly in the southern and the central part of the country, where the most important agricultural areas are located. (Table 3 – Annex I).

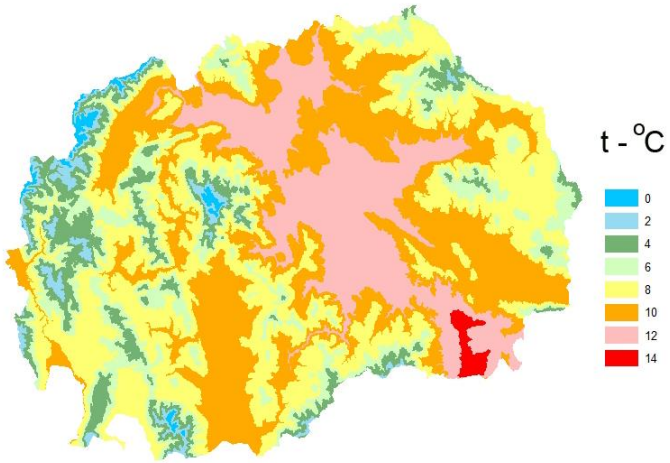


Figure 7 - *Isothermal map*

During summer, surface soil temperatures in the country can exceed 45°C and this intense heat contributes to the cracking of highly-clay soils that expose not only the soil surface but also the

soil subsurface to water or wind erosion. Of course, these high temperatures will also increase soil evaporation and further reduce available soil moisture for plant growth. Solar radiation is the dominant source of energy and sets the broad limits of evaporation. Climatic factors induce an evaporative demand on the atmosphere, but the actual resulting evaporation will be influenced by the nature of the evaporating surfaces as well as by the availability of water.

SOCIO-ECONOMIC FACTORS AND DLDD

7. Socio economic factors that contribute to desertification, land degradation and drought

7.1. Land Cover/Use, Land Management and Land Use Planning

7.1.1. Land Cover

The Land cover data presented in following map and table is based on CORINE Land cover Project for 2006.

Table 3 *Land cover 2006 (according to the CORINE LCU – level 1)*

Class	2006 r. (ha)	%
Artificial surfaces	41 480	1.6
Agricultural areas	939 013	36.5
Forest and seminatural areas	1 548 855	60.2
Wetlands	56 444	2.1
Water bodies	2 015	0.08

Source: State Statistical Office

This data set is the only available and most relevant source of information on a country level related to land cover. In the newest CORINE report (2012), there is no new data for RM.

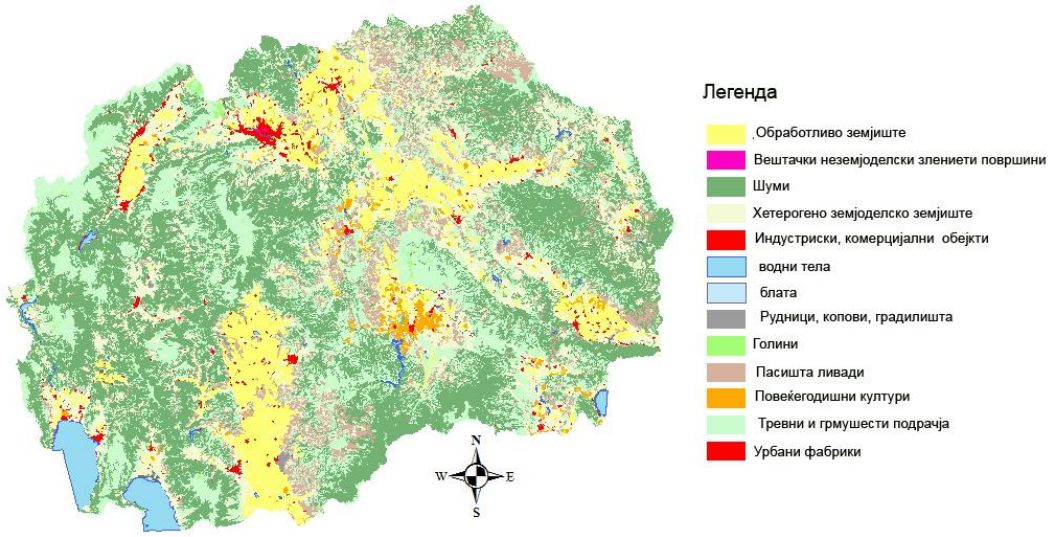


Figure 8 – CORINE LCU – level 3

7.1.2. Soil and Land capability classes

Land use should be adapted to soil/land quality classes. Unfortunately, very often instead of agricultural use, high quality land is converted to artificial land and soil sealing. The soil types according to their quality (Filipovski, G. 2003) are classified in the following seven classes:
I. class: *Fluvisols, and meliorated hydromorphic soils: Mollic fluvisols, Gleysosl,* and *Histosols* 197 702 ha (7.68 %);
II. class: *Vertisoils and Chernozems* 94 700 ha *(3.69%);*
III. class: rendzinas, cinnamon forest soils, and colluvial soils 451 942 ha. (17.56 %);
IV. class: Albic luvisoils, Pseudogleys, and Regosols 195 629 ha. (7.60 %);
V. class: rankers and brown forest soils 1 117 583 ha. (43.49 %);

VI. class: Rendzinas on hard limest. and dol. and Brown soils on hard limest. and dol. (12.23 %);
VII. class: Leptisosl and halomorphic soils 199 359 ha. (7.75 %).

Soil types of the first four classes are agricultural land; soils within the next two classes are mainly under forests and pastures, while soils from the seventh class are unproductive soils. Out of the presented data, it can be concluded that: the most fertile soils from classes I and II covers approx. 11 % of the total arable land. The biggest part of the agricultural land (more than 63%.) is covered with low land capability classes.

7.1.3. Land Use

Land use data presented in Table 4 is based on data presented in the table out of the total area almost 85% is productive land, while the rest of 15% is under category of unproductive land. Productive land is splatted between forest land (38,18%) and agricultural land (43,57), which is divided into the following two subcategories: pastures (23,65) and arable land (19,89) There are several categories within arable land, among which the dominant category is ploughed lands and gardens with 16,13%.

Table 4 *Land use in the Republic of Macedonia*

Land use distribution	Area	
	[ha]	[%]
Total land	**2571300**	**100**
1. Productive land	**2268799**	**88,24**
1.1. Forest land	**1001665**	**38,96**
1.2. Agriculture land	**1267134**	**49,28**
1.2.1. Pastures	**749772**	**29,16**
1.2.2. Arable land	**516644**	**20,09**
1.2.2.1. Ploughed lands and gardens	*417456*	*16,24*
1.2.2.2. Orchards	*16138*	*0,63*
1.2.2.3 Vineyards	*23613*	*0,92*
1.2.2.4. Natural meadows	*59437*	*2,31*
2. Unproductive land	**302501**	**11,76**
2.1. Waters	**81741**	**3,18**
2.2. Other	**220760**	**8,59**

Source: State statistical office, Statistical review, 2017

7.1.4. Land management

Land is a system of interdependent resources associated with strong two-way relationships. Slightest change in one element of the system affects all others, disturbing the natural balance. For this reason, land management should have elements and character of a system.
Land management in Macedonia slightly differs from other countries, because there is rather a different approach to natural resource management within the country. There are differences in notions, regulative, tradition and there is no coordination between enterprises that manage the land.

Land Fragmentation in Macedonia is one of the problems for sustainable land management. Farmers are willing to have their parcels dispersed, because of avoiding some of the risks of the production that can appear on a certain site. Also, the traditional inheritance is that each parcel should be divided among all inheritors. The average area of an agricultural parcel in Macedonia is 0.33 ha. (*NEAP,'97)*.

One of the characteristics of Macedonia is **abandoned land**. Due to some investigations, cca. 193 000 ha (2000) of all arable land is uncultivated, because of its low fertility, lack of labor, abandonment etc. The land market exists on the offer-claim principle. It is reduced only on urban – constructive land and part of agricultural lands. The price of the land varies, depending on the population pressure in the region. No one is interested in investing in land in hilly-mountain regions, so this land is almost out of land market. During the former period, some agricultural, but most of all urban land was nationalized. The Restitution Act is in force and all land that can be returned to its owners is subject to restitution.

At the moment, few companies are jointly managing the same area. Actually, spatial management as a concept does not exist in Macedonia, probably because of the different idea of that term 'land management' from EU countries. Our managing system is in fact resource management. Each of the natural resources is managed by different enterprises as follow: Forests – (PE Macedonian forests; PI national Parks. Local Municipality Institutions, private forest owners); Pastures – PE Macedonian pastures; Water - Water economies established on a level of hydro-ameliorative system; Hunting - various concessioners; Protected Areas – (National Parks– separate Public institution for each NP and for MPA; for other protected areas, the Government assign management body (local municipality, public enterprise, NGO.)

Even more stakeholders could be engaged in the managing of same area if there were other resources in the area (mineral resources, etc.). Then upon the request of the Ministry of Economy a concession is issued for that resource and the concession holder prepares an Environment Impact Assessment study and nothing more. That company/institution is then managing that resource in a given area.

7.1.5. Land Use planning

Land-use planning is a process by which lands are evaluated and assessed to become a basis for decisions involving land disposition and utilization. This involves studies on the environmental effects of land use and its impact on the community. Land-use planning often leads to land-use regulations, also known as zoning, but they are not one and the same. As a tool for implementing land-use plans, zoning regulates the types of activities that can be accommodated on a given piece of land, the amount of space devoted to those activities and the ways that buildings may be placed and shaped.[4]

Spatial planning refers to the methods used by the public sector to influence the distribution of people and activities in spaces of various scales. Discrete professional disciplines which involve spatial planning include land use, urban, regional, transport and environmental planning. Spatial Planning agency is responsible for preparation all spatial plans in the country. The Parliament is responsible for adopting Spatial plans in the country. It means that all other plans are sub-ordinary hierarchically to the spatial plans. Unfortunately, in the reality, there are significant number of cases when sectoral plans for any area are not in accordance with the spatial plan.

Urban plans are developed for cities, villages and other areas determined for construction. It is estimated that the conditions in the towns and cities are rapidly changing and that the urban space will continue to increase. It can be expected that illegal and substandard settlements will grow, that new ones will be formed, that the communal services and infrastructure will retreated. The general estimation of the urban plans is that they are not realistic and that they are more technical than developing instrument.

Unsustainable land use planning causes various land degradation types primarily soil sealing.

7.2. Agricultural and pasture management practices and DLDD

Agriculture is one of the key economy sectors and plays a critical role in the social and economic stability of the country. It covers the primary agriculture production, forestry, hunting and fishery. In 2013, approximately 18.7% of the entire ''working force" is engaged in agriculture, forestry and fishery. (Labor force survey, 2013. Skopje: State statistical office of the Republic of Macedonia, 2014). From the economic perspective, the share of the primary agricultural production in the GDP is amounted from 8.9% to 12.8 %, during the period 2005 – 2012.
Agriculture land covers 51% of the total country surface, out of which 22% are classified as arable land and 29% as permanent pastures. The agricultural land is predominately private 334 226 hg (81%). The Agricultural census in 2007 reported 192 378 private farms and 297 agricultural holdings with average farm size of 1.73 ha.
Most of the pastures are state-owned and managed by public enterprise Macedonian Pastures.

Crop production
Cereals are the major crops in the country, usually not irrigated because their growing period is during the most humid part of the year, but with very low yield of about 3 t/ha. Cereal crops are sown on about 41% of the arable land area or in total 168 000 ha (2013).
The **fodder crops** covered about 36 000 ha in year 2013. The most important fodder crop is alfalfa planted on more than a half of fodder crops area (19 35o ha harvested area in 2013).
Industrial crops in 2013 are planted on about 24 000 ha. Tobacco is the major industrial crop produced exclusively by small farmers and planted on about 80% of industrial crops area.
In year 2013 **vegetables** are produced on a total area of 49 560 ha. The most important vegetable crops (data for year 2013) are potato on about 13.5 thousand hectares, pepper on about 8.5 thousand hectares, tomato on about 5.5 thousand hectares, melon and water melon on 5,5 thousand hectares and cabbage on about 4,5 thousand hectares.
The total area for fruit production is about 15 000 ha (apples, plums, sour cherries, pears, and peaches). The most important fruit crop is apple with about 4,5 millions of fruit trees in 2013.
Grape and viticulture are one of the most important sectors with wine being a significant export commodity, grown on approximately 22 000 ha with more than 2/3 being for wine production.

		Sown area [in '000 hectares]						
	Arable land and gardens	total	cereals	industrial crops	vegetable crops	fodder crops	Plant nurseries	Fallow and uncultivated arable land
2009	420	293	182	24	51	36	1	126
2010	415	277	163	27	51	36	1	137
2011	415	277	163	28	51	35	1	137
2012	414	276	163	27	51	35	1	137
2013	413	281	168	25	50	36	1	132

Table 5 - Arable land by categories of use

Irrigation
Irrigation is significant factor for stable and competitive agricultural production. Some crops cannot be commercially grown without irrigation. Water demand for irrigation is estimated to

62.6% of the total water demand in the country. The existing irrigation systems (area equipped for irrigation) cover about 120 000 ha of arable land. Actually, irrigated area is about 30 000 (officially). The agricultural census shows that farmers irrigate about 80 000 ha in 2007. The discrepancy in numbers is mainly due to non-regulated (illegal) use of ground and surface water for irrigation purposes. The potential for irrigation is estimated at approximately about 350 000 ha of arable land.

Livestock

Livestock sector is characterized by large number of small, subsistence oriented farms, commercially oriented family farms and decreasing number of large specialized livestock enterprises. With the exception of 30 big, previously state owned farms, which may accommodate some 36 000 dairy cows, 90 % of the cattle are reared on private farms.

Sheep are found in the private sector in flocks of some 100-150 heads. The commercial pig and poultry industries are rooted in old state farms. Poultry industry comprises laying hens producing the entire national egg requirement. Poultry meat is almost entirely imported as is some 50 % of pork and pork products. Both the local industries are maize based, and require significant imports of maize or maize-based animal feeds each year. Private farm-based pig and poultry production is based on back-yard systems using home-grown cereals and arable by-products. The cereal diets used are balanced by scavenging, rooting, and grazing.

Table 6 *Estimated number of animals*

Year	Cattle	Sheep	Goats	Pigs	Poultry	Beehives
2013	238 333	731 828	75 028	167 492	2 201 550	68 294

Pastures covers up to 751 000 ha (in 2013). Area under pastures is a solid base for development of livestock breeding, and in particular sheep rising. The existing mountain pastures, meadows, factories for production of fodder, together with the facilities for milk meat processing, give an opportunity for cattle-breeding development, and a significant rise in the livestock numbers. The Public Enterprise for Pasture Management is responsible for cca 560 000 ha state-owned pastures.

7.2.1. Overview of unsustainable agricultural practices

Agricultural production is causing significant pressure on land resources in the country. Various unsustainable agricultural practices identified in the common agricultural production significantly increases the risk of land degradation and desertification. Due to very small average farm and plot size and huge number of very small private farms it is very hard to change habits of the farmers and to reduce this risk. The big number of small private farms just has not capacity to apply modern sustainable agricultural practices.

There are quite a few examples of unsustainable management of agricultural land.

- farmers usually apply almost same practice for one crop, despite of natural conditions of their field.
- most common soil cultivation practice is moldboard plowing which leads to SOM depletion due to more intensive processes of SOM mineralization,
- plowing on inclined areas is usually along the slope instead of contour cultivation causing losses of the soil by erosion, losses of natural vegetation and biodiversity.

Artificial fires – burning of wheat stubbles after harvesting of cereals and other residual biomass from crop production causes reduction of SOM, depletion of soil moisture and increased land degradation processes. Moreover, such fires transfer to the neighboring natural vegetation (forest, shrubs, etc.) and increase areas that are susceptible to land degradation.

Crop rotation –large areas of are mono-cultivated as a result of unfavorable climatic conditions, lack of possibility of irrigation and specialization of primary producers for certain crops, like: tobacco production (Prilep and Radovish area), apple production (Prespa lake area), grape production (Tikvesh) etc. Mono-cropping can create big problems of soil productivity loss and increased sensitivity to land degradation, particularly in arid areas.

Fertilization practices – majority of farmers apply fertilizers without previous laboratory testing of soil properties and fertilization programs. Schematic application of NPK fertilizer in ratio 15:15:15. cause accumulation of potassium and insufficient amount of nitrogen and phosphorus, deactivation of micronutrients and soil fertility decreases. Use of organic fertilizers (manure, composted organic matter) is limited to small areas. Due to this soil is losing the organic matter, and became more compact, water and air holding capacity is reducing and it became prone to other degradation processes.

Crop protection practice – majority of farmers apply pesticides frequently, without any recommendation in order to protect their crop from pest and diseases. Some crops are sprayed with pesticides almost on weakly basis and number of application recorded particularly in some orchards is higher than 15 applications. This increase risk of chemical pollution of the soils.

Losses in agricultural biodiversity – Local varieties and populations of agricultural crops are abandoned. Farmers change to modern varieties that need higher investments. Low level of investment in gene-banks and in protection of agricultural biodiversity cause permanent loses of some local varieties and populations. Similar situation is with local livestock breeds.

Construction and management of land reclamation systems–During the 1950's the big areas of permanent wetlands were transferred into agricultural areas. This created loss in biodiversity and natural landscape, rapid loss of organic matter of the newborn agricultural soils, quite difficult soil physical properties that farmers cope with etc. Nowadays these areas are characterized with bad maintenance of drainage systems that causes increase of water table and flooding of crops (Petrovec, Strumica, Bitola etc.).

Over irrigation and other unsustainable irrigation practices – Some of the existing irrigation practices are closely related to land degradation. Common practice of over irrigation can pronounce soil salinization, uncontrolled irrigation can create irrigation erosion.

Decreasing of the size of the farm holdings and plot size – the average farm size is reducing as result of the evident decrease of arable land and increase of the abounded land and number of farmers. Plot size is very small and it is difficult to apply modern practices of soil and water conservation. This situation is significant pressure on the agricultural soils and increase risk of land degradation on the small farms.

Reducing of rural population – due to evident trend of depopulation of rural areas as result of transfer of rural population in urban settlements the pressure over the agricultural land is reducing, as well as over the other natural resources in rural areas.

Reducing the number of grazing animals – the number of ships is rapidly reduced in last several decades. Traditionally the ships are kept on the highland pastures during the summer and number of the grazing animals per unit area of highland pastures decrease and in same time reduce pressure and risk of overgrazing particularly on highland pastures.

7.3. Forest management and DLDD

Macedonian dendroflora comprise 319 tree and shrub species, with more than 80 sub-species and varieties, divided into 119 genera and 54 families. According recent investigations, the above-mentioned plants comprise 81 forest associations.

According to Strategy for sustainable development of forestry in the Republic of Macedonia, SSDF, 2006., total forest land in the Republic of Macedonia is covering area of 1,159,600 ha out of which forests are 947,653 ha.
About 50% of forests comprise pure and mixed oak stands (480 000 ha.), 30% (285 000 ha.) beech stands, 8% (80 000 ha.) Black Pine and Scots Pine, and 12% other stands.
Forests have a key role not only in wood production but also in watershed protection, and in no-wood products (mushrooms, berries, etc.), hunting, tourism, and recreation.
Almost 90.14% of the total forest area in Macedonia is state owned forest, and only 9.86% (94 146 ha) is private owned. Forest for economic exploitation encompass - 92% while forests within protected areas ape just 8% of the total forest area.

7.3.1. Forest management

Several enterprises manage forests in R. of Macedonia. PE "Macedonian forests" (PEMF) manage the greatest part of state owned forests in the country. Forests within National parks are managed by institution responsible for managing of the territory of particular National park. Only small part of forests is managed by other subject, like: local municipality administration, public communal enterprise or water management enterprise. Management of private forests is by their owners.
Management of private and state forest regardless of their purpose should be in accordance with General Forest Management Plans adopted by the Government of the R. of Macedonia for a period of 20 years but this act hasn't been adopted yet. Each subject that manage forest with area more than 100 ha is obliged to prepare *Forest Management Plans*, with duration of ten years. These plans are approved by the MAFWE while control for performed activities from the action plans is done by the Forest Inspectorate.
With the law on forest form 1998, former protective forests lost their status as forest for special purposes and became part of economy forests management units. Legislation and practice in forestry of the Republic of Macedonia did not and still does not, recognize forests with various statuses, e.g. protective forest and its crucial role in soil and water protection
In the moment, so called "Program for extended reproduction" is the only direct measure for afforestation and other silvicultural activities.

Forest harvesting
Mean annual bio production (AI) in forests managed by PE MF in the last 15 years is **1,6 mil. m^3/y.** Mean annual possible cut (PSC) is 1,17 mil. m^3/y or 72,41% of the AI. From produced special forest products, 80 to 85% is firewood. This is one of main reasons for increase and improvement of forests managed by the P.E. Macedonian Forests.

Afforestation
Total afforested area in past is around 200 000 ha. According to available official documents (e.g. Strategy for sustainable development of forestry in Macedonia) in the moment there are 140 000 ha artificial forest in RM. Annual intensity of afforestation after 1990 decreased on less than 1000 ha per year. In the last 7-8 years' afforestation activities increase over 3000 ha/y.

Forest protection
Protection of forest from various abiotic and biotic factors is highly regulated with the forest related legislation.
Dry weather conditions, climate variability and damaged ecosystem with accumulation of dead biomass increase the risk of forest fires. In addition, forest fires are expected to encourage the spread of invasive species. The length of the forest fires season, its frequency and severity are very likely to increase in the country, and will lead to increased dominance of shrubs over trees.

As a result of drought conditions and human neglect, 2791 fires in the last 15 years destroyed 128 181 ha or 9156 ha annually forest and forest land. Total 1687620 m^3 wood mas was burned causing serious damages for the PE Macedonian forests and other subjects.
According the actual Law on Forest setting up of fire in the forests and the adjacent area of 200 m from the forest border is prohibited. Burning of adjacent juniper bushes and stubbles are common reason for forest fires. Destroying of forest with forest fires, leads to soil and land degradation and desertification especially in semi-arid areas.
Forest deterioration (forest die-back) especially in the 90's of the XX century most probably due to a severe and prolonged *drought period*, caused deterioration of vegetation conditions and decreased resistance to pests and diseases of forests.
Illegal cut is a well-known problem in the country. The exact extent of wild cutting cannot be estimated precisely, but according expert judgements the extent of this practices is most probably in the ranges of 150000 - 200000 m^3.

7.3.2. Changes of forest fund in last 70 years

Generally, forestry activities carried out in past, contributed to double increase of forest cover in a period of 60 years in the RM. On the other hand, some type of forest activities are not appropriate and not tolerable related to land degradation types.

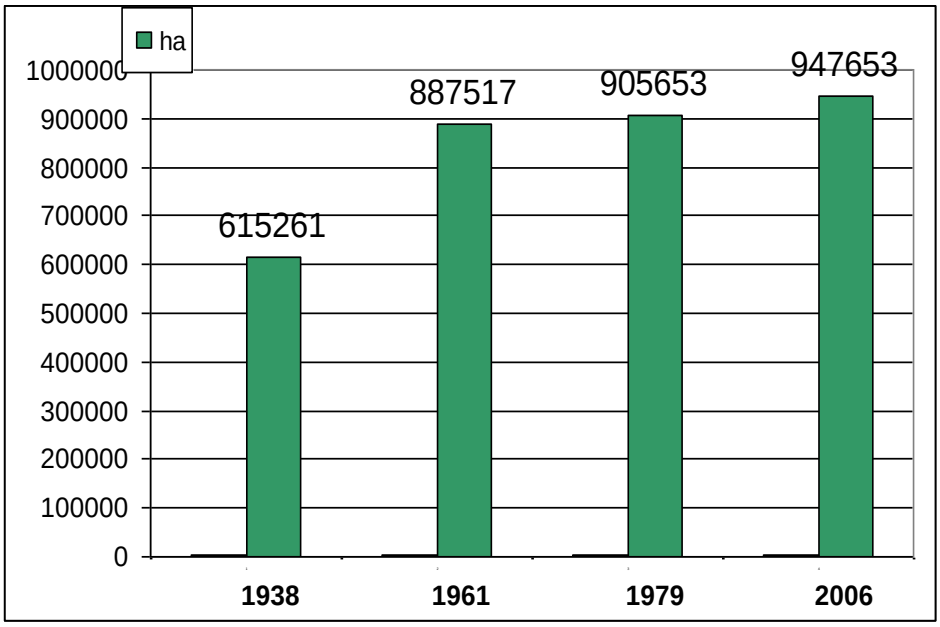


Figure 9 - Increase of forest fund by years

7.3.3. Overview of unsustainable forest management practices

Forest management planning - Rulebook for forest management planning prefer traditional approaches in forestry. Significant number of forest management units are split. Protective forests are not recognized by planners and planning of appropriate activities in this type of

forest missing. Noncompliance of other sector requirements to forest management planning is a problem too.

Harvesting and transport – Although intensity of logging is sustainable, some cut types are not appropriate to location conditions. Beside it, construction and maintenance of forest roads is on a low level and should be improved to avoid their damaging by erosion

Forest protection – There is inappropriate law enforcement related to illegal logging and transport and forest fires.

Economic issues - PE MF is self-financing company that means greater part of activities are aimed to production of wood products and generation of income. More than 90% of the income of the company origin from wood products. Low profitability of the PE MF is barrier for more sustain activities. Public institutions for managing national parks are self-financing companies too. Percent of income of PI national parks is similar to PEMF. Conflicts with nature protection related to proposal for new protected areas is evident because it significantly impact work of PEMF. All this is a reason for insufficient interest of foresters to DLDD issues.

7.4. Water management and DLDD

The current complex institutional arrangements for water management are the result of a long history and of frequent ministerial restructuring and reallocation of responsibilities over the past years. Law on waters of the Republic of Macedonia (Official Gazette of Republic of Macedonia, No. 87/08, 6/09, 161/09, 83/10, 51/11, 44/12, 23/13 and 163/13) defines water as a property of the state and thus gives the right and obligation to manage with them and to preserve them in their natural condition and even improve. These responsibilities and obligations are implemented through appropriate governmental institutions.

Competencies are divided into six ministries, with major responsibility of the Ministry of environment and physical planning. Other ministries with responsibilities in water management sector are Ministry of agriculture, forestry and water-economy, Ministry of economy, Ministry of transport and communications, Ministry of education and science, Ministry of health and the Republic institute for health protection

The Ministry of environment and physical planning take responsibilities related to the protection, improvement and planning in water management. The Law on Waters provides a legal basis for water protection and management in the Republic of Macedonia. It regulates the manner of water resources use and exploitation, protection against harmful effects of water, protection of water against exhaustive water extraction and pollution, water resources management, sources for and manner of financing water management activities, concessions, transboundary water resources, and other issues of relevance with regard to the provision of a unique water use regime. Their responsibilities, the Ministry achieves through its water sector and relevant units in the sector.

The Ministry of Agriculture, Forestry and Water Economy manages with the water for agricultural purposes as well as infrastructural facilities such as dams, reservoirs, irrigation systems. The Hydrometeorological service is part of the Ministry, and they are responsible for monitoring the quantity and quality of surface water and groundwater.

The Ministry of Transport and Communications has responsibilities related to drinking water supply, collection and drainage of urban waste water and responsibilities related to internal navigation. The Ministry of education and science through the Hydro biological institute - Ohrid have responsibilities over the physical and chemical composition of the water in natural and artificial lakes and the state of flora and fauna of aquatic life in them. The Ministry of Health implements control of the state of the water in terms of its safety, particularly epidemics potential that can spread through water and control of the water as a kind of food. Responsibilities are implemented through two bodies in own composition- state sanitary and

health inspectorate and food directorate. Republic Institute for Health Protection has obligations in relation to communal hygienic in public facilities, quality control and hygienic-bacteriological safety of the waters.
The newly established JSC Water economy of Macedonia (WEM) is competent for managing of water and hydro ameliorative systems. There are 16 water management divisions in the country. Besides WEM, JSC Macedonian Power Plants manage several reservoirs aimed for energy production. While collecting of water is under the obligation of WEM, distribution of water in the settlements is under the obligation of local administrations. Beside communal enterprises obliged for water supply in the municipalities, there are 3 regional water supply systems that provide water for more municipalities.

Water Resources, Dams and Reservoirs

Republic of Macedonia is blessed with abundant water resources. However, the spatial-temporal distribution of the water resources is not even: most of the water resources are in the western half of the country, whereas the demand for water resources is much higher in the eastern half of the country. The water bodies consist of 3 big natural lakes (Ohrid Lake, Prespa Lake and Dojran Lake), 37 major reservoirs (24 dams and reservoirs of special importance, 13 big dams and reservoirs), 25 glacial lakes and river springs. There are 4,410 springs and 1,100 of those are considered as big springs.

The Republic of Macedonia is divided into three main catchments: (a) the Vardar catchment covering 80% of the country's geographical area and accounting for about 5,000 million m3 (72%) of the average annual runoff; (b) the Crni Drim catchment, covering 13% of the country's geographical area and accounting for 1,700 million m3 (23%) of the average annual runoff; and (c) the Strumica catchment covering 7 percent of the country's geographical area and accounting for 350 million m3 (5%) of the average annual runoff.
The uneven distribution of the surface water in space and time impedes to a great extent the utilization of water resources. Therefore, construction of dams and creation of reservoirs that would improve the water regime is an imperative and a key solution that will enable full and efficient utilization of water both for the needs of the water management and protection of the human environment from their harmful effects. In order to utilize the hydrological potential of the rivers in Macedonia, 37 major reservoirs (24 dams and reservoirs of special importance, 13 big dams and reservoirs) and more than 100 small dams have been constructed, providing a total live storage of about 1,850 million m^3, which provide sufficient water throughout the year. The stored water is used for meeting the requirements of water supply for the population (11.6%) and industry (15%), irrigation (60%), production of electric power, flood control, maintaining the biological minimum, sports, recreation and tourism.

Water use

Table 7 *Water demands by sector*

Sector	Millions of m^3	%
water supply of municipalities	214	11,6
irrigation	1.155	62,6
industry	274	14,8
fish ponds	202	11,0
Total	1.846	100

The major use-sector of the water is irrigation, followed by industry. The water demand by sectors in the country is presented in the following table:

Irrigation

Until now about 160 smaller and larger irrigation schemes have been built covering an area of 163.700 hectares of fertile arable land. Only 77.35%, or 126.617 hectares are actually equipped for irrigation. The majority of irrigation schemes are constructed for sprinkler irrigation (61%) and remaining 39% for surface irrigation. Due to various reason, only about 30 000 ha are actually irrigated in last period. The major problems are old and devastated infrastructure and very low water use efficiency.

Water supply of municipalities

About 88,9 % of the total number of individual households are supplied with drinking water from public water pipeline. The mere fact that still a part of the households drink water which is neither biologically nor chemically examined, represents a worrying indicator.

Energy production

Water is also used for energy production. Hydro power accounts for only 10% of the total energy production in the country. The hydro potential is not sufficiently used, so the future activities should include the construction of new hydro power plants.

Harmful impact of water

State of river training and protection against harmful effects of water encompass analysis of river training, flood protection, erosion protection, irrigation and surface water drainage. Flood safety is ensured with building the dams as well as with large flood protection schemes that are generally constructed in combination with irrigation and/or drainage systems. Insufficient maintenance of flood protection and irrigation schemes is one of the main problems in the Republic of Macedonia. The current status of the drainage systems in the Republic of Macedonia is not satisfactory - as a result of malfunctioning of the drainage systems, many areas were flooded in the past. Due to torrential flows, numerous settlements are also exposed to erosion.

Water quality

Worrying indicator for water quality is that almost half of dwellings are not equipped with installations to public sewage system. Generally, the systems are rather old, worn out, the collecting network is constructed of different materials, the pipes are cracked and there is leakage of the wastewater in the ground. There is also very small number of wastewater treatment plants in the Republic of Macedonia and this situation should be improved in the future. Beside wastewater important polluters are also industry and agriculture. Impacts on water quality have numerous hydro-morphological pressures i.e. impoundments, water and gravel extraction, morphological alteration and others. The Macedonian Water Strategy reported state of the surface waters in accordance to biological quality elements. The biological monitoring is an integral part of systematic monitoring of water quality. Biological monitoring in the Republic of Macedonia is performed in 9 rivers in 18 monitoring stations.

Overview of unsustainable water management practices

- Lack of an integrated approach to water resources management in the regulatory system
- Overlapping - responsibility of several ministries (MAFWE, MOEPP, ME..).
- High water losses in the convey structures and network. They account for 10 % to 60 %
- Poor technical conditions of the irrigation schemes

- Lack of efficient operational water management practices of existing irrigation systems.
- Drainage systems as well as systems for protection against floods and erosion are in a poor condition.
- Insufficient number of sewage systems in urban and rural areas

INDICATORS OF DLDD

8. Indicators of DLDD

Since the adoption of the 10-year Strategy by the Parties in 2007 (decision 3/COP.8), the UNCCD has set up an indicator-based system for reviewing and assessing the impact and performance of implementing the UNCCD.

The strategic and operational objectives will guide the actions of all UNCCD stakeholders and partners. Parties carry the main responsibility for implementing The Strategy, and they report every two years on the progress made in meeting the operational objectives (reporting against the performance indicators) and every four years on the progress made in meeting the strategic objectives (reporting against the impact indicators).

Country parties has committed to submit the Reports to the UNCCD Secretariat based on the defined dynamics and planned reporting cycles.

On the basis of the defined indicators, the Country parties report to the UNCCD using the online portal - Performance Review and Assessment of Implementation System (PRAIS) which represents a fundamental step forward towards improved evidence-based decision-making within the UNCCD Overall scope.

Based on a series of studies carried out in the biennium 2008-2009, the COP decided provisionally to accept a proposed, minimum but not exclusive, set of eleven impact indicators to measure progress against S.O. 1-4, and eighteen performance indicators to measure O.O 1-5.

IMPACT INDICATORS

SO1: To improve the living conditions of affected populations
Poverty rate
Water availability per capita
Food consumption per capita
SO2: To improve the condition of ecosystems
Degree of land degradation
Drought index
Capacity of soils to sustain agro-pastoral use
Change in land use
Land cover status
Plant and animal biodiversity
SO3: : To generate global benefits through effective implementation of the UNCCD
Carbon stocks above and below ground
Land under SLM
SO4: To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors
Percentage change in the domestic financial commitment to the implementation of the Convention
Number and type of legal and regulatory frameworks, economic incentives or other mechanisms securing or facilitating the transfer of funds for the implementation of the Convention at all levels.
Clear entrusting of institutional responsibilities for UNCCD implementation, at all levels

With a view to supporting the attainment of the strategic objectives, the Strategy also contains five operational objectives, measured through relevant Performance indicators.

PERFORMANCE INDICATORS

OO1: Advocacy, awareness-raising and education
Number and size of information events organized on the subject of DLDD and/or DLDD synergies with climate change and biodiversity, and audience reached by media addressing DLDD and DLDD synergies.
Number of civil society organizations (CSOs) and science and technology institutions (STIs) participating in the Convention processes.
Number and type of DLDD-related initiatives of civil society organizations (CSOs) and science and technology institutions (STIs) in the field of education.
OO2: Policy framework
Number of affected country Parties, sub regional and regional entities to have finalized the formulation/revision of NAPs/SRAPs/RAPs aligned to The Strategy, taking into account biophysical and socio-economic information, national planning and policies, and integration into investment frameworks.
Number of initiatives for synergistic planning/programming of the three Rio Conventions or mechanisms for joint implementation, at all levels.
OO3: Science, technology and knowledge
Number of affected country Parties, sub regional and regional entities to have established and supported a national/sub regional/regional monitoring system for DLDD
Number of affected country Parties, sub regional and regional entities reporting to the Convention along revised reporting guidelines on the basis of agreed indicators
Number of revised NAPs/SRAPs/RAPs reflecting knowledge of DLDD drivers and their interactions, and of the interaction of DLDD with climate change and biodiversity
Type, number and users of DLDD-relevant knowledge-sharing systems at the global, regional, sub regional and national levels described on the Convention website
OO4: Capacity-building
Number of countries, sub regional and regional reporting entities engaged in building capacity to combat DLDD on the basis of NCSA or other methodologies and instruments
OO5: Financing and technology transfer
Number of affected country Parties, subregional and regional entities whose investment frameworks, established within the IFS devised by the GM or within other IFSs, reflect leveraging national, bilateral and multilateral resources for combating desertification and land degradation
Degree of adequacy, timeliness and predictability of financial resources made available by developed country Parties to combat DLDD
Number of DLDD-related project proposals successfully submitted for financing to international financial institutions, facilities and funds, including the GEF
Amount of financial resources and type of incentives which have enabled access to technology by affected country Parties

8.1. Change in land use

Table 8 - CORINE Land Cover – changes

Category of land cover	Minus	Plus	+/-
	ha	ha	ha
Artifical Area	409	2638	2229
Agricultural area	6981	5307	-1674
Forest and semi-natural areas	27158	26074	-1084
Wetlands	223	74	-149
Water bodies	873	1552	678
Sum	35644	35644	0

The areas under agricultural land and forest and semi natural areas are decreasing more than 1000 ha each while decrease of wetland is lower. Significant is increase of artificial land and it is indicator of significant soil sealing. Water bodies area increase due to construction of reservoirs especially Kozjak. As a result of huge forest fires in 2000, almost 18 000 ha forest temporary converted to transitional woodland but according to the newest data from forest service significant part of these area is reforested again. The whole land cover changes per category on level 3 is presented in table 4 – Annex I.

8.2. Land Productivity

According the data of the State Statistical Office (2013), the total agriculture land increase to 1261000 ha which compared to 2011 (1120 thousands ha) is increasing of more than 140000 ha which means that the agricultural land is increasing dramatically in the past years. The cultivated land covers about 40% of the agricultural land while arable land and gardens together covers almost 81% (413 thousands ha) of the cultivated land, while orchards, vineyards and meadows covers the rest of 19% or 96.000 ha. The biggest part of the arable land is under cereals (168 thousands ha). The huge part of the arable land and gardens is under fallow or not cultivated (132 thousands ha). Wheat is the most represented crop with about 82 thousands ha and total production of 259.000 t (about 3,2 t/ha), barley is represented with 42 thousands ha and a total production of 125.600 t (about 2,9 t/ha) and maize is represented with more than 31 thousands ha and a total production of 131 043 t (about 4,2 t/ha), the rest of the area under cereals is covered with rye, oats and rice. The crop yields are among lowest in Europe and land is not very productive.

8.3. Water availability per capita in affected areas

The fresh water consumption per capita in R. of Macedonia vary depending of the climate conditions in the range of 2330 m^3 per capita (dry year) up to 3092 m^3 per capita (wet year). The main problem arising in the field of availability of water resources is the uneven spatial and timely distribution over the country, showing altogether more favourable conditions in the western part, but being characterized over all the national territory by a timely distribution which presents long drought spells and high intensity rainfalls which constitute at the same time a threat for crops and which prone erosion phenomena.

8.4. Food consumption per capita

Out of the data presented in Tab. 12 related to food consumption per capita/yearly it can be noted that the main products of the average inhabitant diet are: cereals, fruit and vegetables and milk and dairy products. There are also differences between population involved in agriculture and non-agriculture populations. Non-agriculture residents consumes about 30% less cereals and more than twofold less milk and dairy products than agriculture population. All other quantities of food are similar except eggs, namely the non-agricultural population consumes more than double number of eggs/yearly than the agricultural population.

Table 9 - Food consumption per capita

Annual household consumption of goods, 2013					
GOODS	Unit of measure	Averages per household member			
		Total	Agricultural	Mixed	Non-agricultural
Cereal products	kg	120.1	170.2	120.8	118.0
Vegetables, fresh and processed	kg	106.7	114.9	105.7	106.6
Fruit, fresh and processed	kg	47.2	46.5	53.1	45.5
Meat, fresh and processed	kg	34.3	43.5	39.8	32.4
Fish	kg	5.1	6.8	5.8	4.8
Milk and dairy products	kg	236.9	249.8	105.7	106.6
Eggs	no	168	181	247.3	233.4
OTHER FOOD PRODUCTS (sugar, coffee, chocolates and biscuits)	kg	22.4	25.6	25.5	21.5
Alcoholic beverages	l	64.7	81.3	76.1	60.9

8.5. Plant and animal biodiversity

The flora of Macedonia is represented with around 210 families, 920 genera, and around 3,700 plant species. The most abundant group is the flowering plants with around 3,200 species, which is followed by mosses (350 species) and ferns (42). The diversity of higher plant species and habitats is represented by a large variety of taxa and plant communities (approximately 30 vegetative classes, 60 orders, 90 alliances and over 260 associations). Higher plant groups are represented by 3,700 species (most of them within flowering plants [*Angiospermae*] – 3,200 species, with 114 endemics). Mosses (*Bryopsida*) are represented by 350 species, with 2 endemics; ferns (*Filicinae*) –42 species, with 1 endemic; *Gymnospermae* – 15 species; *Sphenopsida* – 7 species and *Lycopsida* – 6 species. According to available data, in the Republic of Macedonia lower plants are represented by 1,580 species of Algae (the best studied being diatoms [*Bacillariophyta*] – 512 species, with 62 endemics; Green algae [*Chlorophyta*] – 398 species, with 10 endemics and Blue-green algae [*Cyanophyta*] – 204 species, with 10 endemics). There are at least 1,250 species of Fungi and some 340 species of Lichens. Regarding threats to lower plant groups, most of the available information concerns diatoms. Of this group, nine are considered to be extinct, whereas 107 species are threatened. Among the Fungi, the most threatened are 67 species of *Basidiomycota*, as well as 12 species of Lichens. As for the higher plant groups, Angiosperms are the most endangered group (280-300 endangered species, of which 5 are extinct), ferns (15), mosses (20) and Gymnosperms (7).

The diversity of fauna in the Republic of Macedonia is represented by 9,339 species and 228 subspecies, or a total of 9,567 taxa. Of these, 602 species and 72 subspecies, or a total of 674 taxa, are Macedonian endemics representing 7 % of the entire fauna. Threatened status is defined only for vertebrates and is based upon the European Vertebrate Red List. Out of 506 vertebrate species, 113 are included on the list of threatened species, which is 22.3% of the

entire vertebrate fauna in the Republic of Macedonia. The most threatened group is fishes, with 30 out of 58 indigenous species included on the list, which is 51.7% of the entire ichthyofauna. Biological resources in the Republic of Macedonia are utilized continuously. This utilization includes agriculture, forestry, hunting, fishing and collection of wild plants. The system of protected areas according to the Law on Nature and IUCN categorization, consists of protected areas and areas proposed for protection. It was established for the protection of biodiversity within natural habitats, abiotic and landscape diversity. Protected areas include natural habitats, ecosystems, and natural geological and geographical formations characteristic of the territory. Total number of protected items is 86 and they covered 230 083ha. Properties from Macedonia with international significance:

- UNESCO World Heritage List
  - ✓ Natural and Cultural Heritage of the Ohrid region - Mixed natural and cultural criteria I, III, IV, VII) -1979
- UNESCO Tentative World Heritage List – Natural heritage
  - ✓ Markovi Kuli – Criteria - Natural (VII, VIII, IX) - 2004
  - ✓ Cave Slatinski Izvor – Criteria - Natural (VII, VIII, IX) - 2004
- RAMSAR convention list: Prespa lake – 1995, Dojran Lake - 2007

In the Republic of Macedonia there are 44 wetlands. These wetlands are grouped as follows: 19 artificial lakes (reservoirs), 8 marshes, 6 glacial lakes, 3 fish ponds, 3 natural lakes, 1 temporary water, 2 rivers, one aquatic bed and one spring. Total area that is covered by wetlands is 57.422 ha or 2,23 % of the total area of Macedonia. (*Note: definition for wetland in CORINE LCU terminology is different than those by* Convention on Wetlands of International Importance - RAMSAR)

8.6. Drought

8.6.1. Climate elements related to drought

Drought is a usual phenomenon in Macedonia. Some parameters are presented in the table below.

Table 10 *Meteorological elements related to drought for selected stations*

Gauge Station	∑P mm	PET Mm	AI	T °C	Md mm	G	Na	Nsa	DI	PF
Period of observing 1961-1990										
Veles	459.6	772.0	0.60	13,3	352.0	a	7	1	19.73	34.56
Kavadarci	476.7	780.9	0.61	13,6	350.1	a	7	1	20.20	35.05
Sv. Nikole	471.8	734.4	0.64	12,5	301.1	a	6	1	20.97	37.74
Stip	482.6	748.3	0.64	12,8	302.5	a	5	3	21.17	37.70
Radovis*	471.5	732.0	0.64	12,3	299.9	a	6	1	23.34	42.31
Kocani	522.6	755.1	0.69	13,0	283.7	sa	6	2	22.72	40.20
Skopje	501.7	725.3	0.69	12,0	284.0	sa	6	2	22.80	41.81
Kumanovo	542.8	708.8	0.77	11,8	229.9	sa	4	3	24.90	46.00
Valandovo	610.8	794.1	0.77	14,2	315.3	sa	4	3	25.24	43.01
Delcevo	514.7	668.4	0.77	10,6	189.2	sa	4	3	24.99	48.56
Strumica	583.3	750.6	0.78	12,9	285.5	sa	4	3	25.47	45.22
Dojran	644.6	791.1	0.81	14,2	302.2	sa	5	2	26.64	45.39
Prilep	556.7	684.4	0.81	11,2	222.1	sa	4	3	26.26	49.71
Gevgelija	694.4	796.8	0.88	14,2	314.4	sa	4	2	28.69	48.90

Where:

**Radovis (1951-2010)*

P – mean annual sum of precipitations [mm], PET – potential evapotranspiration [mm],
AI – aridity index, 0,05 < AI < 0,65 – regions vulnerable to desertification,
Md – moisture deficit [mm], DI – Drought index by De Martone, PF – precipitation factor by Lang
G – climate sign by Gracanin, (a) – arid, (sa) – semi-arid,
Na, Nsa – number of arid/semi-arid months in the year,

According to methodology of Gracanin, data from several gauge stations show tendency of aridity and semi-aridity. The tendency of the precipitation quantities decrease and the temperature increase is materialized at the level of almost the whole territory of the country
Climatology use an "aridity index" or "index of desertification" (the ratio of annual precipitation to potential evaporation) to help classify desert (arid) or semi-arid areas. Drylands exist because the annual water loss (evaporation) exceeds the annual rainfall; therefore, these regions have a continual water deficit.
Based on calculation of **aridity index** (Ai = H / PET) on annual level and criteria for **RVD** by UNCCD, was prepared map where are assigned climatologically stations and aridity index (based on older data 1961-90).

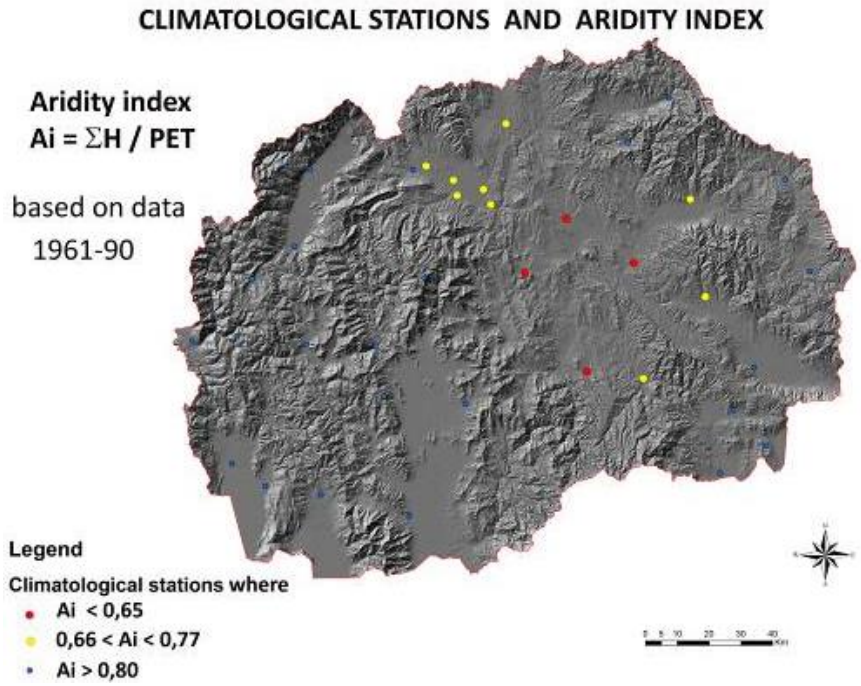
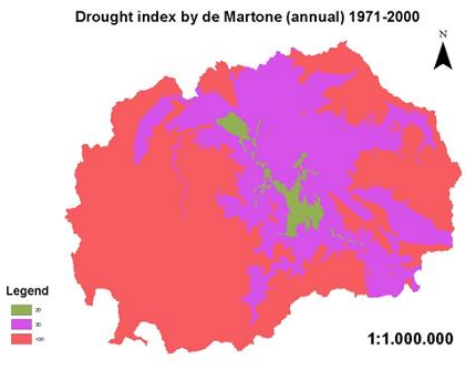


Figure 10 Climatologic stations and aridity index

While there are a lot of researches related to drought, land degradation and some desertification processes, detailed research on desertification in the Republic of Macedonia and primarily delineation of the region vulnerable to it, hasn't been done yet.



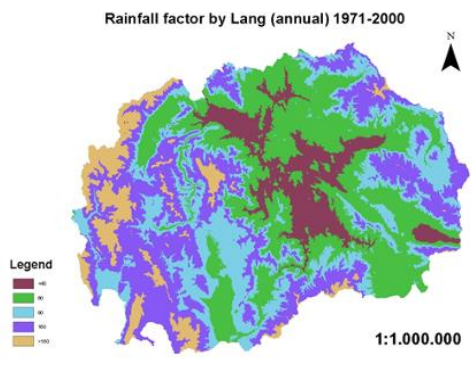


Figure 11 - *Drought index by De Martone and rainfall factor by Lang (1971-2000)*

The following map present annual potential evapotranspiration in the country. It is clear that in most areas evapotranspiration is higher than rainfalls. Moreover, as rule we can say that lower the rainfall are, evapotranspiration is higher.

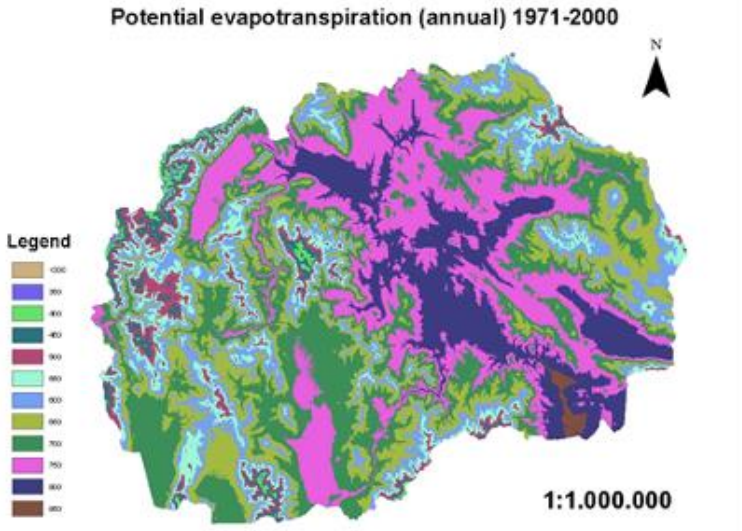


Figure 12 - *Yearly potential evapotranspiration by Thornthwhite (1971-2000)*

However, not all rainfalls are efficient and only part of the rainfalls can be used by vegetation so we calculated effective rainfalls by FAO dependable rainfalls methodology. The following map show water deficit calculated as difference between annual evapotranspiration and annual effective rainfalls.

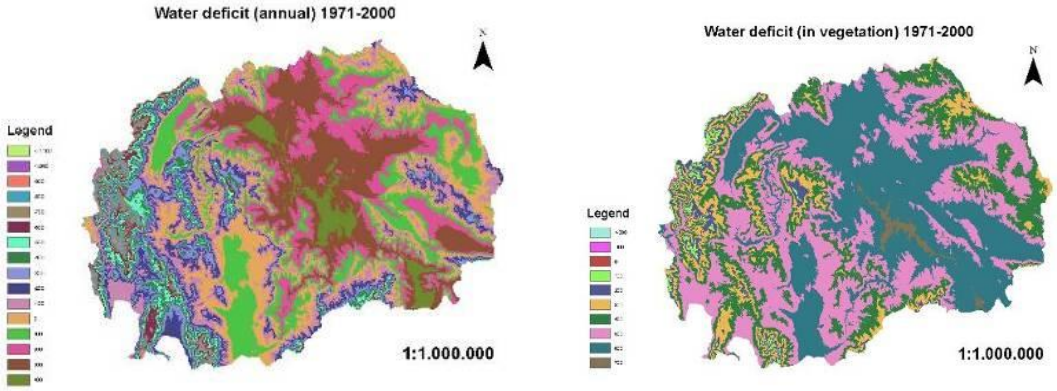


Figure 13 - Yearly and in growing season water deficit for RM in period 1971-2000

The annual water deficits are not so large, and reaching maximum of 400 mm and in all areas in the country some plant life can take hold. In the most arid areas the plant life is in the form of grasslands or steppes. Usually the growing period when plants can grow and develop isassumed as April – September. The water deficit during this period is much higher than annual and reaches up to 700 mm. Also, much bigger part of the country territory is affected by shortage of water for normal growth of vegetation; therefore biomass productivity in the country is highly limited by water deficit especially having in mind low water retention capacities of the most of Macedonian soils.

Drought evidences in Republic of Macedonia

Agricultural drought is very common in the country and almost every year there is drought with various duration and severity. These droughts are limiting crop yield and crop yield in Macedonia is far below EU averages. In 1993 the government proclaimed draught as natural disaster because of huge damages on crop yield (50-70%). The aridity and drought are the most pronounced in the Central region. In recent period, the longest drought was in Stip in year 1992 with duration of 78 days. The maximum drought periods for Skopje is 65 days (1969) for Bitola 1974 with 64 days. During the period 1981-2000, mean annual sum of precipitation on climatologically station Radovis was 348 mm. Few years in this period were assigned as very arid (P<250 mm)

Such droughts cause huge damages to agricultural crops and plants in general. The drought in average reduce national economy for 7,6%.

8.6.2. Soil – Climate Vegetation zones and Drought

Although Macedonia is a relatively small country, different climate types are characterized over its territory; from continental, changed continental, sub-Mediterranean (changed maritime) to mountainous climate with various sub-types. Over the territory of Republic of Macedonia, the influences of the Mediterranean and the continent climate overlap, with a different spectrum of influences.

According to the experiences of the climatic classifications and adequate access for the territory of Republic of Macedonia, we differ on the following, more homogeneous thermo-climatic regions and sub-regions:

1. Region with a sub-Mediterranean climate (50 - 500 m) (Gevgelija-Valandovo region) (SM);
2. Region with a moderate-continental-sub-Mediterranean climate (to 600 m) (MCSM);
3. Region with a hot continental climate (600 - 900 m) (HC);
4. Region with a cold continental climate (900 – 1 100 m) (CC);
5. Region with a sub-forest-continental-mountainous climate (1 100-1 300 m) (SFCM);
6. Region with a forest-continental mountainous climate (1 300 – 1 650 m) (FCM);
7. Region with a sub-alpine mountainous climate (1 650 – 2 250 m) (SAM);
8. Region with an alpine mountainous climate (h_s>2250) (AM).

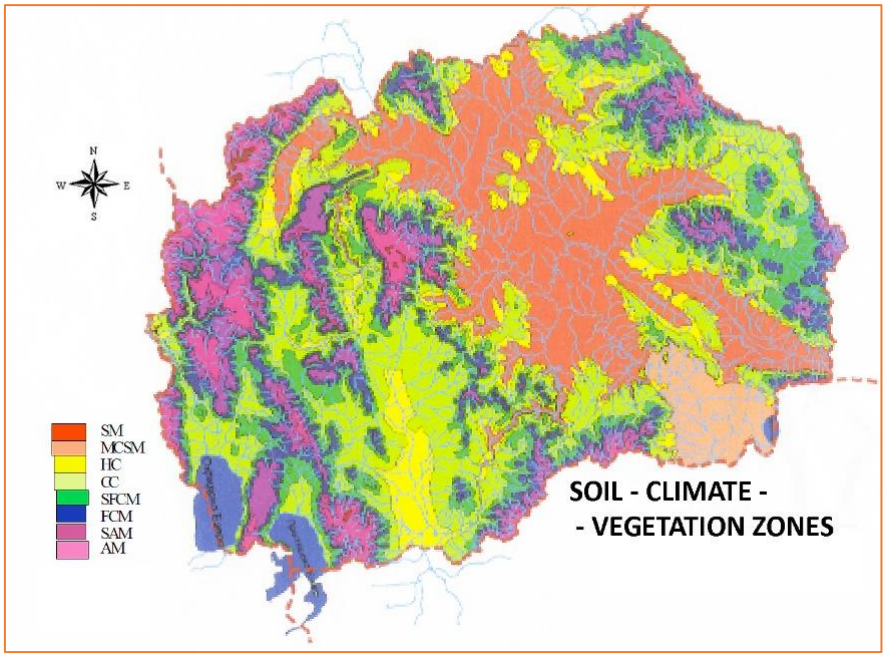


Figure 14 - Thermic climatic types in Republic of Macedonia

The average annual air temperatures in Macedonia are between 14.0°C and 14.5 °C in the region with a sub-Mediterranean climate (Gevgelija-Valandovo region), between 11.8°C and 13.6°C in the region with a continental-sub-Mediterranean climate, between 9.6°C and 11.6°C in the region with a cold continental climate, 4.8°C in the region with a sub-alpine mountainous climate, and –0.8°C in the region with an alpine mountainous climate.
The average annual number of summer days (days with a maximum air temperature above 25°C) are limited to between 121 and 135 days in the region with a sub-Mediterranean climate, between 107 and 130 days in the region with a continental-sub-Mediterranean climate, and 0 days in the region with an alpine mountainous climate.
The average annual number of tropical days (days with a maximum air temperature above 30°C) in the region with a sub-Mediterranean climate is limit between 57 and 73 days, between 41 and 62 days in the region with a continental-sub-Mediterranean climate, and 0 days in the regions with a sub-alpine mountainous climate and an alpine mountainous climate.
The average annual amounts of precipitation vary between 611 and 695 mm in the region with a sub-Mediterranean climate, between 472 and 583 mm in the region with a continental-sub-Mediterranean climate, between 515 and 890 mm in the region with a hot continental climate, between 1 044 and 1 103 mm in the region with a continental mountainous climate**,** 1 001 mm in the region with a sub-alpine mountainous climate, and 791 mm in the region with an alpine mountainous climate. In the territory of Republic of Macedonia, the average summer amounts of the precipitation vary between 118 and 199 mm.

8.7. Land Degradation in FYR Macedonia

The eight main soil degradation processes according to proposal on Soil Directive are:

- soil organic matter decline,
- soil salinization,
- soil compaction,
- soil sealing,
- soil contamination,
- soil biodiversity loss,
- erosion and sedimentation,
- landslides
- flooding

8.7.1. Soil organic matter decline

Organic matter (OM) is an important ‘building block’ for soil structure and for the formation of stable aggregates. Other benefits are related to the improvement of infiltration rates and the increase in storage capacity for water. Furthermore, OM serves as a buffer against rapid changes in soil reaction (pH) and it acts as an energy source for soil micro-organisms. Without OM, biochemical activity in soil would effectively be negligible.
The soils under intensive agriculture production on sloppy terrains with heavy texture and shallow soil profile are the most vulnerable soils particularly the soils on the hilly relief (lithosol, rendzinas, chromic cambisols, vertisols and the soils on colluvial forms). Any decreasing of SOM in these soils especially in lithosol (shallow soil profile) and vertisols (heavy textured soils) can cause a serious and prompt damage on their production capability.

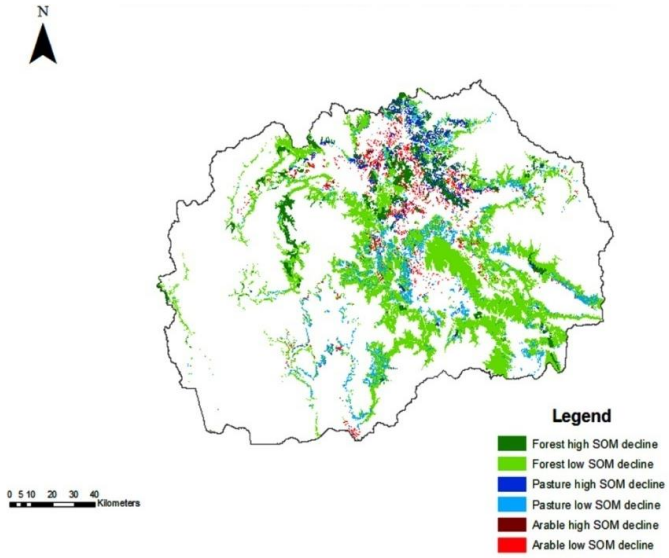


Figure 15 *Vulnerable areas to soil organic matter decline*

8.7.2. Soil salinization

Salinization is the process that leads to an excessive increase of water-soluble salts in the soil. The accumulated salts include sodium, potassium, magnesium and calcium, chloride, sulphate, carbonate and bicarbonate. Primary Salinization involves accumulation of salts through natural processes due to high salt contents in parent materials or groundwater. Secondary salinization is caused by human activities, (inappropriate irrigation practices, with salt-rich irrigation water).
In absence of quality field data that can be used to develop model for risk of salinization the map of saline soils in the country is presented. There in not any research on the soils under threat of salinization and quantification of the influence of climate change on this negative process of soil degradation.

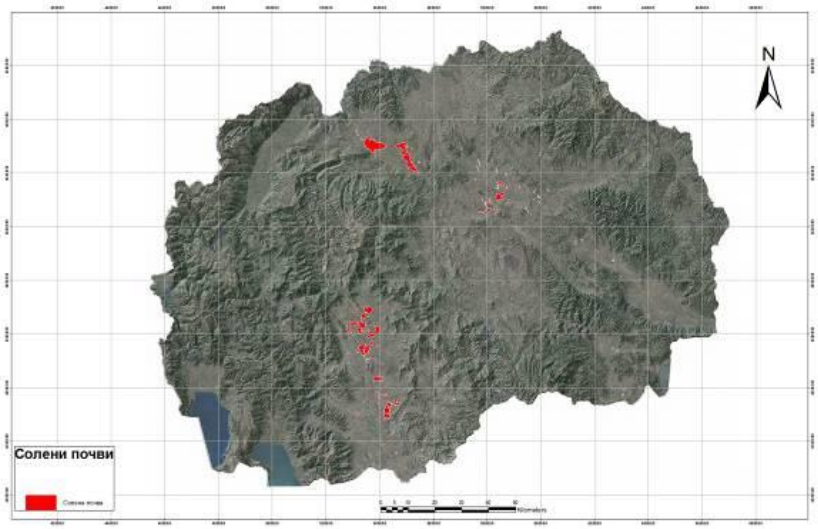


Figure 16 - *Vulnerable areas to salinization*

8.7.3. Soil Compaction

Soil compaction occurs when soil is subject to mechanical stress often through the use of heavy machinery or overgrazing, especially in wet soil conditions. In sensitive areas, walking tourism and skiing also contribute to the problem.

The problem of soil compaction is present in the country, particularly on agricultural soils cultivated with heavy machinery. The very common problem is compaction of the soil layer just below the plowing depth (plow pans). This compacted layer is reducing soil permeability and reduce crop yield. The intensification of agriculture, using of new heavy equipment, using of moldboard plow, increasing the number of operations on agricultural fields is increasing risk of compaction. Unfortunately, there is not sufficient research in the country to produce soil compaction map or to estimate area affected by soil compaction.

8.7.4. Soil sealing

The covering of the soil surface with impervious materials as a result of urban development and infrastructure construction is known as soil sealing. Sealed areas are lost for uses such as agriculture or forestry while the ecological soil functions are severely impaired or even prevented (e.g. soil working as a buffer and filter system or as a carbon sink). In addition, surrounding soils may be influenced by change in water flow patterns or the fragmentation of habitats. Current studies suggest that soil sealing is nearly irreversible.

The greatest impacts of soil sealing are observable in urban and metropolitan areas. An accelerated increase of built-up areas can be recorded as a consequence of the political and economic changes during the late 1980s. Rural populations migrated to the cities and new settlements were developed. Rising pressures on soil can be expected in the course of a strengthened economic growth in the country.

Urbanization was one of the dominant processes of the social and economic development of the country. The concentration of urban population had reached the level of 60% of the whole population. In the last decade, migration has been slowed down and the daily migration movements are expanding especially in the areas of gravitation around the economy centers and bigger cities such as Skopje, Kumanovo, Tetovo, Gostivar and Veles. The cities are uniformly distributed, but the population density is not uniform. An obvious expansion of concentration of population and settlements is noticeable in the valleys, creating a strong conflict among the statement (recommendations) for protection of the high quality arable land and agricultural development and the necessity of urban development. This is asking quick activities for development of sustainable concepts.

Soil sealing in the Republic of Macedonia hasn't been defined yet. Main reasons are inappropriate historical data. The only relevant research was done by Trpcevska-Angelkovic, D., (2014) for the Skopje region for the period 1965-2010. Results show mean annual conversion of productive in unproductive land is 0,14% of the total. Forest land increase annually with 0,37%. On the other hand, agricultural land decrease 0,52% annually. (0,24%-arable land and 0,28% - pastures). These changes are result of rapid urbanization of the Skopje region after the earthquake and conversion of abandoned pastures to forests.

8.7.5. Soil contamination

Soil contamination as part of land degradation is typically caused by industrial activity, agricultural chemicals, or improper disposal of waste.

In general, people are not aware of waste problems and the potential risks of hazardous waste, or of the adverse effects on their health and living/natural environment. There is an insufficient level of awareness particularly for citizen's responsibilities and role as producers of waste and actors in waste reduction. To a large extent, the increasing amount of generated waste is result of uninformed consumers as well as of their behavior and choices. There is no monitoring of the possible impacts of the industry and services.

The total amount of generated waste, can be estimated app.26 million t/year. The main waste fractions arise from mineral excavation and ore processing (app. 17,3 million t/year). However, the group of waste from mineral extraction and processing contains a significant amount of hazardous constituents and improper landfills and managing of technological processes cause the most evident impacts on the environment. Despite this type of waste, of importance is waste from agriculture and food processing (5.610.000 t/y) and municipal waste (680.000 t/ha). These 3 types of waste yields 90.5 % from the total solid waste production. The total amount of hazardous waste from different sources is approximately 77.126 t/y. Storage of manure on farms and the application of manure on agricultural land is generally very questionable with respect to the pollution of soil and groundwater. There are no available disposal facilities in Macedonia for agrochemical wastes containing hazardous substances like contaminated packaging waste and pesticide residues. The contaminated packaging waste is usually burned or dumped together with municipal waste. Only 60 -70% of the population is involved in the public municipal waste collection system, but only 10% of habitants in rural settlements receive regular municipal solid waste collection services. Most of the MSW and other collected wastes are deposited at municipal dumpsites or at wild dump sites without any pre-treatment. There are app. 54 active municipal dumps used by communal enterprises and a huge number of non-legal dumpsites created by population that do not receive a waste collection service. Most of the existing municipal dumpsites need to be closed since the site conditions and environmental impact do not allow them to be upgraded economically, to be harmonized with the EU standards. Active municipal waste landfills are categorized according to the assessment of their environmental risk.

51 industrial landfills and dumpsites are classified as hot spots, out of them 16 landfills are ranked with high risk with 268 million m3 deposed material (Annex I – table 5).

8.7.6. Soil biodiversity loss

Soil biodiversity is threatened by excessive agricultural exploitation due to simplified crop rotation and monocultures, application of pesticides and fertilizers, soil compaction and habitat fragmentation. There is no database on long-term studies on the protection of soil biodiversity loss in the country.

8.7.7. Erosion and sedimentation

Erosion is the most dominant process causing soil degradation. Predominant form of soil erosion in our country is water erosion which is caused by several factors and accelerated by human activities. The causes of erosion are:

- Natural (uneven relief, steep slopes, high intensity rainfalls, land cover, soil erodibility etc.)
- Socioeconomic (inappropriate human activities in agriculture and grazing, forest management, inappropriate construction activities etc.)

The consequences of soil erosion can be seen both on-site and off-site. The natural conditions in Macedonia (climate conditions, topographical characteristics, vegetation cover, and geology) and the deforestation are the main contributors to the high rate of water erosion. In the western part of Macedonia, the configuration of the terrain is rough and steep, so deep erosion processes are dominant. In the central part of Macedonia processes of sheet erosion are dominant. There is wind erosion in this part, but its intensity is not so high. Mixed processes are spread in the eastern part of Macedonia. Gully erosion is spread all over the country. Inadequate plowing and irrigation lead to different processes of sheet and rill erosion. There are high losses of topsoil, humus and nutrients from the agriculture land located on the slopes.

Erosion map of the country was prepared during the 80's. The results of direct terrain mapping are presented below.

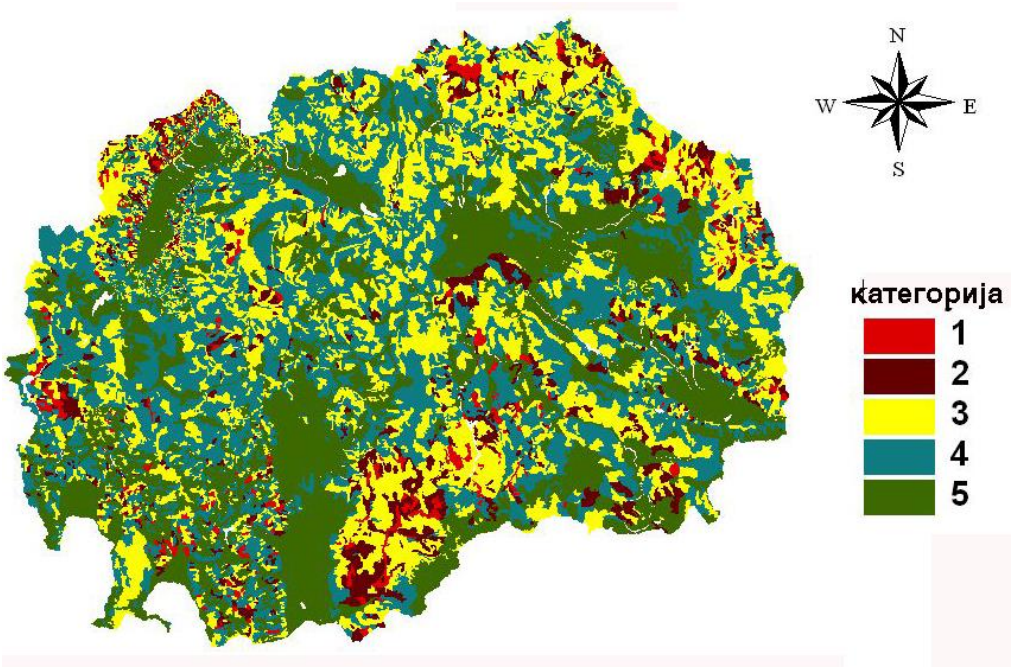


Figure 17 - Erosion Map of Macedonia (Source: Institute for Water Management - 1993)

Table 11 *Erosion distribution in RM (by Gavrilovic methodology)*

Degradation category (erosion processess)		Area (km^2)	Percent (%)	erosion intensity ($m^3\ km^2\ y^{-1}$)
I	extremely high	698	2.77	> 3000
II	high	1 832	7.38	1500 – 3000
III	medium	6 893	27.78	1000 – 1500
IV	low	7 936	31.98	500 – 1000
V	very low	7 463	30.09	70 – 500

Of the total area 96% is affected by processes of erosion. An amount 9423 km^2 or 36.65% of the total state territory is in the highest categories (I – III). The total annual production of erosive material on the whole territory is about $17*10^6\ m^3\ y^{-1}$ or 685 $m^3\ km^{-2}.y^{-1}$, which of $7.5*10^6\ m^3\ y^{-1}$ or 303 $m^3\ km^{-2}.y^{-1}$ are carried away.

Irrigation erosion is a problem too. Agriculture is the base of the Macedonian economy; water deficit is high especially during the vegetation period, so irrigation is necessary for high quantity yields. Erosion due to inadequate irrigation practices, such as furrow irrigation on sloping land, is less serious than other erosion factors. About 40 000 ha of irrigated land is subject to erosion, with an annual average soil loss of about 300 000 m^3. However, this soil is generally very fertile.

Significant part of the deposits in the country (about $3*10^6\ m^3\ y^{-1}$) is not transported through the downstream sections of the rivers to the exit of the state territory, but **deposed in nature lakes and reservoirs**. For example, the rates of annual sediment yield in the biggest reservoirs in Macedonia are: Tikves ($1,3 * 10^6\ m^3$ or 497 m^3/km^2), Kalimanci ($0,42*10^6\ m^3$ or 970 m^3/km^2). Typical for these reservoirs is that great part of the eroded material was deposed in the so called "useful storage of the reservoir", so it decreases available volume of the reservoir.

Republic of Macedonia is one of the most erosive countries in Europe together with Albania, Monte Negro, Portugal, Italy, Romania and Slovenia.

Data about erosion is not up to date.

However, erosion is still a big problem for the country and important generator of desertification processes in the semi-arid and region of Macedonia.

8.7.8. Landslides

Landslides and landfalls happened very often. They are natural events, sometimes directly caused by human activities.

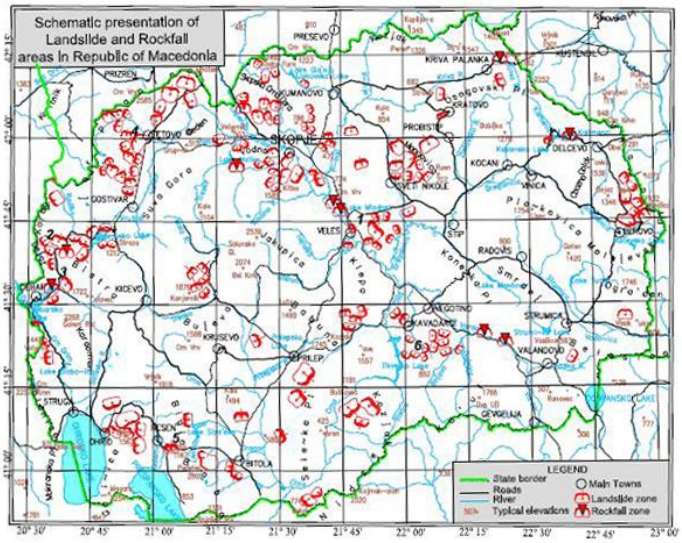


Figure 18 – *Landslides and rockfalls in Macedonia* (Source: M. Jovanovski)

The biggest landfall on the Balkan Peninsula happened in 1958 in the central part of Macedonia (15 km south from Kavadarci). The most important landslides happened in Veles (Ramina), Germo, Timjanik, near Bitola (Surnati ridoi), Crnik, along Radika river (Velebrdo-Rostuse is the biggest). There are a lot of shallow landslides. During the 2001, a high percent of the forest in the region of Sar Planina, northwest of Tetovo was subjected to wild cutting, which caused the appearance of several landslides in that region. Avalanches frequently happen on several mountains in Macedonia.

8.7.9. Flooding

There are few types of floods in Macedonia as follow: regional floods – by river Vardar and other bigger rivers; flash floods by smaller rivers; coastal floods – Ohrid Lake; floods caused by rise of groundwater level and urban floods as a result of urban runoff.
Very often there are combination of various types.

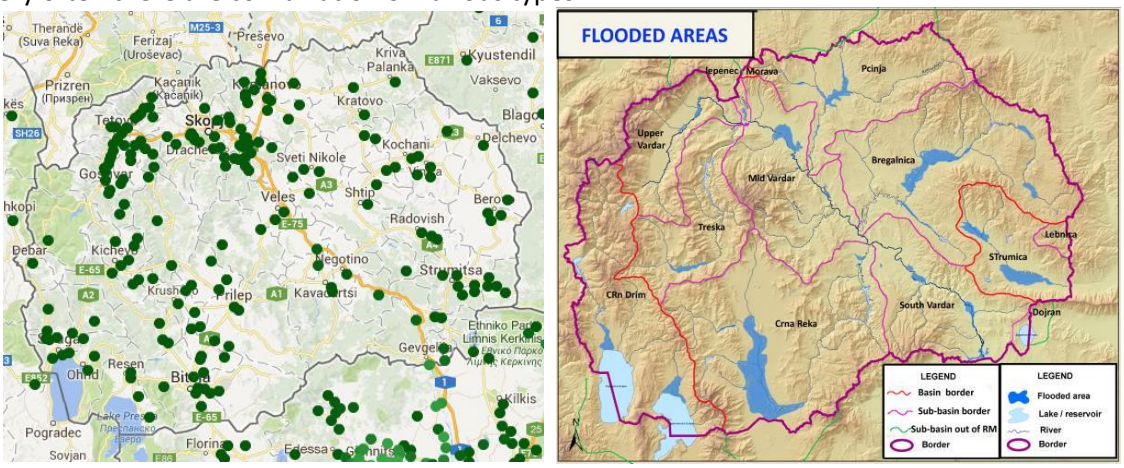


Figure 19 - *Flood events and flooded areas in Macedonia*

Regional floods

These floods were caused by the biggest rivers in Macedonia: Vardar, Crna Reka, Strumica, Treska, Pcinja, Lepenec, and Bregalnica. During the floods in 1962, the Vardar flooded 12 735 ha., the Crna Reka 25 000 ha., and the Strumica 8 000 ha. During the floods in 1979, 45 860 ha were flooded by all the rivers in Macedonia. The total cost of the damages caused by floods in 1979 was US$ 193.8 million.

The damage caused by floods directly affects the already fragile agriculture and local rural economies especially in the last few years.

Economic losses experienced during the flash floods in 2004 show that 91.3% of the total damage is attributed to the agricultural production mainly in the south-eastern part of the country. The biggest losses have been experienced in the rural areas where households and cultivated areas have been flooded. In the last few years' various part of Macedonia was flooded in 2008, 2009, 2010, 2012, 2013 and 2014.

Torrential floods

Torrential flash floods are typical for Macedonia and they are very frequent. These floods often but not exclusively are result of natural conditions, bad land cover especially low forest closeness (high percentage of degraded forest and shrubs), high erosion processes on the catchments, rare but very intensive short time rainfalls, unbalanced water regime, etc. Exactly **1245 torrents** are registered over the whole country territory. Torrential flows (flash floods) endanger infrastructural facilities (roads, bridges …) and they cover agricultural land with sterile sediments (stones, gravel, etc.). Small torrents (with catchment area less than 5 km^2) are 62% of the total number.

The most important torrential (flash) flood in Macedonia happened: River Pena (1979); the Luda Mara River (1958, 1979); the Anska Reka; the Bregalnica; the Negotinska Reka (1995: [F = 17.8 km^2, Qmax = 220 m^3/s]); the Kamenicka Reka (*permanent*); the Dzepciski Poroj (*permanent*); Radoviska Reka and Sushica (2008) and the last torrent floods happened in the Tetovo region (2015) and Skopje region (2016).

The small torrents (with catchment areas of less than 5 km^2) can get the peak flow of more than 30 m^3/sec resulting in a lot of sterile sediment on the flooded areas. In June 2004, high, intensive rainfall caused floods and flash floods in 26 municipalities in the country located in the upper Vardar and in the central south and south-eastern part of the country. The latest torrential floods in the Tetovo region (august 2015) caused significant damages

8.8. Carbon storage and sequestration

Since carbon sinks depends on forest productivity, all factors that affect productivity will also affect carbon sequestration. Only forest fires had significant negative influence on the decrement of carbon storage and sequestration capacity of the forests in Macedonia in the previous period. By 2025, Macedonian forest, due to the predicted increasing productivity, will be able to increase their carbon sink capacity, if there are no enormous changes in number and intensity of forest fires (as it was in 2000). The total ecosystem Carbon stock is large and dynamic equilibrium with its environment. Because of the large areas involved at regional and local scale, forests and forest land are one of the key players in global Carbon cycle. Land use change can cause perturbation of the ecosystem and can influence the carbon stock and fluxes. In general, conversion of forests and forest land to agricultural ecosystems can reduce the soil organic carbon (SOC) concentration and stock between 20-50%. (Schlesinger,1985). General capacity for carbon stock of forest ecosystem is presented in figure 20.

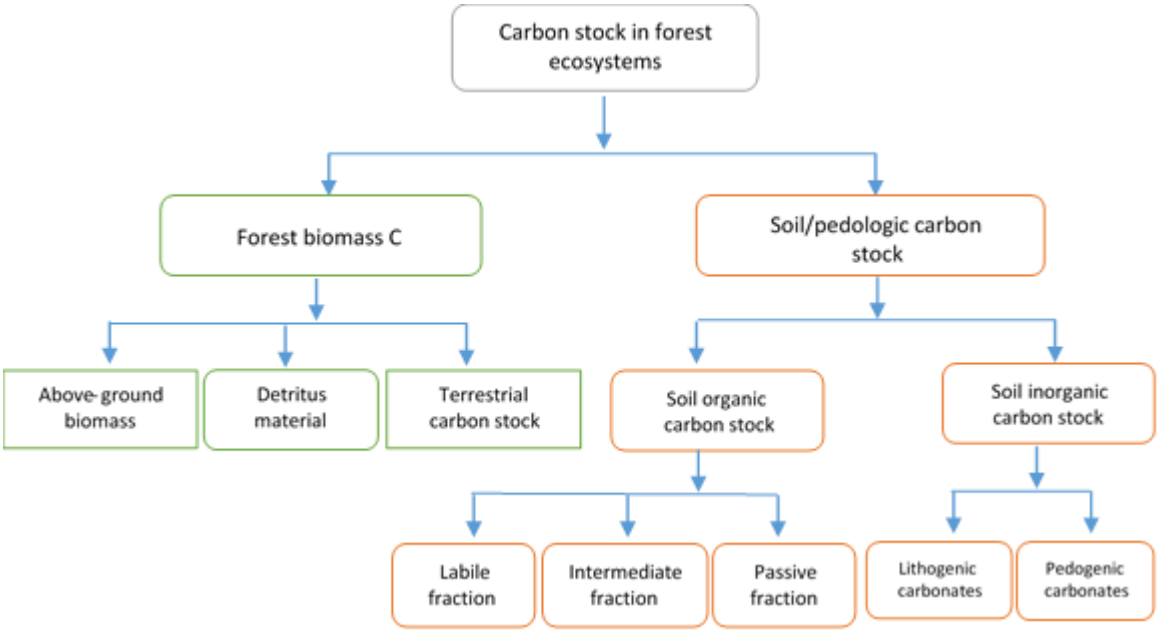


Figure 20 *General capacity for carbon stock of forest ecosystem*

So, according to the figure, estimation of the forest carbon sequestration is a very complex and long- term work that need to be done in Republic of Macedonia. There are numerous factors that have to be taken into consideration. The primary data should come from forest inventory data (forest stock, forest growth, forest species, net annual increment by age classes, area, thinning, final cuts, etc.), as well as soil carbon, litter and forest products.

ENVIRONMENTAL, ECONOMIC AND SOCIAL EFFECTS OF DLDD

9. Environmental, economic and social effects of DLDD

The report of the Hydrometeorological Service of Republic of Macedonia prepared for the needs of the Drought Management Centre of SEE reports damages of the droughts in the year 2001, 2002, 2003, 2005, 2007, 2008 and 2009. The various adverse effects are reported from reduction of crop yield, financial damages related to crop yield reduction, honey bees' mortality, draying of trees, water level depletion in natural lakes, reduced production of electricity from hydro power plants, etc.

9.1. Decreasing of the crops yield and their quality

The yield damages in the no irrigated fields are smaller for the winter crops (wheat, barley, oil seed rape), sunflower, tobacco (known as more tolerant species to drought) and much greater for the complete season crops (sugar beet, maize). The successive droughts superimposed to the heat days may lead to the drastic decreasing of the yields, even by 80 – 90% from the mean annual yield. It is obvious that the irrigation has a special importance in these conditions both for the yields ensuring and for the improvement of the environment conditions.
According to previous analyses, in the Republic of Macedonia drought has caused a 50-60 % decrease in crop production in non-irrigated areas especially in the period 1987-2000. Also, there were problems in areas in eastern Macedonia, caused by lack of water in the reservoirs 'Kalimanci' and 'Mantovo' so farmers were forced to change their crops to more drought tolerant ones.
It is well known that agricultural drought causes water stress in plants. If the length of the drought is long enough, crop yields decrease. Droughts inevitably decrease a farmer's income. In Macedonia, a prolonged drought occurred during 1993, damaging most of the crops. During 1993, 16 communities applied for refunds for the damage to crop production caused by the severe drought. The biggest yield reduction appeared in the communities of Stip, Sveti Nikole, and Kocani with up to a 70 % reduction, compared with the average yield from the previous three years. The total value of the yield reduction caused by drought was 2 669 451 000 denars (about €80 million). The loss of this income represented at least 5 % (and up to 21.2 %) of the gross income of each community. On a countrywide basis, the damage caused by this drought in decreasing agricultural production amounted to 7.6 % of the total national income.

Table 12 - The yield reduction from the expected yield for Gevgelija and Kavadarci in prolonged drought during 1993

Crop	Gevgelija		Kavadarci
	Expected yield in kg/ha	**% of reduction of yield**	% of reduction of yield
Wheat	2 744	44.4	**50.0**
Barley	2 698	42.0	**50.0**
Maize	3 000	30.0	**70.0**
Alfalfa	21 112	71.4	**30.0**
Tomato	23 500	42.5	**30.0**
Tobacco	1 300	44.8	**70.0**
Grape	12 332	47.5	**50.0**
Orchards	**9 760**	**34.2**	**50.0**

The problems caused by drought are much more serious for the productivity of perennial crops (orchards and grape). The damage caused to perennial crops during one year is also expressed for several succeeding years. If drought is prolonged, serious damage can appear on the trees. In the past Macedonia, has been exposed to prolonged droughts (ten successive dry years from 1985 to 1997). Fruit production during these years was seriously affected. Because of severe drought and other climatic changes (higher summer temperatures and frequent late spring frosts) more than 3 700 hectares of fruit orchards became desiccated: 1 000 ha of apricot, 780 ha of sour cherry, 430 ha of pears. As a result of these droughts, the fruit growing area decreased from 23 900 ha in 1985 to 16 500 ha in 1997. The total fruit production rapidly decreased as follows: apricot from 12 000 tons to 2 000-3 000 tones. Peaches decreased from 16 000 tons to 3 500-5 000 tones depending on the year, sour cherries from 11 500 tons to 3 000-4 000 tones.

The total fruit production decreased from 200 000 tons to 120 000-130 000 tons. This damage is essentially irrecoverable, and a large amount of time and money should be invested to rebuild fruit production in the Republic of Macedonia.

Having in mind the conditions that predominate in the largest part of Macedonia, it is obvious that some measures to prevent or decrease the damage caused by drought should be undertaken. The most popular measure is irrigation. Other measures, such as choice of genotype and cultural practices are also in use, but they are of limited effectiveness for various reasons.

The crop yields under irrigated conditions are increased and become stable. This is very important for the farmers because any investment in crop production is secured by irrigation.

Table 13 - Average crop yield (tonnes/ha) with and without irrigation for Tikves and Bregalnica

Crop	Bregalnica irrigation system			Tikves irrigation system		
	Without irrigation	Limited irrigation	Fully irrigated	Without irrigation	Limited irrigation	**Fully irrigated**
Wheat	2.0	3.0	4.2	2.5	3.5	**4.8**
Maize	2.0	4.5	6.7	2.5	5.5	**8.5**
Sunflower	0.8	1.6	3.0	1.1	1.8	**3.2**
Alfalfa (hay)	3.0	5.0	10.0	3.6	6.0	**12.0**
Tomato	8.0	18.0	42.0	10.0	19.0	**40.0**
Pepper	0.0	14.0	35.0	0.0	12.0	**32.0**
Peaches	6.9	9,0	16.0	10.2	15.0	**25.0**
Wine grape	-	-	-	4.0	12.0	**23.0**
Table grape	**-**	**-**	**-**	**14.0**	**20.0**	**40.0**

Table 14 - Average evapotranspiration, water income and water deficit (m^3ha^{-1}) for crops in Macedonia

Crop	Evapotranspiration (ET)	Incomes	Deficit	Deficit as % of ET
Wheat	3 592	2 321	1 271	**35.4**
Maize	5 219	1 389	3 830	**73.4**
Sunflower	3 434	1 311	2 123	**61.8**
Tobacco	3 269	1 144	2 125	**65.0**
Alfalfa (hay)	7 817	2 484	5 333	**68.2**
Forage peas	3 624	2 269	1 355	**37.4**
Oilseed rape	3 774	2 249	1 525	**40.4**
Maize II crop	4 713	1 758	3 955	**83.9**
Orchards	**5 191**	**2 165**	**3 026**	**58.3**

Data in Table 14 present that water deficiency appears for all crops grown in the Republic of Macedonia. The water deficiency is from 1 271 to 5 333 m^3 ha^{-1}. Water deficiency is between 35.4 and 83.9 % of crop water needs and irrigation should be applied in order to overcome this deficiency and permit normal crop growth.
Drought caused about 60 000 ha of riverside forests to vanish. Also about 50 000 ha of oak forests on high clayey soil are facing difficulties in the regeneration processes.

9.1.1. The limiting of cultivation of some plant species

Because of the repeated droughts as well as the lowering of the groundwater level and wind speed intensifying, the water balance of the country is strongly changed to have negative influence over the growth and development of herbaceous and woody plants. Meanwhile the non-irrigated fields are suitable only for some winter crops (winter cereals first of all) and some summer drought tolerant species (tobacco, sunflower, etc). On salt polluted soils the spectrum of suitable plants is reduced to halophytes and some vegetables (but only in area under irrigation) and possibly rice.
As a result of aridity and drought it is impossible to grow some vegetable species, without irrigation (tomato, pepper, cabbage, etc.), so production of such vegetables is limited only to irrigated areas of the country. In the central (arid) region of the country it is impossible to grow without irrigation some of the forage, cereals and industrial crops without irrigation (alfalfa, maize, sugar beet, etc.). It was previously stressed that aridity and drought dramatically decrease fruit growing area in the country. The new strategy of the Department for Fruit Growing of Faculty of Agriculture and Food is not to recommend planting of new orchards if irrigation water is not available.
There are problems with afforestation too. Drought periods caused the drying of young nurseries, which need replanting and increased costs. Greater part of the bareland is located in the central part of Macedonia, region vulnerable to desertification. Afforestation in this region is limited to few so-called "pioneer species". The problem is that some of them are nonindigenous. Planting nonindigenous species is prohibited according to Act of Nature Protection, or requires special expertise for issuing of an import and planting permit.

9.2. Forests decline

There is not any research dedicated to this problem but effects of drought are evident. There are two groups of reasons for the deterioration and loss of vegetation. The first ones are the natural reasons, and second ones are the human induced reasons. According to forest health experts, the major problem was the drought period (1987-2000), so it caused deterioration of vegetation conditions and decreased resistance to pests and diseases. A general tendency is that in this period the vital trees decreased in the research plots from 80% to 30.8%. From time to time, forests in Macedonia are occupied by calamity of some insects. A few airplane treatments were undertaken to destroy those insects and save the forests. The most dangerous pests for forests in the RM are: *Thaumatopoea pityocampa* Schiff.; *Neodiprion sertifer* Geoffr.), *Euproctis chrysorrhoea* L., Porthetria dispar L., Scolytidae etc. Elm forests are total destroyed by a disease called “elm cancer; Dutch diseases“ (*Ophiostoma ulmi* (Buism.) Nannf. and *Ophiostoma novo-ulmi* Brasier). A very dangerous disease called “chestnut cancer” (Lat. Cryphonetria parasitica) slowly destroy chestnut forests in RM. Elm and chestnut are the most enlarged trees in the RM.

9.3. Pastures degradation

Over-grazing is a well-known reason for desertification all over the world. Unfortunately, there is not enough data about pastures in the country and it is almost impossible to assess current

situation with quality and degradation of the pastures. Some estimation can be done based on the total number of the grazing animals that is decreasing as a result of the big decrease in the number of sheep. It means that pressure over the grazing areas (particularly high elevated summer pastures) decrease. At the same time the number of goats is increasing.
Other problem is that traditional grazing areas were affected by military conflict. So even though there are smaller numbers of animals in the country, the concentration of animals is different than before the conflict. It should be additionally investigated if there is such a burden from grazing animals in some areas that can make over-grazing problem of serious concern.
Goats can be a very big problem for forest and bush vegetation. After the Second World War goat-keeping was forbidden by law. The idea was to protect the forests and to decrease the erosion processes on steep slopes in hilly and mountainous regions. Goats were never totally eradicated. Due to the very bad economic situation in the transitional period and following the suspension of the abovementioned law, the goat number is rapidly increasing. Still we cannot assess the effects of increased number of goats on land degradation and desertification. According to positive regulations (forest law) grazing in forest areas is allowed only with special permission from the official authorities in order to protect the forest. Farmers do not fully respect such regulations and they are grazing their animals even in forest. There is not any evidence of the negative effect of the goats on increasing of land degradation processes, so it is topic that should be carefully analyzed.

9.4. Reduction of biodiversity

The Second National Communication to the UNFCCC (SNC) identified, on the bases of expert judgment and on the basis of relevant literature, that subalpine and alpine pastures (grassland ecosystems) would be the most threatened by the global warming. Alpine grasslands, rocky habitats, screes and rock vegetation are distributed only on the highest parts of mountain summits and occupy very small areas (only 0.5% of the country's territory). Vertical movement of these communities will be hindered by many relief related obstacles, ecological preferences and especially available space. Conical shape of the mountain summits means smaller area on the higher elevation. And not the whole area will be available. Only north faced slopes would offer suitable ecological conditions since alpine zone in Macedonian mountains will disappear.
Another significant threat to the biodiversity in Macedonia in relation to climate warming and predicted drop of precipitation is the danger of disappearing of the vegetation and other species in the refugia centers (SNC 2006). They are very important for biodiversity in Macedonia due to the extraordinary species richness, especially endemic and relict species, which have found shelter there as a response to the climate changes in the former epochs. Other azonal plant communities /ecosystems in the river gorges and valleys etc. will be affected as well. It is very difficult in this stage to predict to what extent they are threatened by the global warming. However, it is an important issue for Macedonian biodiversity. Climate change impact to biodiversity and possibilities for adaptation and vertical movement of species and communities will be different in different regions due to many reasons, including geology, relief, general geographical characteristics etc. (SNC 2006). Past and present human impact, especially agriculture and infrastructural object will have crucial role in that process.

9.5. Impact of desertification, land degradation and drought on human communities

Decrease of water for the water supply and for irrigation causes social and economic problems to the people. As with the consequences of the drought period in nearly past, there were problems

with water supply for population in some parts of Macedonia, so those problems implicate political (inter-ethnic and inter-municipal) problems.
Also, problems with water for irrigation caused the decrease of agricultural production and the pauperization (impoverishment) of farmers, so that the socio-economic problems become very tangible.

GAP ANALYSIS

10. Identified GAPs

A gap analysis is a method of assessing the differences in performance between a current and needed situation to determine whether convention requirements are being met and, if not, what steps should be taken to ensure they are met successfully. *Gap* refers to the space between "where we are" (the present state) and "where we want to be" (the target state). A gap analysis may also be referred to as a needs analysis, needs assessment or need-gap analysis.

Type	GAP
1. General institutional issues	1.1. Ministry of Environment and Spatial Planning has lack of capacities for DLDD related issues
	1.2. Ministry of Agriculture, Forestry and Water Economy has lack of staff engaged on issues related to DLDD
	1.3 Not clearly defined responsibilities among relevant stakeholders on operational level for addressing DLDD issues
	1.4 Lack of efficient mechanism for coordination among the central government institutions with regards to the activities related to DLDD
	1.5. Lack of monitoring system for DLDD
	1.6 Low level of awareness about DLDD of the stakeholders in the Republic of Macedonia
Specific DLDD capacity-related issues	1.7 Insufficient capacities for administration of the national soil information system
	1.8. Lack of appropriate land management system
	1.9. Lack of sufficient and efficient support of agricultural production that addresses DLDD issues
	1.10. Limited capacities of water management organizations (water economies) related to DLDD
	1.11. Low capacity of water user associations (water communities)

Type	GAP
2. Policy framework	2.1. Lack of integral policy-framework for DLDD, based on sound linkages between DLDD and other areas (primarily socio-economic issues)
	2.2. Insufficient coverage of the DLDD matters into the operational (annual) planning of the institutions with competence for DLDD issues
	2.3. Weak link between policy-making and research
	2.4. Insufficient level of cooperation with regards to DLDD issues among central and local governmental level
	2.5. Erosive areas and areas vulnerable to erosion have not been officially proclaimed, therefore creating lack of basis for research and specific policy actions

Type	GAP
3. Data	3.1. Scarcity of relevant data for DLDD processes in the country
	3.2. Very limited public availability of the existing data related for DLDD
	3.3. No specific programmes for data collection and data management for research purposes related to DLDD issues exists.
	3.4. There is no delineation on vulnerable and affected areas by desertification
	3.5. Trend of narrowing of Hydrometeorological monitoring network has been present in the recent years
	3.6. Lack of data on soil organic matter
	3.7. The erosion map has not been updated for several years
	3.8. Vegetation map has not been completed yet
	3.9. Land capability map has not been completed yet
	3.10. No updated data in relation to land property

Type	GAP
4. Research and development	4.1. Limited number, as well as lack of capacity of research institutions working in the area of DLDD
	4.2. There is insufficient national support for research related to DLDD
	4.3. No programs for R&D and technology transfer in the area of DLDD have been developed in the country. In addition, there is low participation of the domestic research institutions in the available international programs related to DLDD.

Type	**GAP**
5. Management practices	5.1. Good agricultural practices and agro-ecological measures related to DLDD are in initial phase of implementation
	5.2. Inappropriate application of agro-technical measures (related to fertilization and plant protection)
	5.3. Irrigation practices are inappropriate
	5.4. Land fragmentation and consolidation
	5.5. Drainage and flood protection structures are in a poor conditions
	5.6. Waste water treatment is not sufficient
	5.7. Forest management is not appropriate for treating DLDD issues
	5.8. Forest Ecosystem services are not recognized by other sectors and the state authorities
	5.9. Land Use Planning is inappropriate to DLDD
	5.10 Low awareness of the primary producers about their role in land management, crucial for DLDD related issues
	5.11 There are deficiencies in treatment of illegal logging, which causes serious problems from the perspective of DLDD
	5.12. Loss of vegetation cover as a result of frequent wildfires causes implication for DLDD
	5.13. Lack of land conservation measures and activities on areas affected with degradation processes

NAP PURPOSE, VISONS AND GOALS

11. Purpose, visions, goals and measures of NAP DLDD

11.1. Purpose and methodological approach of the NAP DLDD

The NAP aims to provide specific measures and actions that would contribute to proper use and management of the land resources, in purpose of prevention of land degradation and desertification in the Republic of Macedonia. The methodological approach of the elaboration of the NAP has been based on participatory principle. In this respect, government institutions, private sector, affected communities, the NGO and other stakeholders has been consulted in the process of drafting of this document. The timeframe of the document covers period of 6 years. The document contains vision, goals, objectives and specific measures for DLDD. The vision, goals and objectives of the NAP have been set in accordance to the principles for sustainable management of land resources and the mitigation of drought-like conditions in the Republic of Macedonia. The specific measures and actions in the NAP reflect the research undertaken for elaboration of this document, consultation of the stakeholders and available institutional set-up for implementation of the NAP.

11.2. Vision, Goals and Objectives

The **vision** of the NAP is to establish a harmonious relationship between the natural and human-made environments through utilization of the nation's resources in a sustainable manner to meet the current population's needs without compromising the needs of future generations.

The **main goal** of the NAP is to **combat land degradation and possible desertification and to mitigate the effects of drought in the Republic of Macedonia, based on principles of** sustainable management and protection of land resources.

Specific goals of the NAP include:

- Development of an environmentally aware and responsible society;
- Wise use of the nation's natural resources to satisfy socio-economic needs without compromising the quality of land resources;
- Better knowledge about the use of land resources in line with sustainable land management;
- Improved regulatory and legislative framework that will provide appropriate use, management and protection of the land resource base,
- Established effective mechanisms for institutional collaboration and cooperation.

In order to achieve the above specific goals and the objectives set by the UN Convention to Combat Desertification and to implement its provisions, Republic of Macedonia undertakes to implement the National Action Plan (NAP) To Combat Land Degradation and Desertification and to Mitigate the Effects of Drought.
The Macedonia NAP DLDD 2014-2020 is formulated in support to The Strategy 2008-2018 to enhance the implementation of the UNCCD at the country level. Its vision is "a strengthened convergence of actions among national government agencies (NGAs), local government units (LGUs), the private sector, and the civil society organizations (CSOs) to halt and prevent desertification and land degradation, and mitigate the impacts of drought, in order to support poverty reduction and environmental sustainability". Its development framework, therefore, is anchored on The Strategy's overall goal, its four strategic and five operational objectives.

Strategic objectives to be achieved with the NAP are the following:

Strategic objective 1: To improve the living conditions of affected populations
Strategic objective 2: To improve the condition of affected ecosystems
Strategic objective 3: To generate global benefits through effective implementation of the UNCCD
Strategic objective 4: To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors

11.3. Measures of the National Action Plan

Specific measures have been developed according to the 5 operational objectives set within UNCCD 10-years strategy 2008-2018, as well as 1 additional objective. They are listed below:

Operational objectives according to the CCD 10-years strategy to be achieved with the NAP are

- advocacy, awareness and education
- policy framework
- science technology and knowledge
- capacity building
- financial mechanisms and technology

and additional country specific objective of this NAP is:

- Sustainable land management – engineering in a dryland areas

Apart of specific measures and activities that address primarily DLDD issues, there are many sectoral documents that contain measures related to DLDD. For the purpose of elaboration of this NAP, following strategies/plans are taken in consideration: III National Communication on Climate Changes, 2014; The Water Strategy, 2014, National Strategy for Sustainable Development of Forestry, 2006; National Strategy for Biodiversity Protection and Action Plan, 2003. The **complementary measures and activities** listed in the above Strategies are given in the Annex II. Their implementation is primarily within the competence of the institutions responsible for the specific sectors, although they could significantly contribute realization of specific DLDD issues.

All specific measures are develop based on a GAP analyze and analyzing of related documents to find complementary measures. This measures are presented in the table below.

OO-1 - ADVOCACY, AWARENESS AND EDUCATION

Measure	Description	Timeframe	Expected results	Source of financing	Responsible institution	Synergy with RIO Conventions
001-1 Strengthening the regional cooperation among the stakeholders of the SEE countries in the area of DLDD						
Activity						
1.1.1. Enhancing the regional co-operation among the SEE countries for development of common data and plans for DLDD	Taking in consideration that all SEE countries are vulnerable to DLDD, common actions are necessary. Such cooperative actions should be initiated on a bilateral and regional level among all key players governing DLDD (governmental and expert level). Main outcomes should be more focused and coordinated actions towards: risk assessment, monitoring and risk management of DLDD aroused negative impacts on soil. The regional cooperation should be shaped and implemented within short time activities e.g. scientific or applicative projects, panel meetings, discussion groups, thematic workshops, or on a mid or long-term level e.g. cross border synchronized monitoring, establishment of networks of various digital data bases, continuously harmonization of legislation and build-up of efficient system for sharing of: ideas, experience and know how among countries on regional level	2017-2023	Established co-operation, realized common plans	Global Environmental Facility (GEF) Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE NHMS	UNFCCC UNCBD
1.1.2. Creation of DLDD database in the Republic of Macedonia, as a part of national geospatial information system	The existing data related to DLDD in the country are insufficient and not harmonised, scattered within different intuitions and in most cases, accessibility and transparency is an issue. Affected areas with various types of land degradation and desertification are still not identified and delineated. For these reasons, creation of digital data base as a part of a functional and efficiently designed national geospatial information system is a first step towards permanent and efficient monitoring of soil quality and processes of DLDD (e.g. soil chemical and physical properties) should be created, stored and available according to the new legislation related to geospatial information.	2017-2021	Created data, as a part of National geospatial information system	GEF Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP	UNFCCC UNCBD
1.1.3. Connection of national monitoring network for	In order to identify the common issues and threats related to DLDD networking of existing systems and data bases is needed.	2019-2023	Established co-operation, realized	GEF	MOEPP	UNFCCC UNCBD

DLDD with the regional/sub-regional network of the SEE countries	This connection of the national monitoring and risk assessment systems will enable synchronization and harmonization of common initiatives and actions towards combating and mitigation of negative effects of DLLD,		monitoring system	Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE	
001-2 Public Awareness rising for issues related to DLDD						
Activity						
1.2.1. Elaboration of Communication Strategy for DLDD issues	Despite many efforts mainly originated from the scientific community within various project activities, seminars and workshops, it seems that there is an insufficiency of organized and systematic approach and increasing the level of awareness on issues related to DLDD among key players and decision makers. Elaboration of Communication Strategy will enable: more focused and targeted approach towards identification of the main activities and actions to improve the communication and collaboration on different levels, to improve and channel the process of dissemination and distribution of information, data and initiatives between key stakeholders, will enable improved coordination and networking among all actions related to DLDD.	Continuous	Increased public awareness	GEF Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE NHMS	UNFCCC UNCBD
1.2.2. Organization of trainings and workshops for DLDD issues for the stakeholders on central and local governmental level	Crucial part of the increasing of public awareness is increasing the level of knowledge of the main stakeholders and finding the most proper means for conveying of information and results to the broader audience. It should be noted, that many of the issues related to DLDD needs to be treated on local governmental level, while the main legal and policy framework is designed on a national level. In this respect, better link between both levels is needed for achievement of satisfactory results.	2017-2018	Realized trainings and workshops	Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE NHMS	

1.2.3. Design and realization of media campaign for DLDD	Gap 1.6. Low level of awareness about DLDD of the stakeholders in the Republic of Macedonia In addition to the educational and promotional activities (trainings, workshops, presentations, informative meetings etc.) to a targeted groups of stakeholders on a central and local level, realization of a media campaign will enable to convey the main ideas for the impacts of DLDD, the vulnerability of the natural resources and the role of the broader audience in combating and mitigations of the impact. In order to achieve as much as possible better results and effects from the media campaign, it should be carefully and professionally planned and designed. Up to this moment the level of awareness about DLDD in the Republic of Macedonia could not be assessed as sufficient. Medina campaign or other forms of information/trainings of the stakeholders (including institutions) about relevant issues for DLDD .have never been organized before	2017-2023	Realized media campaigns	MOEPP MAFWE NHMS	MOEPP CSO's	UNFCCC UNCBD
001-3 Education						
Activity						
1.3.1.Establishment of National Training and Technology Transfer Center in the area of DLDD (NTTTC)	In the past decades there are a lot of initiatives and frameworks dealing with many aspects of DLDD due to the increased focus and importance of this phenomena. Issues related to land degradation; desertification and drought are becoming more and more important. Research and monitoring programs on a national and regional level among countries are intensified resulting in development of new techniques, methods and technologies for more efficient combating with DLDD. In order to bring this knowledge and know-how to the broader audience and the main stakeholders responsible to deal with DLDD, as well as to enrich the curricula of the Universities R&D and technology transfer programmes are essential in the area of DLDD in order to keep up with the mainstream and latest trends. Nevertheless, they are expensive, which serves as main constrain to development of such programmes in the country. In addition, the participation of the research institutions in the available international programmes is rather low, partially owing to scarce database for research, as well as limited research staff working in the area of DLDD, such Training and Technology Transfer centres should be established	2019	Established NTTTC for DLDD	Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE MOEPP Universities	UNFCCC UNCBD

	within academic institutions which possess sufficient capacities to follow the most recent achievements and technologies and transfer it to a various target groups					
1.3.2. Establishing new curricula for DLDD on II and III cycle of high education and mainstreaming DLDD issues in the study programmes on I cycle of studies of agriculture and forestry	There are several research institutions which certain capacities, which enables limited activities in the area of DLDD. It should be emphasized that due to the very limited finances and capacities (equipment and staff) the activities are generally bounded to theoretical discussions and lecturing with very restricted practical and applicative activities. For these reasons, the curricula of the educational and research institutions should be enforced in order to enable more practical work for the students on all cycles of studies. This way, the students will gain better knowledge on issues related to DLDD which they will implement in practice as experts. This process should be implemented through: capacity building with long term R&D programs, involvement of the research in the monitoring programs and other governmental initiatives related to DLDD	2017-2018	Adopted new curricula on Faculty of Agriculture and Faculty of Forestry	Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	Universities	UNFCC UNCBD

OO-2 POLICY FRAMEWORK

Measure	Description	Timeframe	Expected results	Source of financing	Responsible institution	Synergy with RIO Conventions
OO-2.1 Setting of a sound legal and strategic framework for DLDD						
2.1.1. Further harmonization of the legislation with the EU requirements, UN Conventions and other relevant international documents	Harmonization of the legislation relevant to DLDD with EU requirements, UN Conventions and other relevant international documents will be done	Continuous	Legislation in line with the EU requirements, Un Conventions and other relevant international documents	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	Parliament of the Republic of Macedonia MOEPP MAFWE Respective Ministries	UNFCCC UNCBD
2.1.2. Elaboration and adoption of Secondary legislation related to DLDD issues, deriving from the primary Laws	Further regulation of specific DLDD issues introduced in the Laws, by their elaboration through bylaws	Continuous	Secondary Legislation which further regulates DLDD issues	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE Respective Ministries	UNFCCC UNCBD
2.1.3. Updating existing relevant Strategies and Action Plans treating issues for land degradation,	Update of the existing Strategies and Action Plans due to insufficient coverage of the DLDD matters into the operational planning of the institutions with competence for DLDD issues	Continuous	Updated Strategies and other documents with DLDD issues	GEF EU/IPA Bilateral	MOEPP MAFWE Respective	UNFCCC UNCBD

desertification and drought with the EU requirements				and Multilateral Donors National Budget of the Republic of Macedonia	Ministries	
2.1.4. Development of National Integrated Strategy for land degradation, desertification, and drought, including linkages with socio-economic and other relevant aspects	Elaboration of the Strategy for DLDD in purpose of overcoming the lack of integral policy-framework for DLDD, based on sound linkages between DLDD and other areas (primarily socio-economic issues)	2019-2020	Integrated Strategy for DLDD Prepared	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP	UNFCCC UNCBD
2.1.5. Development of local action plans for land degradation, desertification, and drought	Overcoming the insufficient coverage of the DLDD matters into the operational planning of the institutions with competence for DLDD issues by updating existing/elaboration of new plans	Continuously	Elaborated local action plans for DLDD	GEF EU/IPA Bilateral and Multilateral Donors Budgets of municipalities	Municipalities	UNFCCC UNCBD
2.1.6. Elaboration of Plans and policies to deal with the	Overcoming the insufficient coverage of the DLDD matters into the operational planning of the institutions with competence for	2017-2023	Included DLDD issues in various strategies and	GEF	MOEPP	UNFCC

socio-economic impacts of desertification and drought	DLDD issues by updating existing/elaboration of new sectoral strategic documents		plans	EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE	UNCBD
2.1.7. Mainstreaming of DLDD issues in sectoral strategic documents in agriculture, forestry, and water management, spatial planning	Gap 2.2. - Insufficient coverage of the DLDD matters into the operational (annual) planning of the institutions with competence for DLDD issues	2017-2023	Involved DLDD issues in various strategies and plans	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE SPA	UNFCC UNCBD
002-2 Creation of a base for implementation of the legislation on national and local level						
2.2.1. Clarification of the competences amongst the institutions on central and local level, as well as other stakeholders for addressing DLDD issues	Not clearly defined responsibilities among relevant stakeholders on operational level for addressing DLDD issues (Gap 1.3.)	2018	Defined responsibilities among institutions on central and local level for DLDD	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic	MOEPP	UNFCCC UNCBD

2017-2023

				of Macedonia		
2.2.2. Creation of the mechanism for effective vertical and horizontal coordination of the institutions in planning and undertaking DLDD activities	Lack of efficient mechanism for coordination among the central government institutions with regards to the activities related to DLDD (Gap 1.4.)	2018	Set mechanisms for coordination of the relevant institutions for DLDD issues	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP	UNFCCC UNCBD
2.2.3. Assessment of forest ecosystem services in affected areas and establishing mechanism for payment for afforestation and maintenance	Forest Ecosystem services are not recognized by other sectors and the state authorities (Gap 5.8.)	2018-2019	Forest ecosystem services recognized by the legislation	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE	UNFCCC UNCBD

OO-3 SCIENCE TEHCHOLOGY AND KNOWLEDGE

Measure	**Description**	**Timeframe**	**Expected results**	**Source of financing**	**Responsible institution**	**Synergy with RIO Conventions**

003-1 Building up the basis for scientific approach in managing issues related to LDDD						
Activity						
3.1.1. Identification of regions vulnerable to desertification and assessment of the status of desertification	One of the first priorities for successful combating with the certain types of land degradation is to identify and delineate the affected vulnerable areas and to estimate or quantify the intensity of certain type of degradation. Due to the fact that there is no preliminary investigations for identification and delineation of affected areas. All existing data related to soil and non-soil parameters, climatological data and other relevant data should be a starting point for preliminary delineation of the regions and later through field research final delineation of the region. This risk maps are crucial for all other activities related to combating with the negative effects of DLDD.	2017	Map of region vulnerable to desertification	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MES HESI	UNFCCC UNCBD
3.1.2. Elaboration of Soil Erosion Map	Soil erosion is widely spread type of land degradation across the country, especially in areas with diversified relief forms and significant human activities. This is the most devastating type of land degradation which results in inevitable loss of fertile soil. Its intensity is closely related to drought phenomena and its negative effects, dis-balanced rain regime and other disturbances in climatic parameters and indexes caused by CC. Elaboration of soil erosion map indicating prone areas and quantifying the intensity of erosion, as mentioned before, is a of paramount importance for successful implementing of measures for diminishing of its intensity and mitigation of the negative effects. The actual soil erosion map is out of date and should be updated using field mapping and modern geospatial modelling and IT supported GIS technologies. In addition, there is lack of a precise field measurement, implying that reliable data for validation of the modelled erosion zones is also missing.	2017-2019	Soil Erosion Map is elaborated for the entire country including erosion map for agricultural land using 2 different models.	GEF FAO EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE MES HESI	UNFCCC
3.1.3. Implementation of Digital Soil Mapping in elaboration of thematic	Despite soil erosion, there are other forms of land degradation that severely affects soil properties. As mentioned before identification and delineation of areas affected and prone to soil	2017-2019	Soil sealing map, Soil salinization map, Soil Compaction map, Map	GEF	MAFWE MOEPP	UNFCCC

maps related to various types of land degradation (soil sealing, soil salinization, soil compaction, loss of organic matters etc,)	degradation should be performed by elaboration of risk maps using modern techniques of DSM. A serious gap and one of the biggest constrains for accurately delineation and identification is a lack of sufficient and quality data. The existing data are scattered within different intuitions with low spatial and temporal resolution. One big step forward has been made with the establishment of the Macedonian Soil Information System (MASIS) where all existing soil data has been integrated in digital format. Still, although this system offers the needed capacities for modelling and DSM application, there is still need for improvement of soil data and significant lack of non-soil data e.g. climatic data, vegetation cover, geology etc.		of loss of organic matter are developed	FAO EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MES HESI	
3.1.4. Development of inventory of harmful impacts and damages of drought and measures taken so far against harmful impact of drought	Connected to GAP 1.8. Drought has severe impacts agricultural production, forestry and on soil properties per se. In order to have an good overview of the degree of impact of drought there is an need of development of sustainable system (consisting of core structure of responsible bodies on central and local level) which will be responsible for systematic land management and data monitoring (on both - state and privately owned land), including collection and storage of monitoring data, land tenure, distribution of best management practices, implementation of DLDD mitigation measures etc.).	2019	Harmful impacts and damages of drought are developed.	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE MOEPP MES HESI	UNFCCC
3.1.5. Establishment of plant and animal life indicators of degradation and desertification	Bio-indicators are important for defining ecological state of any ecosystem. Because ecosystem changes affect flora and fauna. For this reason identification of bio-indicators for any type of land degradation play and serve as an important tools for monitoring of various types of land degradation and its intensity. This indicators includes presence and distribution of specific plants or animals. This action includes: identification of referent	2019	Plant and animal life indicators of degradation and desertification are established.	GEF EU/IPA Bilateral and Multilateral	MOEPP MAFWE MES HESI	UNCBD

	terrestrial or aquatic groups of bio-indicators (plants, animals and microorganisms, development of methodology for its monitoring and selection of tools (models) for spatial prediction of its spatial distribution and verification.			Donors National Budget of the Republic of Macedonia		
003-2 Creation of suitable environment for implementing modern techniques, methodologies and techniques for mitigation of LDDD						
Activity						
3.2.1.Develop Methodology for criteria and procedure for delineation of protective forest areas, including sustainable silvicultural measures	To this moment forest management mainly applies to forest logging within scattered forest management units. Giving thought that unsustainable forest management heavily humper other natural resources e.g. water and soil, any effort towards its protection and improved management is of high importance. Protective forests (forests for protection of soil and water) are recognized within the legislation but not in practice because of absence of definition and methodology as well as recommended silvicultural measures that will be used by forest management planners. In this contest an suitable zones for agroforestry will be identified and delineated as well, which represents another suitable way of usage of forest as a protection of soil and water degradation	2018-19	Established Methodology for criteria and procedure for delineation of protective forest areas and prepared set of recommended sustainable silvicultural measures within these forest. Launched pilot study	GEF WB FAO EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE MES HESI	UNFCCC
3.2.2. Preparation of methodology for recognition of erosive zones and zones affected by erosion	For effective land management and protection of LDD of the areas prone to soil erosion, after its identification and delineation these zones should be recognized as “erosive zones”. The erosive zones are foreseen by the Law on water. The	2017-18	Established methodology for delineation of erosive zones and zones	WB	MOEPP	UNFCCC

	next step will be preparation of Rulebook which will define methodologies of identification and proclamation of erosive zones, and will stipulate an detailed guide of prohibited and recommended land management activities in erosive zones, as well as control and monitoring. Land management activities should be adapted to the need for control of erosion. Such practice of proclamation of those zones existed in the past, but it has been abandoned (despite regulation), creating a lack of basis for undertaking specific policy actions and research projects. For better control of the activities within the erosive zones, the local authorities will be entitled in charge for its administration		affected by erosion (according to the Law on Water) and preparation sustainable land management measures. Launched pilot study	FAO EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MES LMA HESI	

OO - 4 CAPACITY BUILDING

Measure	Description	Timeframe	Expected results	Source of financing	Responsible institution	Synergy with RIO Conventions
004-1 Strengthening of administrative and operational capacities for DLDD issues						
Activity						
4.1.1. Strengthening of the Unit for Soils for dealing with DLDD issues within the MOEPP,	The Unit for Soils within the MOEPP has not sufficient capacities to address complex cross-sectoral DLDD policy-making as well as to establish and maintain a comprehensive LD related database. Also the capacities for development of conflict resolution approach for LD and related sectors are limited. Within a frame of a capacity building project the following issues will be addressed: a functional analysis of the Unit for Soils within MOEPP, identification of possible gaps and opportunities and recommendations for the strengthening of the Unit for Soils within MOEPP.	2018-20	Upgraded capacities of the Unit for Soils within MOEPP with required staff, equipment, knowledge and know-how for DLDD policy making and conflict resolution based on evidence based decision making	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP	UNFCCC UNFCBD
4.1.2 Development of organizational structure to support UNCCD reporting process	The obligation of the member countries for periodical reporting to UNCCD involves many preconditions such as: specific data sets with suitable accuracy and format, knowledge and experience of the reporting staff and sufficient availability of data and appropriate flow of information for the activities undertaken between two reporting periods etc. All these prerequisites for proper reporting to the Convention are unavailable or very limited. Development of the needed infrastructure (development of the data sets, training of the MOEPP staff, establishing links with HESI) will build up required capacities and will enable MOEPP to provide high quality and accuracy reports to UNCCD	2017-18	Capacities for production of high quality and accurate national reports to UNCCD are upgraded. The national reports are timely developed and delivered to	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE NHMS	UNFCCC UNFCBD

4.1.3 Capacity building of MAFWE`s organizational structure - establishment of DLDD Department within Land Policy Unit	The MAFWE organizational structure do not have department responsible for DLDD. The DLDD issues are of crucial importance for departments dealing with environment, crop production, pastures, climate change and biodiversity. The mainstreaming of DLDD issues should be provided through functional analyses of the MAFWE and deriving recommendation for best available practice how to address DLDD issues.	2017-19	Capacities of MAFWE upgraded and DLDD issues mainstreamed within regular activities of MAFWE	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE	UNFCCC UNFCBD
4.1.4. Strengthening supervision of land degradation and protection through - enforcing capacities of inspection service	The capacities of inspectorate for Environment, as well as capacities of inspectorate on Agriculture are not sufficient to conduct DLDD activities and controlling measures related to DLDD. The capacities of these inspectorates should be upgraded trough series of trainings/workshops and elaboration of practices for controlling of DLDD during the field inspections. In addition the corresponding secondary legislation within the Law of soil protection should be adopted which will give a ground and for action to the inspection service. Strong coordination should be established between MAFWE and MoEPP on issues related to DLDD especially on local level which will enforce coordination the actions of both inspectorates. Recently there are initiations to integrate all inspection services within one organizational unit, which will further increase coordination of their actions.	2017-19	The capacities of Inspectorates on Environment and Agriculture strengthened and DLDD issues addressed in field inspections	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE	UNFCCC UNFCBD
4.1.5. Capacity building for DLDD of the HESI through enhancing mobility in respective institutions abroad and ensuring transfer of knowledge from foreign experts	The HESI do not have sufficient capacities to conduct serious research on DLDD. The aged equipment and methodologies in use are limiting their activities and international cooperation. The capacities are not sufficient neither for supporting MOEPP in reporting process. The supplying of modern equipment, training of the research staff and intensification of international cooperation is essential in order to catch step with	2018-20	Increased capacities of HESI with new equipment and training of staff. Access to the journals and other bibliography upgraded. The HESI start with using of	GEF EU/IPA Bilateral and Multilateral	HESI MOEPP MAFWE	UNFCCC UNFCBD

	contemporary research activities at global level. Also access to the contemporary publications (scientific journals, books, publications and unnoted bibliography) should be improved particularly in DLDD related fields.		international research funds and cooperate with other institutions from abroad.	Donors National Budget of the Republic of Macedonia	MES	
4.1.6. Capacity building of water management organizations on DLDD issues	The water management organizations as well as water users associations need awareness raising and capacity building for DLDD in the national and international scale. Management of the water is one of the important factors to prevent land degradation, particularly in the irrigated areas (salinization, irrigation erosion, over exploitation of the water…)	2018-19	Capacities of the Water management organization upgraded. Risk of land degradation in irrigated areas reduced.	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE	UNCBD UNFCCC
4.1.7. Capacity building of the stakeholders for assessment and treatment of the socio-economic implications of the DLDD	DLDD usually have serious impacts on socio economic conditions and human welfare in certain areas. This is especially emphasized in rural regions where inhabitants heavily depend on natural resources due to what any change in the environment and services provides within certain ecosystem or landscape have reflection on socio-economic conditions. There are certain measurable indicators used for identification and evaluation of socio-economic changes. In order to develop and implement of certain measures for mitigation of the negative effects of DLDD on socio-economic conditions it is important to build-up technical and human capacities on central and local level which will enable monitoring, collection and processing of data, as a prerequisite for timely and appropriate intervention in affected areas.	2018-19	Capacities of the stakeholders for assessment and treatment of the socio-economic implications of the DLDD on central and local level are strengthened.	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE MLS	Yes UNFCCC UNFCBD

004-2 Building capacities for efficient monitoring and combating DLDD issues						
4.2.1. Establishment of comprehensive DLDD monitoring	Exhaustive monitoring is the initial and essential step to determine if problems related to DLDD (e.g. soil degradation, desertification, land cover change, vegetation changes, land use changes etc.) really exists and to what extent. There is not existing monitoring of the soil and soil degradation and desertification processes. Also there is not monitoring on land use, land cover and vegetation changes. The monitoring should be based on direct well planned, long-term field surveys. Collected data will be further-on processed and analyzed through GIS techniques, Digital Soil Mapping and remote Sensing (Satellite Imagery analyses). Collected data set as well as derived products in a shape of geo-data base, risk and thematic maps data obtained through this monitoring will be valuable resource for deriving policies and decisions based on scientific data and evidences and will help for reducing the LDD risk in the country.	2018-2020	The monitoring of soil, soil degradation, land cover, vegetation is established and functional. Data of the monitoring are transparent and regularly published trough WEB portal.	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	HESI NHMS MOEPP MAFWE	UNFCCC UNCBD
4.2.2. Establishment/ Improving existing monitoring in the respective institutions related to DLDD	In this moment the National Hydro Meteorological Service (NHS) is in charge for monitoring of climatological parameters and indexes and as a member of DMCSSE contribute to the periodical preparation and issuing of Drought Bulletin. Unfortunately the monitoring network of NHS in the past years is dramatically reduced, which in addition to the insufficient capacities for storage and processing and analyses of data, prevents elaboration of accurate forecast of drought periods, quantification of its impact and design of measures for adaptation and resilience of some sectors (e.g. agriculture, forestry, health) and validation of the effects of implemented measures. The scientific community within Universities, during their research and investigations generates certain set of data related to DLDD but these activities are short term project based activities with very diverse scope of work due to what the collected data sets usually: refers to a small specific areas and very short time frame, have format and resolution, due to what cannot be considered as a basis for analysis of DLDD on a country level and drawing of the necessary conclusions. The capacity building of the institutions that already provide some	2018-19	Institutions that already have some capacities for monitoring of land degradation, desertification and drought developed their capacities and sustainability of the activities is provided.	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	HESI NHMS MOEPP MAFWE CMC	UNFCCC UNCBD

	data on these issues should be upgraded and sustainability of the activities should be ensured, through: establishment of national network of automatic meteorological -stations, which will be used for permanent monitoring of meteorological data which should be stored into mutual data center. This network will enable collection of meteo-data with sufficient spatial and temporal resolution. The collected data should be further on analyzed within the Data Center which will be in charge for forecasting of drought, analyzing of its impact, forecasting of frosts, forecasting of climatologically parameters and indexes which are in a close relation to drought and LDD by the means of climatologically modeling and publishing and dissemination of Bulletin to the end users.					
4.2.3. Establishment of National information centre forDLDD	The National information center for DLDD should serve as a central unit where data related to the DLDD should be collected, analyzed and disseminated.	2018	The National information center for DLDD established and operative	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	HESI, NHMS MOEPP MAFWE CMC	UNFCCC UNCBD
4.2.4.Establishment of Early warning system for UNCCD related matters	The early warning system in UNCCD should be related with other early warning systems in the country. The early warning system should alarm drought, floods, highly intensive rainfalls, forest fires and other events that can generate intensive land degradation	2018	The early warning system established and operative	GEF EU/IPA Bilateral and Multilateral	NHMS MOEPP MAFWE CMC	UNFCCC UNCBD

				Donors National Budget of the Republic of Macedonia		
4.2.5. Development of database for dry lands	The National soil information system is finalized and Web GIS Portal is populated. The system offers many valuable information related to soil properties and can generate many other deliverables related to soil property and suitability. There are still a plenty of data (existing or to be collected) related to land and soil which can be nested within the system and added and interrelated to the existing data. Part of the data are data for the drylands which would be collected and connected to the soil information system for better analyzing and evaluating the dryland processes, territory affected and development of combating measures	2018-2020	Database for dryland issues developed and connected to Soil information system	GEF EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	HESI MAFWE MOEPP AREC	Yes UNFCCC UNFCBD

004-3 Strengthening the environment for efficient R&D on DLDD related issues						
Activity						
4.3.1. Enhancing technical capacities of LDD related scientific institution	The HESI are major promoter and developer of new technologies and major technology transfer source. The technical capacities of HESI for conducting scientific activities in LDD are limited and need to be enhanced.	2018-2020	The technical capacities of HESI enhanced	EU Bilateral and Multilateral Donors National Budget of the Republic	HESI MOEPP MAFWE MES	Yes UNFCCC UNFCBD

				of Macedonia		
4.3.2. Development of long-term research national programmes related to LDD	The financing of research related to LDD is very limited. This type of research in required for development of new monitoring practices, new technologies in the affected sectors, understanding environmental, economic and social implications of LDD processes and deriving mitigation options. The MES, MOEPP and MAFWE should support this type of research trough thir national programs for supporting research activities.	Continious	The LDD issues introduced in National research support programs and number of research project related to LDD increase	EU Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MES MOEPP MAFWE HESI	Yes UNFCCC UNFCBD
4.3.3. Establishing environment for efficient mobility and know-how transfer with similar research institutions on regional/EU level.	The international cooperation, particularly mobility of the researchers is essential for exchange of experiences and know-how. Of particular importance is mobility within the region because there is similar condition, similar factors that generate LDD and these experiences can be easily adopted. The use of existing funds for mobility should be increased (EU funds) but national support particularly for regional cooperation is required.	Continious	The number of scientist doing research activities in LDD abroad and number of visiting scientist increase	EU Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	HESI MES	Yes UNFCCC UNFCBD

OO-5 FINANCING AND TECHNOLOGY TRANSFER

Measure	Description	Timeframe	Expected results	Source of financing	Responsible institution	Synergy with RIO Conventions
005-1 Development of Integrated investment framework for DLDD						
Activity						
5.1.1. Mapping of possible DLDD financial sources (domestic and international)	The issue of DLDD has been directly or indirectly included in the programmes of different donors, but the awareness of the potential beneficiaries about possible financial sources is rather limited. The country lacks Integrated Investment Framework (IIF) for DLDD (as well as IIF in general), implying the need for identification of the possible financial sources for DLDD as a first step towards elaboration of IIF. In addition to the identification of the donor programmes, this measure would include identification of the possible national contribution for DLDD projects (through national and local budgets)	2017	Elaborated comprehensive map of possible financial sources for DLDD projects (domestic and international – bilateral donors, GEF and IPA II)	EU WB FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE	UNFCC UNCBD
5.1.2. Creation of mechanisms for linking available domestic and international financial sources for DLDD	Based on the identification of the possible financial resources for DLDD, mechanisms for linking of the identified sources would be created in purpose of more effective use of the available assistance. In this regards, Programme Based Approach (PBA) in the area of Environment, a mechanism for coordination of the donors that already exists (under auspices of the Sector for European Integration) might be modified or upgraded to cover DLDD as a specific topic.	2017	Created mechanisms for effective coordination of the identified financial sources for DLDD	EU WB FAO Bilateral and Multilateral Donors National	MOEPP MAFWE	UNFCC UNCBD

				Budget of the Republic of Macedonia		

005-2 Provision of domestic financial support for DLDD activities						
Activity						
5.2.1.Integration of DLDD issues in the annual operational financial planning at the central and local level	Commitment of the relevant institutions for financial allocation for DLDD projects is necessary. Activities within the frame of this measure would include increase of awareness about DLDD in the budgetary units in the respective institutions at the central and local level (through different instruments of inter-institutional coordination) and incorporation of the planned DLDD projects in this Action Plan and other related documents into the annual budgeting for the respective years of implementation.	Continuous	Visible allocation of budget support for DLDD projects (co-financing included)	This activity could be conducted through intra-institutional coordination and commitment from the respective institutions	MOEPP, MAFWE, MES, CMC, NHMS, LMA, AREC, PRD, SPA and other institutions dealing with DLDD	
5.2.2. Ensuring regular allocation from the central and local budgets for DLDD issues	Commitment of the relevant institutions for financial allocation for DLDD projects should be sustainable in purpose of achieving valuable results. Elaboration of multi-annual IFC for DLDD would contribute to better and sustainable budgetary planning with regards to DLDD, along with the strong inter-institutional coordination in the respective institutions.	Continuous	Sustainable allocation of budget support for DLDD projects (co-financing included)	National Budget of the Republic of Macedonia Municipal budgets	MOEPP, MAFWE, CMC, NHMS, LMA, AREC, PRD, SPA and other institutions dealing with DLDD	
005-3 Mobilization of international financial support for DLDD activities						
5.3.1. Increasing the capacity at the national and local level to apply for and use the available international	Increase of the capacity for more efficient and effective use of available Funds is necessary. This measure would incorporate identification of the needs for increase of the capacity in respective institutions, followed by workshops about the map of	2018-2020	Strengthened capacity of the institutions for use of the available international	EU/IPA Bilateral and	MOEPP in cooperation with other institutions	UNFCC UNCBD

Programmes for DLDD	available financial sources (link to the measure5.1.1), application rules of the specific programmes (IPA, etc.), project cycle management and other specific trainings according to the identified needs of the institutions.		programmes covering DLDD	Multilateral Donors National Budget of the Republic of Macedonia	dealing with DLDD	
5.3.2. Matching domestic with international financial support by co-financing and other mechanisms	This measure is closely related to 5.1.2 (Creation of mechanisms for linking available domestic and international financial sources) and 5.2.1.(Integration of DLDD issues in the annual operational financial planning at the central and local level). In addition, this measure would include specification of the contribution mechanisms for more effective use of the available international programmes (co-financing, in-kind contributions, etc)	Continuous	Increased use of the available funding for DLDD	EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP in cooperation with other institutions dealing with DLDD	UNFCCC UNCBD
005-4 Development of innovative approach to DLDD financing						
Activity						
5.4.1. Promotion of the public-private partnerships for treating DLDD issues	DLDD issues are usually relevant for larger group of stakeholders, implying possibility for specific issues to be treated through public-private partnership. This measure would include activities for identification and realization of DLDD issues to be treated by private-public partnerships	Continuous	Increased number of treated DLDD issues through public-private partnerships	EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP in cooperation with other institutions dealing with DLDD	UNFCCC UNCBD

5.4.2. Promotion of inter-municipal cooperation in the area of DLDD	Certain DLDD issues could be relevant for two or more municipalities, implying necessity for the inter-municipal cooperation between them. This measure would include activities for identification of issues that could be subject of inter-municipal cooperation and development of instruments (such a joint projects, joint ventures, etc.) for cooperation	Continuous	Established inter-municipal cooperation in the area of DLDD	EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia Municipal budgets	Municipalities	UNFCCC UNCBD
005-5 Improving access to technology in the area of DLDD						
Activity						
5.5.1. Encouraging participation of the research institutions into the EU and UN Programmes for DLDD, aiming to transfer of knowledge and technology	The research institutions working in the area of DLDD are scarce in terms of number and capacity, and have limited participation in the available research programmes of EU and UN. This measure would include activities related to increase of awareness of the respective institutions about the available research programmes for DLDD (by circulation of the relevant information from MES and MOEPP to research institutions), and workshops related to application to such Programmes.	Continuous	Increased participation of the Macedonian research institutions into the DLDD research projects supported from different Programmes	EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	HESI MES MOEPP	UNFCCC UNCBD
5.5.2. Increase of the national allocations for R&D in the area of DLDD	Due to the insufficient national support of the research teams/projects dealing with DLDD, the scientific activities in DLDD are not systematically nor regularly conducted. In this respect, financial commitment of the relevant institutions for financial allocation for DLDD projects should be sustainable in purpose of achieving valuable results. This measure is closely	Continuous	Visible allocation of budget support for R&D in the area of DLDD	EU Bilateral and Multilateral	MES	UNFCCC UNCBD

	related to 5.2.1 and 5.2.2.			Donors National Budget of the Republic of Macedonia		
5.5.3. Ensuring support to the private companies for research, development and application of technologies in the area of DLDD	This measure is related to 5.5.2. In this respect, commitment for financial allocation for DLDD research activities at private companies should be ensured by the respective institutions, and cooperation with the state research institutions should be encouraged (not just in financial terms, but also with regards to exchange of experts, etc.)	Continuous	Increased inclusion of the private companies into the research activities in the area of DLDD	EU Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MES HESI private companies	UNFCCC UNCBD
5.5.4. Promoting networking of the domestic research institutions within the country and abroad	This measure is closely related to 5.5.1. It would include activities related to increase of awareness of the respective institutions about the available research programmes for DLDD (by circulation of the relevant information from MES and MOEPP to research institutions) and signing memorandums of among the universities for cooperation in the area of DLDD	Continuous	Established domestic and international networks of the research institutions for cooperation in the area of DLDD	This activity could be conducted through intra-institutional coordination and commitment from the respective institutions	HESI MES MOEPP	UNFCCC UNCBD
5.5.5. Setting up of a sound statistical base for DLDD	This measure would focus on establishing of a sound statistical base for DLDD by gathering all available information from different institutions in one place and development of indicators that should be further monitored and further stored into the database.	2018-2020	Established statistical database for DLDD	EU/IPA Bilateral and Multilateral	State Statistical Office	UNFCCC UNCBD

				Donors National Budget of the Republic of Macedonia	MOEEP MAFWE	
5.5.6. Maintenance of a sound statistical base for DLDD	Regular updating of the statistical database for DLDD by gathering, processing (if needed) and storing of the respective indicators	From 2017 onwards - continuous	Regularly updated statistical database for DLDD	EU/IPA Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	State Statistical Office MOEEP MAFWE NHMS	Yes

OO- 6 SUSTAINABLE LAND MANAGEMENT – ENGINEERING in a Regions Vulnerable to Desertification

Measure	Description	Timeframe	Expected results	Source of financing	Responsible institution	Synergy with RIO Conventions
OO6-1 - To develop and implement of a full set of Management Practices for Efficient Utilization of Available Land Resources in Agriculture						
Activity						
6.1.1. Improving sustainable soil management and soil conservation practices including erosion control on agricultural land	The soil management on agricultural land is not sustainable. There is no conservation practices in place. The unsustainable soil cultivation practices (plowing in line with the slope, permanent soil cultivation with moldboard plow, constant depth of plowing in long period, use of heavy machinery, cultivation out of the optimal period, over irrigation, no application of manure or other organic matter etc.) are promoting soil degradation processes as erosion, organic matter loss, salinization and reduce soil productive capacities. These practices should be upgraded to the conservation practices and promote practices that improve soil health.	2018-2023	The NEA prepared extension package for using of these practices. Increased awareness for the sustainable soil management and soil conservation practices. The system for supporting these practices in place.	EU/IPA/IPARD GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE NEA HESI	UNFCCC UNFCBD
6.1.2. Implementation of suitable methods and techniques for better water and nutrient use efficiency and soil moisture conservation techniques	The fertilization and irrigation are techniques that significantly increase yield, but frequently used by common sense, not based on soil properties, nutrient content and crop requirement. The fertilization and irrigation based on soil and crop data will highly improve fertilizer use efficiency and water use efficiency. The systems for supporting farmers in decision making when to apply water and/or fertilizers, how much to apply, what type of fertilizer to use, how to conserve soil moisture etc. should be developed and offered as service to the farmers.	2018-2023	The systems for supporting farmers in decision making for increased water and nutrient use efficiency in place	EU/IPA/IPARD GEF FAO Bilateral and Multilateral	MAFWE NEA HESI	UNFCCC UNCBD

				Donors National Budget of the Republic of Macedonia		
6.1.3. Encouraging the implementation of agro ecological measures and good agricultural practices in common agricultural production	The implementation of the good agricultural practices is not at satisfactory level as well as implementation of the agro ecological measures. These measures will enable better control of the activities on the farms, better protection of the soil and limiting soil degradation processes. Encouraging the use of these measures trough use of incentives is required.	2018-2023	The NEA prepared extension package for using of these practices. The incentives for implementation of good agricultural practices and agro environmental measures in place. The agro environmental measures updated with measures that will reduce DLDD in the country	EU/IPA/IPARD GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE NEA HESI	Yes UNFCCC UNFCBD
6.1.4. Promotion of adaptive measures for diminishing the negative effects of DLDD	The use of measures for diminishing negative effects of DLDD such as: cover crops for reducing of soil loss during the period when soil is usually leaved as bare land, intermediate crops in vineyards and orchard for reducing soil loss and damages in the inter row space, use of zeolite and other materials to improve soil water holding capacities, and some other techniques should be promoted. The introduction of incentives will help in quicker promotion and use of these techniques.	2018-2023	The NEA prepared extension package for using of these practices. The incentives for the measures that diminish negative effects of DLDD are introduced in National System for supporting of Agriculture	EU/IPA/IPARD GEF FAO Bilateral and Multilateral	MAFWE NEA HESI	UNFCCC UNFCBD

				Donors National Budget of the Republic of Macedonia		
6.1.5. Introduction of new varieties tolerant to drought and negative impact of CC	The climate change is factor that will increase aridity and DLDD processes. The most of agricultural regions in the country are already affected by CC. The use of new varieties tolerant to drought and heath stress will help in maintaining the agricultural production even in the most affected areas. It will support agricultural activities in the most affected regions. The new varieties should be tested and approved for local production or even better to be a product of domestic breeding programs.	2018-2023	The new drought and heath tolerant varieties in use. The program for supporting National breeding programme for producing such varieties in place.	EU/IPA/IPARD GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE NEA HESI	UNFCCC UNFCBD
OO6-2 Increasing the resilience of agricultural land in dryland (RVD)						
6.2.1. Promotion and implementation of high efficiency irrigation techniques and technologies	The biggest water user in the country is irrigation. The inappropriate use of the water (over irrigation, uncontrolled irrigation on high sloped area, irrigation with unsuitable water quality, inefficient use) are creating problems with land degradation (irrigation erosion, pollution etc.). High efficient irrigation techniques are using much less water, water is applied safely with no risk of erosion even on the high sloped areas etc. Also significant water saving will be achieved that can be used for irrigation of other areas or in some other sectors.	2018-2023	The area under high efficient irrigation techniques increased. The Training Center for Irrigation and Agricultural Water Management (established with support of UNESCO at the Faculty of Agricultural Sciences and Food in Skopje)	EU/IPA/IPARD UNESCO GEF FAO	MAFWE NEA HESI Water Management Organizations	UNFCCC UNCBD

			reactivated and involved in promotion of these technologies	Bilateral and Multilateral Donors National Budget of the Republic of Macedonia		
6.2.2 Encouragement of primary producers for more efficient organic residues management,	The management of organic residues in the country is very inefficient. The organic waste is valuable source of organic matter and energy. The burning of organic matter (spring yard waste, pruning residues etc.) is very common practice. Also unregulated disposal of organic waste and decaying in open areas is causing environmental pollution. This organic matter is valuable resource for maintaining soil organic matter and reducing DLDD problem. The organic restudies can be directly incorporated into the soil or collected and processed in compost that will be used on agricultural land. The incentives for proper management of organic residues will help in awareness raising about its value and capacities for reducing DLDD problems.	2018-2021	The NEA prepared extension package for using of these practices. The incentives trough National System for Support of Agriculture introduced.	EU/IPA/IPARD GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE NEA HESI	Yes UNFCCC
6.2.3. Enhancing the resilience of agricultural land (e.g. organic farming, fertilizing with organic manure etc.)	The agricultural system in the country is characterized with low resilience to weather and soil. The yields are fluctuating with aridity of the growing season that is more pronounced on low fertilie soils with low or reduced soil water holding capacity\y. The simple well known measures can help in increasing land resilience and one of the most efficient is increase of organic matter. The application of manure, green manureing, organic farming and other measures that increase soil organic matter content should be promoted trough system of support of the	2018-2023	The NEA prepared extension package for using of these practices. The incentives trough National System for Support of Agriculture introduced.	EU/IPA/IPARD GEF FAO Bilateral	MAFWE NEA HESI	UNFCCC UNCBD

	farmers.			and Multilateral Donors National Budget of the Republic of Macedonia		
6.2.4. Reconstruction, rehabilitation, and modernization of irrigation and drainage systems	The irrigation is important agricultural measure in the country and about 120000 ha are equipped for irrigation. Only less than 30 000 ha are actually irrigated. Due to various reason hug portion of these irrigation schemes are damaged and the irrigation network is in very bad condition. The rehabilitation and reconstruction process is required in order to increase irrigated area in the country. The process of reconstruction and rehabilitation must be aggregated with process of modernization of the network and to make it suitable for modern and advanced irrigation techniques (drip irrigation, micro sprinklers low energy precision application, using of various irrigation machines etc.)	2018-2023	The portion of the area equipped for irrigation rehabilitated and modernized	EU/IPA/IPARD GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE NEA HESI Water Management Organizations	UNFCCC UNCBD
6.2.5 Support of the extensive (traditional) systems of agricultural production in dry lands	The local experience in managing of land and crops during drought periods is of the high value and should be used in development of the measures for combating DLDD. The incentives for supporting these traditional systems of agricultural production in arid conditions should be introduced to these farming practices.	2018-2023	The incentives trough National System for Support of Agriculture introduced.	EU/IPA/IPARD GEF FAO	MAFWE NEA HESI	Yes UNFCCC UNFCBD

				Bilateral and Multilateral Donors National Budget of the Republic of Macedonia		
OO6-3 Integrated forest-water engineering techniques in dryland						
6.3.1. Improved afforestation of degraded land in RVD (analyze of past actions; defining suitability of species for planting in RVD taking in consideration CC; new techniques and technologies for afforestation, sustainable silvicultural measures…)	In the initial steps of the planned and well organized afforestation in the previously identified areas affected with DLDD processes, the most appropriate techniques of afforestation and sustainable silvicultural measures should be selected together with selection of most suitable species which are in the first place dry and fire resistant species. These approaches in improving of afforestation management should be in accordance with erosion protection which is the main scope of these actions. In addition improving of the capacities and know-how of the institutions in charge for this action is one of the main prerequisites and should be considered as a permanent process of rehabilitation of forests and its maintenance in affected areas of DLDD	2018-2023	Afforested areas using new approaches and techniques	EU/IPA/IPARD GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE PEMF HESI	UNFCC UNCBD
6.3.2. Reconstruction and amelioration of protective belts and monitoring effects of belts on agricultural land	Protective belts play significant role in DLDD affected areas especially on agricultural zones affected with wind erosion and around water bodies and infrastructural objects threatened by water erosion and sediment accumulation. The protective belts apart of its primary function for protection of soil, water and infrastructure, have additional positive side effects e.g. influence on microclimate through decreasing of temperature amplitude, depletion of evapotranspiration and soil water conservation,	2018-2023	Reconstructed protective belts in Sveti Nikole region	EU/IPA/IPARD GEF FAO	MAFWE PEMF HESI	UNFCC UNCBD

	increased yield of agricultural crops and provide habitat for wildlife.			Bilateral and Multilateral Donors National Budget of the Republic of Macedonia - PROFOR		
6.3.3. Introduction ecological friendly material, measures and activities for erosion control	There are wide set of various methods techniques and material used for erosion and torrent control in affected areas. Selection of appropriate technique and material for erosion and torrent control needs sufficient level of knowledge and expertise. In this moment as a very efficient and environmental friendly is usage of biodegradable materials for erosion control (e.g. blankets made of natural fiber, biodegradable polyesters, etc.). This materials were not widely used so far due to a low awareness and insufficient know-how. For these reasons demonstrational plots as pilot studies can be very useful for increasing the awareness for the benefits of use of these materials in common practice for erosion control	2018-2023	Realized pilot study in the RVD	EU/IPA/IPARD GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MES HESI	UINCBD UNFCCC
6.3.4. Introduction ecological approaches for torrent control (with pilot study)	GAP 5.13. While in past dominate constructive structures for torrent control made by rock or concrete, contemporary approach is with use of natural materials (rocks, wood etc.) so called eco-friendly torrent control	2018-2019	Realized pilot study in the RVD	EU/IPA/IPARD GEF FAO	MOEPP MES HESI	UNCBD UNFCCC

				Bilateral and Multilateral Donors National Budget of the Republic of Macedonia		
6.3.5. Introduction new techniques for reclamation of anthropogenic degraded land (excavation sites, landfills, slag disposal sites, etc..)	GAP 5.13. These areas are generally highly prone to erosion processes and all consequences of them. Using new approaches and techniques and approaches especially on chemically degraded land should be reduced additional effects of them on soil, surface water and groundwater.	2019-2122	Realized pilot study within the RVD	EU WB GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MES HESI	UNCBD UNFCCC
6.3.6. Community based rehabilitation of degraded land in hilly-mountain regions and reclamation of extremely degraded land	Huge areas affected by high erosive processes, very frequent torrential flows, intensive mineralization of soil organic matter on areas under intensive agricultural production, common over irrigation practices can intensify salinization, inappropriate irrigation practices can provoke intensive erosive processes, but there is lack of appropriate and sufficient land conservation measures and activities. In this respect, delineation of these	2019-2022	Realized pilot study within the RVD	EU WB GEF	MOEPP MES LMA HESI	UNCBD UNFCCC

	areas is needed as basis for further actions. Gullies and shallow landslides could be managed using natural materials and specific techniques. This actions needs systematic approach and needs long term planning and financing and enforcement of capacities and expertize of the of institutions which will be in charge for its implementation and maintenance. Land management should be down scaled to community level			FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia FAO		
6.3.7.Reconstruction and maintenance of hydro-ameliorative systems (dams and irrigation schemes), water supply structures and systems for flood protection	Water supply for households and irrigation are country priorities which in an environment of more severe water scarcity in the past decades, becomes more and more keen issues. Recent more frequent floods affecting large areas of the country, causing big material loses and in some cases human casualties, increase the attention and the need for urgent intervention. All this makes the water sector very complex giving thought that in all cases the needed interventions are long term and costly. In this sense it should be noted that drainage and flood protection structures are in a poor conditions. .Loss of water in the systems is significant. Taking in consideration forecasted CC, these structures should be reconstructed and upgraded. In terms of water supply for households, in many cases especially in rural areas which are the most affected by DLDD, the need for access to fresh water is of high importance and has a strong impact on the overall wellbeing of the rural population. In many cases water supply network should be newly established, in some cases there is a need of reconstruction and in many cases especially in the urban areas there is a need of optimization such as introduction of dynamic control systems etc.	2018-2023	Reconstructed water structures in the RVD (pilot study) Established dynamic control of irrigation in pilot area	EU WB GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE PWE	UNFCCC
6.3.8. Preparation of flood management plans for affected areas	Drainage systems as well as systems for protection against floods, erosion and torrents are in a poor condition because most of them are constructed in the 60' and 70's of the XX	2018-2019	Prepared flood management plan for any sub-basin in the RVD	EU	MOEPP	UNFCCC

	century. Priority issue is preparation of secondary legislation which will contain provisions for preparation of Flood management plan according to the Flood directive.			WB GEF Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	LMA's HESI	UNCBD
OO-6-4 Improvement of land use planning						
6.4.1. Development of land capability and land suitability analysis for the dryland areas and preparation of a detailed management plan	Land capability map is in draft format within MAFWE. Less than one half of the country is covered with field and laboratory examinations related to determination of land capability.. This map is indispensable for determination of land capability classes and further delineation of agro ecological zones (AEZ), which along with definition of land utilization types (LUT) is a prerequisite for sustainable use of land.	2018-2019	Prepared Land capability map of RM	EU WB GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MAFWE AREC	UNFCCC UNCBD

6.4.2. Protection of land from soil sealing	Having in mind that soil resources are very limited and vulnerable to DLDD impacts, the protection of the high quality soil/land from urban development and negligent use is a high priority especially in the agricultural sector. There is an urgent need for implementing of sustainable land use planning and measures for maintenance and improvement of soil quality (e.g. GAP and AEM, permanent control of soil fertility etc.). Land resources are under heavily pressure of urbanisation and development of infrastructure network. For these reasons delineation and protection of high quality agricultural land is necessity. Land use planning should be taken in consideration during preparation of urban plans around big urban areas and during planning and building of big infrastructural objects.	Continuously	Soil is protected from sealing	EU GEF Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP MAFWE	UNFCCC UNCBD
6.4.3.Systematic improvement of urban and spatial planning	With a reference to DLDD, it can be concluded that the Land Use Planning is inappropriate DLDD issues are only tackled in spatial planning, but in general urban planners don't pay sufficient interest to this matters. Changes should be done especially in the secondary legislation. Pilot plans should be prepared in a lien with the provisions indicated in the newly drafted secondary legislation. Land use planning should be improved with implementing of modeling for e.g. prediction of future land use change and its linkage with changes of its biophysical and socio economic drivers. On the base of this approach for prediction of LUCC an model for SLM could be established. With developing of sustainable models of land use and land management, the state of land degradation and desertification could be improved.	2018-2023	Amended rulebook for preparation urban and spatial plans with involving DLDD issues. Prepared urban plan that take in consideration DLDD issues. Preparation of new spatial plans with mainstreaming DLDD issues. Realized pilot study in RVD where will be developed model for future LUCC and based of it model for SLM	EU GEF FAO Bilateral and Multilateral Donors National Budget of the Republic of Macedonia	MOEPP LMA	UNFCCC UNCBD

NAP IMPLEMENTATION

12. NAP Implementation

12.1. Guiding principles to the implementation of the NAP

The following are the set of principles which will guide the implementation of the NAP and which will be used to achieve its goals and objectives. They encompass the principles set out in the Convention and are based on the sentiments articulated during the UNCCD public consultations.

Figure 21 *Sustainable management and use of land resources*

12.2. Prioritization and Dynamic plan

Which combination of the measures to be implemented **should be based on an agreed selection process based on agreed selection criteria, and agreed scoring and ranking**. These selection criteria should cover hard selection criteria as available funding, available manpower with necessary skills, as well as more soft selection criteria reflecting political priorities national, regional and local., All proposed measures were prioritized with sub-objective and duration of each project was defined through the public participation process.

Measures within any sub-objective are ordered per priority.

1. Dynamic plan and financial construction
2. Financial mechanisms
3. Public Participation/ CSOs/
4. Scientific – education society
5. International cooperation
6. Monitoring the NAP implementation

12.3. Financial mechanisms

The awareness about the importance of sustainable land management (SLM) and DLDD has increased over the years, resulting into development of different financial mechanisms that could be used for SLM and DLDD. These mechanisms include different types of regulations and direct or indirect payments schemes provided by the state, instruments provided by the investment and commercial banks, as well as joint ventures of stakeholders, including public-private partnerships. UNCCD has identified several financial mechanisms for SLM and DLDD, including Microfinance and Incentive and Market Based Mechanisms, as most relevant for this document.

Microfinance is a financial mechanism aiming to provide support to small stakeholders who lack access to finances for investment that could contribute to SLM and DLDD. The financial support could take form of grants, credit lines, loans under favourable terms and other financial instruments. Projects eligible for financing usually include investment for better agricultural techniques, capacity building and education, income diversification, improved access to credit for women, and improved soil, water and forest conservation. Microfinance can at the same time help foster poverty reduction, gender empowerment and climate change. It could be used in many areas relevant for DLDD – agriculture, forestry, water-management, eco-tourism, etc. The sources for microfinance mechanism could be provided from state budget, private funds, investment and commercial banks.

According to UNCDD, the incentive and market based mechanisms could be categorised into four types:

- Public payment schemes to private land and forest owners who implement sustainable land management practices. These schemes mostly include subsidies and tax incentives for investment and activities related to SLM and contributing to DLDD.
- Open trading between buyers and sellers of property or services affecting balance of the ecosystems. This type includes mechanisms such as tradable development rights, conservation banks, trading of emission reductions, etc.
- Self-organized private deals between individual beneficiaries of ecosystem services and providers of those services. This type includes mechanisms such as purchase of development rights (related to ecosystem service), direct payments for environmental services, as well as conservation concessions;
- **Eco-labeling** of products that assures buyers that production processes involved have a neutral or positive effect on ecosystem services. These products are sold to consumers who are willing to pay a higher price. The mechanisms include marketing labels and certification schemes.

Apart of abovementioned, there are other mechanisms that could be used for financing activities related to DLDD. Particularly important are joint ventures of stakeholders, including public-private partnerships, as innovative mechanisms that could significantly contribute to ensuring ownership (as precondition for better results) from public and private sector to the activities related to DLDD. Also, significant mechanisms are green funds established by the state, which could also include partners from the private sector, designated to fulfilment of particular goals related to DLDD.

In the Republic of Macedonia, the awareness about the financial mechanisms for DLDD is primarily related to state schemes and microfinance instruments. However, the application of financial instruments aiming to combat land degradation and desertification is rather scarce. The measures in this document include mapping of the potential financial sources for DLDD and elaboration of an Integrated financial strategy (IFC) for DLDD, which should enable widening of the range of financial mechanisms in the area of DLDD in Macedonia (ANNEX III).

12.4. Public Participation/CSOs

The UN Convention attaches great importance to the role of public opinion to combat land degradation/desertification. Moreover, public participation, particularly in the sphere of raising awareness, has been identified by the Aarhus Convention that Macedonia acceded in 1999. The efficiency of taking concrete steps in combating land degradation is conditioned by the state of economic and social situation of a country, since, in a situation when there is high unemployment and economic crisis in the country, the problem of land conservation is not considered particularly important. In order to attract public attention, and increase its participation in the processes of drafting and adoption of the environmental legislation, we
need to form a system that will efficiently and in shortest possible time, provide answers to submitted requests (inquiries), and permanently and effectively inform the public on taken steps. This type of dissemination of information can, to some extent, seem passive since it would be available only to those who have interest in finding out the state of a specific environmental aspect. We note that the public bodies responsible for the environment have so far published numerous promotion materials for the World Earth Day, World Environment Day, World Ozone Layer Preservation Day, and International Biodiversity Day but in terms of land – the importance of its preservation from degradation is still invisible in Macedonia. Mobilizing citizens for the purpose of raising public awareness on the importance of land as a natural resource, and its preservation, represents a very important part of NAP implementation. In the previous period, media in Macedonia have not paid enough attention to the problems and state of the environment, and almost none to land issues. Regardless of whether they are printed or electronic media, their information on these segments is limited, minimized and treated as irrelevant. On the other hand, one can find a certain number of good examples, primarily as a consequence of efforts of specific non-governmental organizations and individuals that resulted in high quality articles, reports and publications. There are about 70 to 100 registered environmental NGOs in Macedonia. It is the environmental NGOs that are among the most active NGOs in the country. These NGOs contributes to the development of sound and well-formulated environmental policies through dialogue with decision makers.

The issue of lack of information, analysis, research, single databases on polluters, facilities with environmental permits, amounts collected under environmental protection at all government levels, inevitably reflect on the awareness and behavior, that do not sufficiently appreciate ecological functioning of all citizens. Systemic addressing of the issue of land protection against any type of degradation implies more active involvement of all citizens, public and non-governmental organizations, in the process of creating, adoption and implementation of environmental decisions and all other activities.

For this problem to become topical, there is a need to promote land preservation in mass media more aggressively, to organize workshops, seminars, training courses, meetings with local communities, companies, scientific and research institutions, NGO sector, etc. In addition, attention should be paid to marking and promotion of specific dates such as the World Day to Combat Land Desertification, World Environmental Day, World Forestry day, distribution of materials and development of a Yearbook on the state of the environment by governmental and non-governmental institutions with participation of media to the maximum extent possible. Public participation requires close collaboration of civil sector in Macedonia with the state institutions and local communities. Governmental institutions in charge of the issues of land protection should initiate cooperation in early stages of planning of specific activities, invite the Civil Society representatives in Macedonia and other stakeholders and involve them in decision making process. Relevant information should be made available, and local experts included in development of relevant laws and by-laws, strategies and projects in the field of land protection, as well as professionals and representatives of the NGO sector, and actively collaborate with local communities. As for this separate COMMUNICATION PLATFORM FOR THE IMPLEMENTATION OF NATIONAL ACTION PLAN ALIGNED TO THE UNCCD 10 YEAR STRATEGY was elaborated (ANNEX IV).

12.5. Scientific – education society

The country has a considerable background, tradition and experience in coping with issues related to land management and conservation. Remarkable results were achieved within the past few decades after the Second World War up to the end of ’90. During this period the majority of relevant educational and scientific capacities were established and the most important activities were performed.

Most significant institutions encompassing the majority of capacities and activities related to land degradation and desertification are Institute of Agriculture, Faculty of agricultural sciences and food and Faculty of Forestry, which are parts of the University Ss Cyril and Methodius in Skopje. These institutions are in fact the scientific and educational base which coupled with the relevant capacities within the Ministry of Agriculture, Forestry and Water Economy (MAFWE) and Ministry of Environment and Physical Planning (MOEPP) were entitled to cope with wide range of issues related to land e.g. strategic, legal, R&D and participation in various ad-hock and long-term activities of vital importance.

Implementation of actions and measures as foreseen and proposed for the next period of implementation of the NAP requires proactive involvement of the relevant scientific institutions and all existing capacities on institutional and individual level. For fulfillment of the proposed actions a joined long term effort of interdisciplinary teams is a necessity.

With regards to the implementation of the NAP main role of the scientific society will be to:

- To participate in building up of the needed infrastructure for implementing of NAP and to give a full support to the responsible institutions and bodies on a central and local level,
- To participate in design and implementation of a specific projects and programs for successful and efficient implementation of activities and measures foreseen in this NAP,
- Proactive participation in exchange of know how between scientific communities on a regional and international level, development of new methodologies and approaches in combating LDD and conveying of this knowledge to end users,
- Improvement of the curricula on Universities related to LDD and upgrading of the needed environment for successful transmission of new methodologies, models and techniques to students,
- Increasing of the public awareness of a broader audience for the importance of LDD processes and its overall impact on all aspects of human being and welfare, through drafting of interactive materials for all levels of educational process, participation on public debates, electronic media and all other means for information and education.

12.6. International cooperation

Participation to the meetings such as particularly Conferences of Parties (COP), Committee for Revision of Implementation of the Convention (CRIC), Regional Action Programme (RAP), and Sub-Regional Action Programme (SRAP) is important in terms of benefiting and exchange of experiences. Moreover, participation of all related national institutions, universities, civil society organizations and interested experts should be promoted.

An active follow up program is necessary for improving cooperation by means of bilateral, regional and global conventions and for harmonizing implementation in Macedonia with new techniques and new approaches.

In order to benefit from these mechanisms effectively, it is necessary to establish coordination and cooperation between national institutions. At the same time, partnerships with countries from

European Union, Central Asia and Mediterranean should be encouraged. Especially, projects with the financial support of European Union and other sources should be identified to increase knowledge and capacity of the institutions.

12.7. Monitoring and Reporting

A rigorous monitoring and evaluation system, based on participatory principles, would be built into NAP implementation, making for not only accountability at various levels but also helping shape and refine program implementation methods over time. Monitoring and evaluation arrangements would include:

- Semi-annual progress reports on each project by the implementing agency concerned;
- At the national level, a stakeholder's review workshop to be held annually to review status of implementation of individual projects, outputs achieved and the progress towards anticipated outcomes, along with constraints faced and areas of improvement needed; and
- Country reports by the National Focal Point every four years.

In addition, a *mid-term review* is also provided for, at which time independent assessments based on the documented results as well as additional observations and/or studies would be carried out. A small professional team made up of individuals nominated by the MOEPP shall undertake this exercise, to be completed no later than five (5) years after project inception. Its main aims shall be to take stock of achievements as well as constraints, from strategic as well as operational perspectives; re-examine program objectives; help fine-tune approaches and methods; and ensure continuing relevance of various program interventions. Near the end of the project, a *terminal evaluation* will be undertaken to assess program achievements and overall impacts. Both the mid-term review and terminal evaluation will be funded by the UNCCD.

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Annex I: Additional Figures and Tables

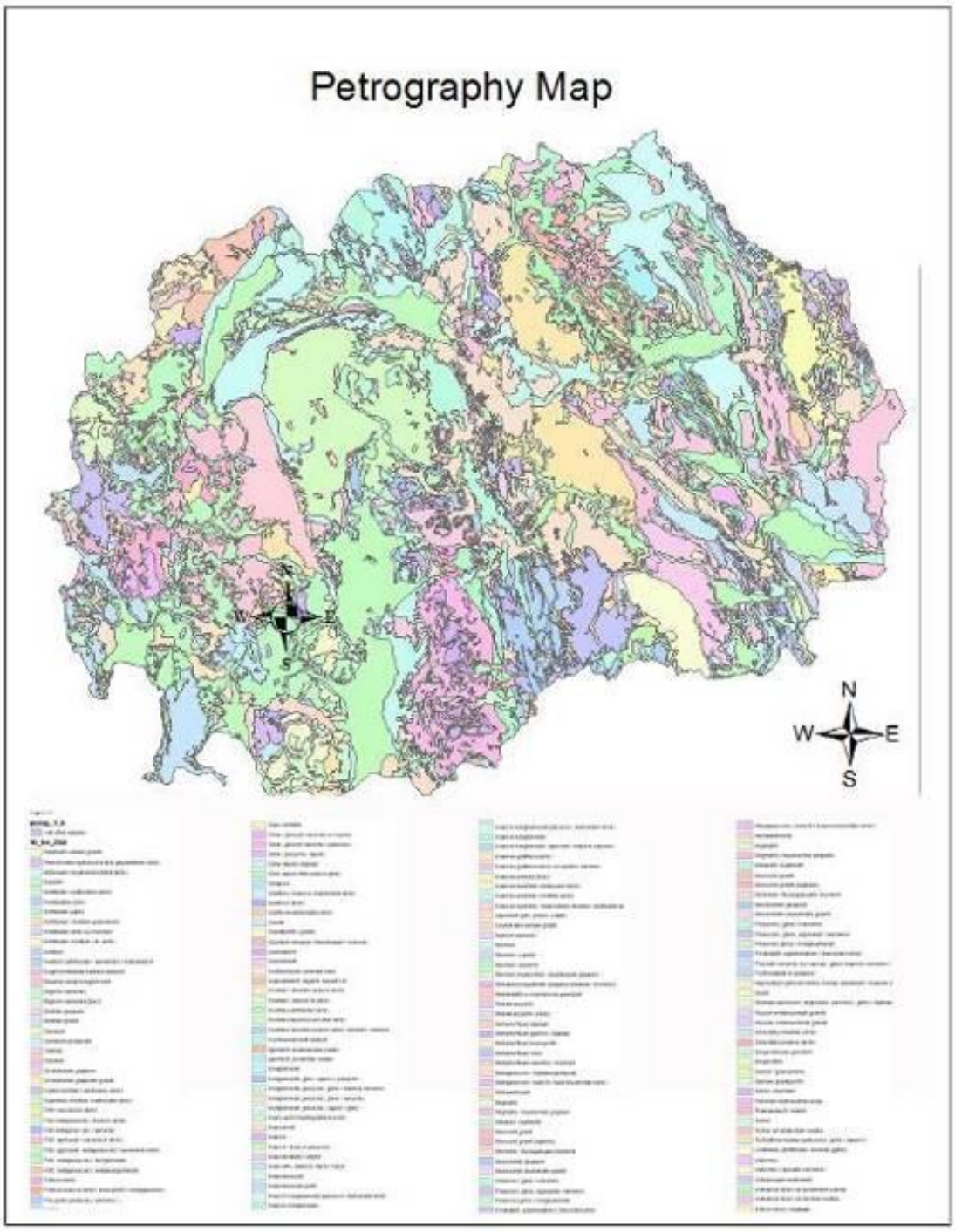


Figure 1 – *Petrography map of Macedonia*

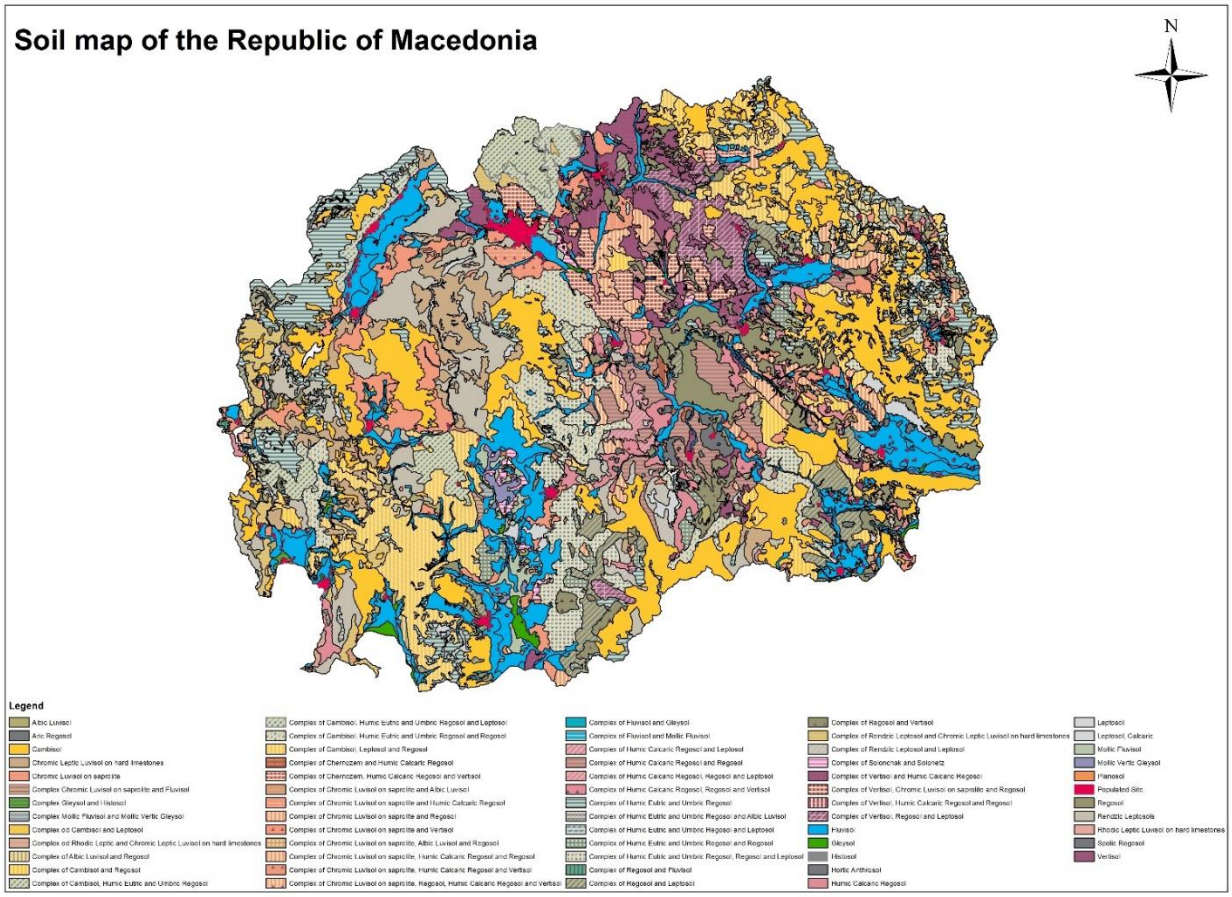


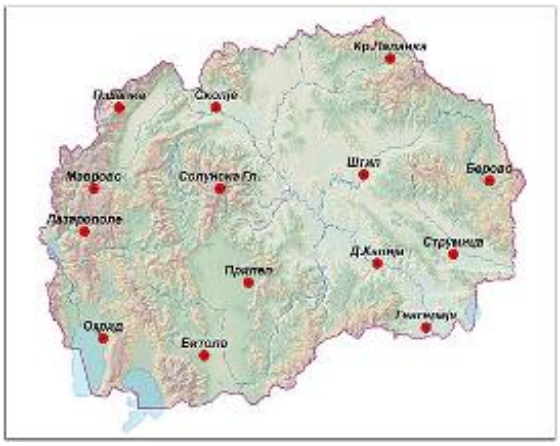
Figure 2 – *Soil map of Macedonia*

Table 1 - Soil types distribution in Republic of Macedonia

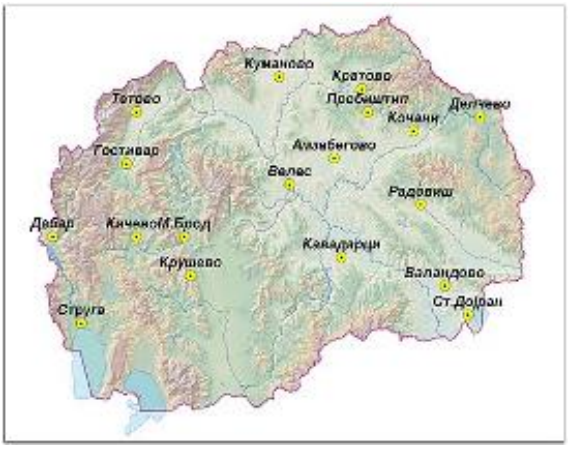
No.	Soil Type	ha	%
1	Chernozems	6412.34	0,26
2	Chromic cambisols	96594.38	3,86
3	Terra rossa	182.75	0,01
4	Deposols	309.92	0,01
5	Fluviatle soil	136343.60	5,45
6	Fluviative meadow soil	18278.68	0,73
7	Hydromorphyc black soils	6625.53	0,26
8	Coluvial hortisol	380.16	0,02
9	Forest cambisol	397285.2	15,87
10	Calcocambisol	89839.87	3,59
11	Proluvium	181391.20	7,25
12	Leptosols	42548.15	1,70
13	Albic luvisols	9392.27	0,38
14	Gleic soils	9377.06	0,37
15	Regosols	108291.60	4,33

16	Ranker	142294.80	5,68
17	Rendzinas	49678.59	1,98
18	Vertisol	85779.23	3,43
19	Salinic soils	13863.22	0,55
20	Calcomelanosols	148556.70	5,93
21	Planosols	1218.93	0,05
22	Albic luvisols+regosol	6000.48	0,24
23	Swamps	219.65	0,01
24	Rigosols	7223.65	0,29
25	Saprosols	156.31	0,01
26	Umbrisols	132.56	0,01
27	Albic luvisols+regosol	6000.48	0,24
Soil complexes		ha	%
28	Complex of leptosols+regosol	13999.14	0,56
29	Complex of fluviative+proluvium, fluviative-meadow	2200.23	0,09
30	Complex of chromic cambisol+Leptosols, Luvisol, Rednzina, Vertisol	88016.32	3,52
31	Complex of fluviative meadow+gley soils	230.33	0,01
32	Complex of forest cambisols +rakers, leptosols, regosols	377249.70	15,07
33	Complex of ranker+regosol, leptosol	101162.60	4,04
34	Complex of regosols+rendzinas, leptosols, ranker, vertisol	100768.70	4,03
35	Complex of rendzinas+chromic cambisols, regosol, leptososl, vertisol	72909.71	2,91
36	Complex of vertisol+rednzinas, Leptosols	133542.20	5,33
37	Complex of calcomelanosols + leptosols, Calcocambisols	48873.89	1,95
	T o t a l	2503330	100.00

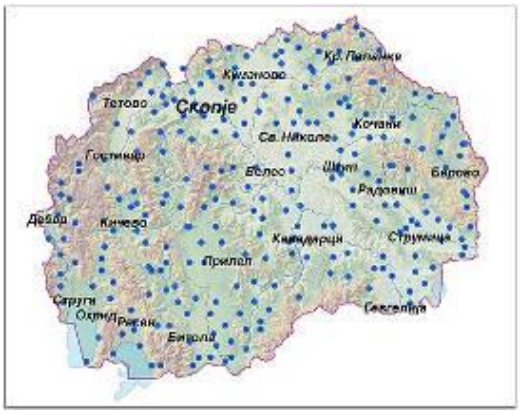
Figure 3 – Hydrological monitoring network



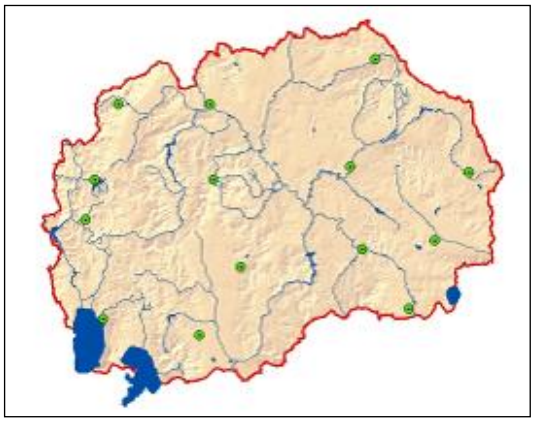
Main meteorological stations



Regular meteorological stations



Precipitation stations



Phenological stations

Figure 4 – Meteorological monitoring network

Table 2: *Average annual rainfall sum for selected stations, period 1951-90, 1991-2000, 2001-2010 and 1951-2010*

Gauge	***P [mm]***	***note***	***1951-1990***	***1991-2000***	***2001-2010***
Kavadarci	465,5	1951-2000	476,7	420,5	
Sv. Nikole	471,1	1951-2000	471,8	468,4	
Radovis	471,5	1951-2010	463,5	402,7	572,2
Stip	475,4	1951-2010	482,6	423,7	498,0
Veles	478,3	1951-1990 U 2000-2010	459,0		555,5
Skopje	497,5	1951-2010	501,7	436,1	542,0
Kocani	514,3	1951-2010	522,6	485,1	510,4
Delcevo	526,8	1951-2010	514,7	470,9	631,2
Kumanovo	531,5	1951-2010	542,8	448,6	569,2
Prilep	541,7	1951-2010	556,7	461,3	562,0
Demir Kapija	554,0	1991-2010		499,4	608,6
Strumica	583,1	1951-2010	583,3	525,2	640,0
Valandovo	598,3	1951-2010	610,8	486,6	660,0

Gevgelija	695,6	1951-2010	694,4	615,8	780,0

Table 3 *Average annual temperature for selected stations, period 1951-90, 1991-2000, 2001-2010 and 1951-2010*

Gauge	***T [°C]***	***note***	***1951-1990***	***1991-2000***	***2001-2010***
Valandovo	14,7	1951-2010	14,2	15,4	16,1
Gevgelija	14,5	1951-2000	14,2	15,0	15,4
Demir Kapija	14,0	1991-2000		13,7	14,3
Kavadarci	13,4	1951-2000	13,6	12,8	
Kocani	13,4	1951-2000	13,0	14,3	13,8
Veles	13,3	1951-1990 U 2000-2010	13,3		13,1
Strumica	13,0	1951-2010	12,9	12,7	13,5
Stip	13,0	1951-2010	12,8	13,0	13,5
Sveti Nikole	12,5	1951-2000	12,5	12,6	
Skopje	12,3	1951-2010	12,0	12,7	13,1
Radovis	12,3	1951-2000	12,3	12,2	
Kumanovo	12,0	1951-2010	11,8	12,3	12,6
Prilep	11,4	1951-2010	11,2	11,5	11,9
Delcevo	10,4	1951-2010	10,6	10,0	10,2

Table 4: Land Cover/Use changes in the period 2000-2006

CHANGE	CLC_00	CLC_06	AREA ha
131-231	Mineral extraction sites	Pastures	376,01
132-231	Dump sites	Pastures	486,34
142-112	Sport and leisure facilities	Discontinuous urban fabric	9,49
211-112	Non-irrigated arable land	Discontinuous urban fabric	348,91
211-121	Non-irrigated arable land	Industrial or commercial units	205,89
211-131	Non-irrigated arable land	Mineral extraction sites	11,92
211-132	Non-irrigated arable land	Dump sites	140,69
211-133	Non-irrigated arable land	Construction sites	8,78
211-213	Non-irrigated arable land	Rice fields	57,79
211-221	Non-irrigated arable land	Vineyards	838,4
211-222	Non-irrigated arable land	Fruit trees and berry plantations	11,06
211-231	Non-irrigated arable land	Pastures	49,26
211-242	Non-irrigated arable land	Complex cultivation patterns	153,69
211-411	Non-irrigated arable land	Inland marshes	14,38
212-211	Permanently irrigated land	Non-irrigated arable land	62,36
221-121	Vineyards	Industrial or commercial units	25,62
221-132	Vineyards	Dump sites	7,6
221-133	Vineyards	Construction sites	38,13
221-211	Vineyards	Non-irrigated arable land	1349,6
221-231	Vineyards	Pastures	176,57
221-242	Vineyards	Complex cultivation patterns	355,87
221-243	Vineyards	Land principally occupied by agriculture, with si*	37,58
222-211	Fruit trees and berry plantations	Non-irrigated arable land	450,41
222-231	Fruit trees and berry plantations	Pastures	34,09

222-242	Fruit trees and berry plantations	Complex cultivation patterns	125,39
231-112	Pastures	Discontinuous urban fabric	50,13
231-121	Pastures	Industrial or commercial units	8,24
231-131	Pastures	Mineral extraction sites	202,12
231-132	Pastures	Dump sites	125,76
231-133	Pastures	Construction sites	56,54
231-211	Pastures	Non-irrigated arable land	52,08
231-221	Pastures	Vineyards	24,18
231-242	Pastures	Complex cultivation patterns	224,09
231-311	Pastures	Broad-leaved forest	47,53
231-324	Pastures	Transitional woodland-shrub	604,56
231-512	Pastures	Water bodies	17,91
242-112	Complex cultivation patterns	Discontinuous urban fabric	511,37
242-121	Complex cultivation patterns	Industrial or commercial units	17,65
242-122	Complex cultivation patterns	Road and rail networks	11,1
242-131	Complex cultivation patterns	Mineral extraction sites	156,65
242-132	Complex cultivation patterns	Dump sites	36,65
242-133	Complex cultivation patterns	Construction sites	2,36
242-211	Complex cultivation patterns	Non-irrigated arable land	45,06
242-213	Complex cultivation patterns	Rice fields	5,4
242-231	Complex cultivation patterns	Pastures	41,87
242-324	Complex cultivation patterns	Transitional woodland-shrub	19,52
242-511	Complex cultivation patterns	Water courses	8,57
242-512	Complex cultivation patterns	Water bodies	82,36
243-112	Land principally occupied by agriculture, with	Discontinuous urban fabric	132,19
243-131	Land principally occupied by agriculture, with	Mineral extraction sites	110,01
243-132	Land principally occupied by agriculture, with	Dump sites	3,04
243-133	Land principally occupied by agriculture, with	Construction sites	2,45
243-213	Land principally occupied by agriculture, with	Rice fields	18,96
243-221	Land principally occupied by agriculture, with	Vineyards	18,98
243-311	Land principally occupied by agriculture, with	Broad-leaved forest	116,21
243-312	Land principally occupied by agriculture, with	Coniferous forest	6,17
243-324	Land principally occupied by agriculture, with	Transitional woodland-shrub	127,2
243-511	Land principally occupied by agriculture, with	Water courses	13,85
243-512	Land principally occupied by agriculture, with	Water bodies	332,7
311-131	Broad-leaved forest	Mineral extraction sites	25,55
311-133	Broad-leaved forest	Construction sites	112,13
311-231	Broad-leaved forest	Pastures	6,36
311-312	Broad-leaved forest	Coniferous forest	5,3
311-313	Broad-leaved forest	Mixed forest	102,1
311-321	Broad-leaved forest	Natural grasslands	93,88
311-324	Broad-leaved forest	Transitional woodland-shrub	17476,27
311-512	Broad-leaved forest	Water bodies	222,66
312-112	Coniferous forest	Discontinuous urban fabric	6,06
312-131	Coniferous forest	Mineral extraction sites	12,21
312-324	Coniferous forest	Transitional woodland-shrub	692,76
313-131	Mixed forest	Mineral extraction sites	21,8
313-312	Mixed forest	Coniferous forest	40,96
313-324	Mixed forest	Transitional woodland-shrub	231,63
313-512	Mixed forest	Water bodies	77,23
321-131	Natural grasslands	Mineral extraction sites	87,19
321-133	Natural grasslands	Construction sites	13,89
321-243	Natural grasslands	Land principally occupied……..	100,49

321-311	Transitional woodland-shrub	Broad-leaved forest	162,5
321-324	Natural grasslands	Transitional woodland-shrub	472,13
321-512	Natural grasslands	Water bodies	199,29
322-131	Moors and heathland	Mineral extraction sites	15,81
323-312	Sclerophyllous vegetation	Coniferous forest	5,5
324-112	Transitional woodland-shrub	Industrial or commercial units	10,71
324-121	Transitional woodland-shrub	Industrial or commercial units	14,5
324-131	Transitional woodland-shrub	Mineral extraction sites	72,25
324-132	Transitional woodland-shrub	Dump sites	14,18
324-142	Transitional woodland-shrub	Sport and leisure facilities	8,09
324-231	Transitional woodland-shrub	Pastures	137,36
324-242	Transitional woodland-shrub	Complex cultivation patterns	3,83
324-311	Transitional woodland-shrub	Broad-leaved forest	4220,86
324-312	Transitional woodland-shrub	Coniferous forest	919,67
324-313	Transitional woodland-shrub	Mixed forest	723,87
324-512	Transitional woodland-shrub	Water bodies	596,94
411-242	Inland marshes	Complex cultivation patterns	58,32
511-243	Water courses	Land principally occupied …….	5,25
511-331	Water courses	Beaches, dunes, sands	5,43
512-411	Water bodies	Inland marshes	59,55

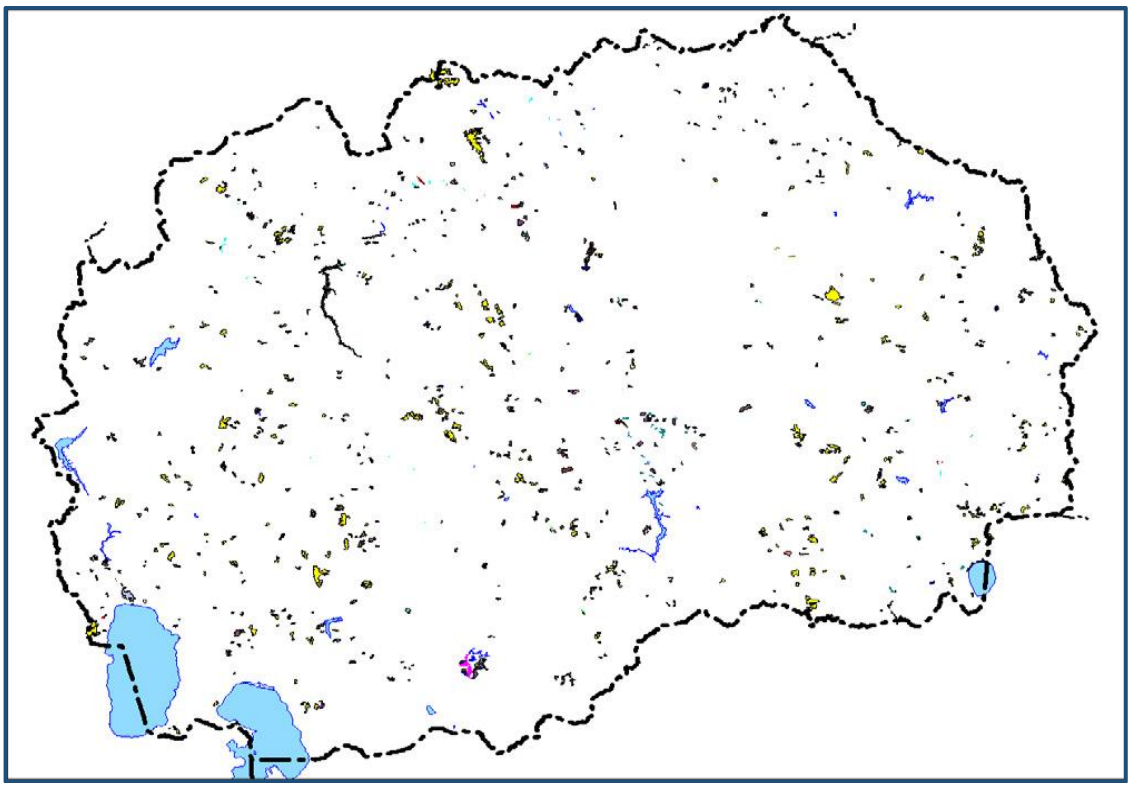


Figure 5 – Changes in Land Cover 2000-2006 according to CORINE nomenclature

Table 5 – Industrial/mining hot spots

Hot spot	Source of pollution	Status	Material (m^3)	Area covered (ha)
OHIS	Dump site HCH, lindane,	abandoned	252.200	7,7
Bucim	Dump site of copper	active	196.000.000	90,0
	Dump site of mine activities	active	1.115.000	9,5
Lojane mine	chrome, arsenic, antimony	abandoned	1.000.000	10,0
SASA mine	Lead and zinc	abandoned	30.000.000	28,5
Silmac	Ferro - silicia	active	851.000	8,0
Toranica mine	Lead and zinc	abandoned	3.000.000	2,5
Makstil	Iron and steel	active	2.500.000	12,5
Zletovo mine	Lead and zinc	abandoned	14.000.000	28,0
MEC Bitola	Coal mine and TEP	active	11.000.000	10,0
FENI	Ferro - nickel	active	2.200.000	16,7
Zletovo mine	fertilizers	abandoned	3.700.000	7,0
MEC Oslomej	Coal mine and TEP	active	2.000.000	28,0
Godel	furrier	abandoned	5.600	0,1
OKTA	Oil raffinery	active	3.000	0,6
	Metal industry	abandoned	10	0,0
T o t a l			267.626.810	259,0

ANNNEX II: COMPLEMENTARY MEASURES RELATED to DLDD IDENTIFIED FROM OTHER PLANS

1) **Measures and activities identified within Climate Change Action Plan (for agriculture, forestry, water and biodiversity)**

Agriculture

- Establishing of National center for drought and yield forecasting
- Development of techniques and procedures for cultivation, fertilizer utilization and soil reclamation for the key crops
- Development different tillage practices for the promotion of sustainable agricultural practices.
- Development irrigation techniques and water supply
- Establishing of national network for long term monitoring of agro-climatic and agro-edaphyc parameters
- Development of criteria and identification of LUT and AEZ
- Establishment of 15-20 phenological fields and long term financing program
- Establishment of facilities for processing of bio residues
- Establishment of early warning system (network of meteorological stations) for improved pest control and water use efficiency
- Financial support for implementation of modern adaptation measures, e.g. UV nets, cover crops
- Financial support for implementation of methods and techniques for increasing of water use efficiency, e.g. pressurized irrigation systems, control systems for efficient irrigation scheduling, etc.
- Long term investments in reconstruction and extension of dams and irrigation schemes

Water sector

- Modification of existing water supply and irrigation systems to decrease water losses (drip, micro spray, low-energy)
- Long term investments in reconstruction and extension of dams and irrigation schemes
- Implementation technology for reuse of water (municipal, drainage, waste water)
- Construction system for inter-basin water transfer
- River basin management plan Development including conjunctive surface and groundwater
- GIS hazard events mapping and risk management (drought and flood)

Biodiversity

- Adoption of policy instruments for implementation of corridors management plans into national and regional planning
- Definition of possible routes (bio-corridors) for movement and migration of threatened plant and animal species by the climate change

2) **Measures and activities identified within Strategy for Sustainable development of Forestry in the Republic of Macedonia with Action Plan**

- Afforestation of 2500 ha bare lands
- Start of the first stage of amelioration of 450 degraded oak forests
- Develop of study of forest areas threated by erosion
- Preparation of study for preventive measures for protection of forests from fires
- Develop forestry information system

- Streamline the forestry personnel in the area of planning and environmentally friendly management
- Study for valorization of multifunctional benefits of forests
- Develop general plan for forest management
- Development of programs for adaptation of forestry to climate changes

3) Measures and activities identified within Water strategy for the Republic of Macedonia

From the water strategy are extracted the most relevant to land degradation and desertification measures and activities

Protection against floods and other harmful impact of water

Flood protection

Administrative instruments

- Preparation of program for protection from harmful effects of waters within the respective river basin as an integral part of plans for river basin management.
- Disabling of spatial construction work and other activities that could increase the danger of flooding and damage.
- Implementation of Floods Directive (Directive 2007/60/EC) (Preparation of preliminary flood risk assessment, flood hazard maps, flood risk maps and flood risk management plans according to Floods Directive)
- Rising of public awareness
- Preparation of detailed flood plans for local/regional centers
- Preparation of integral international plans for flood protection

Structural flood protection measures

- Maintenance of water buildings (dams, reservoirs, protective embankments etc.) in a way that ensures acceptance of flood waves, as well as providing protection from natural disasters
- Providing preventive measures (construction of dykes, reservoirs, river regulation, regulation of erosion, afforestation, etc.)
- Utilizing floodplains and wetlands as natural flood storage areas
- Rehabilitation measures
- Removal of waste, rubble and barren from floodplains

Non-structural flood protection measures

- Improvement of catchment level planning of flood management measures
- Integration of rural land use and flood management policies and funding
- Improvement of hydro meteorological prognosis
- Preservation of retention areas (floodplain and wetlands)
- Arrangements of integral urban development plan (avoiding from areas with flood risk)
- Intense control over interventions on areas with flood risk
- Education of engineers and other water related workers

Erosion protection

Administrative instruments

- Preparation of program for protection from harmful effects of waters within the respective river basin as an integral part of plans for river basin management.
- Preparation and implementation of legal framework for protection of reservoirs from sedimentation

- Prohibition and restrictions for cutting of trees and shrubs and prohibition of grazing cattle
- Prohibition on removing soil, sand, gravel and stone within erosion area

Structural erosion protection measures

- Afforestation and grass slopes erosion control
- Sustainable forest management
- Maintenance of erosion protection buildings
- Considering of rules against erosion (i.e. planting of trees must be done in a way that provides protection from erosion)

Irrigation and drainage

Administrative instruments

- Water drainage monitoring - measure the amount and quality of discharged water

Structural measures

- Maintenance of canal network for drainage and irrigation
- Revitalization and reconstruction of existing systems (higher efficiency and decrease of losses)
- Construction of irrigation systems

Water use

Agriculture

- Reconstruction and rehabilitation of the existing irrigation schemes
- Construction of new irrigation schemes
- Development of irrigation systems, according to users in accordance with the national projects and strategies for irrigation in the Republic of Macedonia

Public water supply – drinking water supply

- Provide sufficient quantities of drinking water from existing or new sources (resources) along with strict enforcement of protective measures on water protection zones
- Create the conditions for lifting the percentage of people connected to public water supply system in the future investment cycle (85 - 90%)
- Preparation a long-term development plan for public water supply to determine the distribution / service areas as economic and technological whole. On each distribution area, should be established:
- Technology enlargement - to implement when it is economically justified.
- Improve management, degree of use and security of water supply
- Ensure drinking water quality to all users
- Establish rationalization in water consumption (economical use of drinking water, especially in households with modern home-appliances and sanitary equipment)
- Reduction of losses from public water supply system
- Gradually connect local water supply systems into public systems due to quality control and introducing principle “Polluter pays”. All other ways of water supply (wells, cisterns etc.) gradually introduce into public system
- Sustainable use of water resources

ANNEX III: INTEGRATED FINANCIAL STRATEGY

1) Background

The ultimate goal of the Integrated Financing Strategy (IFS) is to create an enabling environment for mobilizing internal, external and innovative resources to provide an investment framework for Sustainable Land Management (SLM). The concept has been developed by Global Mechanism of the UNCCD in purpose to assist the countries to develop more stable financial platform for SLM.

The IFS identify relevant sources of financing for SLM - domestic, foreign, public and private, as well as potential synergies between these sources in order to establish the enabling environment required for resource mobilization for SLM. Sources of financing include bilateral and multilateral funding, national budgets and investments by households, communities and private sector entities. IFS also highlight aspects in the fiscal, legal, institutional and human resource environments that may impede the implementation of specific actions related to financing of SLM.

According to the Global Mechanism, IFS should be specified and tailored to the needs of the country for which it is created. Also, it should be based on existing strategies, policies and procedures, primarily on National Action Plan (NAP) against land degradation which is considered as a major operational document in this field. In this respect, the NAP and the IFS are closely interconnected and should be developed simultaneously in order to ensure realistic dimension of both documents and their implementation.

IFS consist of three key elements:

- Analysis of the environment for SLM financing;
- Identification of potential financing sources, instruments and mechanisms;
- Designing measures for resource mobilization.

Elaboration of the key elements is provided below.

2) Analysis of the environment for SLM Financing

In the Republic of Macedonia, the awareness about the importance of environmental issues, including land management, has increased over the past decade. Certain land management issues related to land erosion have been stipulated into the Law on agricultural land, Articles 43-45 (Official Gazette of the Republic of Macedonia 135/07, 18/11, 148/11, 95/12, 79/13, 87/13, 106/13, 164/13 and 39/14), as well as in other Laws in the field of nature and environment, forestry and water management. The respective set of relevant Laws has been listed into the National Action Plan (NAP) to Combat Land Degradation and Desertification (DLDD). However, the legal set-up with regards to land management should be further updated, in particular with regards to financing of the activities in this area. So far, limited activities have been undertaken for financing of sustainable land management, primarily due to financial constrains in the national budget, as well as certain institutional, administrative and data issues.

The analysis of the environment for SLM financing has shown several major gaps regarding the support of the activities related to land management. Primarily, the general economic situation in the country has been characterised with high unemployment rate, socially vulnerable persons and households, limited investment (particularly domestic) in industry, insufficient and older infrastructure, etc., which reflects to limitation of the finances in the national budget allocated to the sustainable land management. However, there are certain allocations for land management within the Government Programme for support of the agriculture, mentioned in the section 3 of this Strategy.

Furthermore, the general institutional set-up for land management exists (Table 2), but the responsibilities among relevant stakeholders that should deal with land management issues on operational level have not been clearly defined. More specifically, the competences of certain institutions either overlap or some land issues have not been appropriately covered within the framework of any institution. This reflects into insufficient inclusion of the land management matters into the operational planning of the relevant institutions. In addition, many of the issues related to DLDD needs to be treated on local governmental level, while the main legal and policy framework is designed on a national level. In this respect, better link between both levels is needed for achievement of satisfactory results.

Also, the land management system in the country copes with serious capacity issues. The major institutions in the field of land management (Ministry of Agriculture, Forestry and Water Management, Ministry of Environment and Physical Planning, etc.) deal with lack of staff. This particularly applies to the limited capacities for administration, upgrading and elaboration of thematic maps within the soil information system (in digital and other format) which is in the final stage of elaboration and should serve as a major source for future geospatial analysis related to land management. In addition, the current state of affairs related to insufficient capacity of the institutions for land management also contributes to the weakness in the coordination of the institutions in this field.

Furthermore, there is no sufficient data for land management in the Republic of Macedonia. The existing data are scattered within different intuitions and most often, accessibility and transparency is an issue. In addition to the scarcity, there is very limited public availability of the existing data, which would serve as basis for research studies and operational planning of the institutions. Implicitly, there is lack of functional and efficiently designed system for permanent monitoring of soil quality and processes of land degradation (e.g. soil chemical and physical properties), which is crucial for planning and undertaking activities for sustainable land management.

Another field relevant for sustainable land management is research and development. There are few public institutions working in the area of DLDD, all of them coping with problems related to scarce finances and staff. In addition, there are no private research institutions working in the area of DLDD. Furthermore, there is insufficient national support of the research teams/projects dealing with DLDD. The scientific activities in DLDD are not systematically nor regularly conducted, as they primarily depend on the support provided by the international donors. However, the participation of the research institutions in the available international programmes

is rather low, partially owing to scarce database for research, as well as limited research staff working in the area of DLDD. Implicitly, due to the scarce database and limited research in the area of DLDD, policy-making is rarely based on research studies.

The mentioned weaknesses, as well as additional ones are identified in the NAP. In this respect, strategic and operational objectives defined in the NAP focus on improvement of the state of affairs in the field of land management. Priority actions for achievement of these objectives, including potential funding sources and holders of implementation, are presented in the Table 1.

Table 1. Priority actions to be taken in order to achieve the objectives defined in the NAP

Sector	Activity	Potential Sources of Funding	Holders of Implementation	Budget (EUR)
Setting of a sound legal, strategic and policy framework for DLDD, in line with the EU Acquis	Further harmonization of the legislation (primary and secondary) with the EU Acquis, UN Conventions and other relevant international documents	Budget of the Republic of Macedonia Donors	Parliament of the Republic of Macedonia MOEPP MAFWE Other respective Ministries	
	Updating existing relevant strategies and action plans treating issues for land degradation, desertification and drought issues with the EU acquis	Budget of the Republic of Macedonia GEF Donors	MOEPP MAFWE Other respective Ministries	
	Development of National strategy for integrated approach to land degradation, desertification, and drought, including linkages with socio-economic and other relevant aspects	GEF Budget of the Republic of Macedonia	MOEPP	
	Identification of regions vulnerable to desertification and assessment of the status of desertification	GEF Budget of the Republic of Macedonia	MOEPP MES HESI	
	Development of local action plans for land degradation, desertification, and drought	Budgets of municipalities Donors	Municipalities	
	Ensuring implementation of the legislation on	Budget of the Republic of	Respective ministries	

	national and local level	Macedonia Budgets of municipalities Donors	Municipalities	
	Creation of the mechanism for effective vertical and horizontal coordination of the institutions in planning and undertaking DLDD activities	Budget of the Republic of Macedonia	MOEPP	
Institutional and capacity-building for DLDD issues	Strengthening of administrative and operational capacities for DLDD issues of MOEPP, MAFWE and other respective institutions in this field	Budget of the Republic of Macedonia GEF UNDP	MOEPP MAFWE	
	Development of organizational structure to support UNCCD reporting process (gathering information, validation and reporting)	Budget of the Republic of Macedonia GEF UNDP	MOEPP	
	Strengthening supervision of land degradation and protection through enforcing capacities of inspection service	Budget of the Republic of Macedonia GEF UNDP	MOEPP MAFWE	
	Establishment of National Training and Technology Transfer center in the area of DLDD (NTTTC)	Budget of the Republic of Macedonia	MAFWE MOEPP	
	Building capacities for efficient monitoring and combating DLDD issues	Budget of the Republic of Macedonia GEF UNDP UNEP IPA	HESI NHMS MOEPP MAFWE	

	Establishment of comprehensive DLDL monitoring (Soil, Soil degradation, desertification, landcover changes, vegetation changes, etc.) through direct surveys and modern geomatic techniques	Budget of the Republic of Macedonia GEF UNDP UNEP IPA	HESI NHMS MOEPP MAFWE	
	Establishment of National information centre for DLDD	Budget of the Republic of Macedonia GEF UNDP UNEP IPA	HESI NHMS MOEPP MAFWE CMC	
	Establishment of Early warning system in UNCCD related matters	Budget of the Republic of Macedonia GEF UNDP UNEP IPA	NHMS MOEPP MAFWE CMC	
	Development of database for dry land issues connected to soil information system;	Budget of the Republic of Macedonia GEF UNDP UNEP IPA	HESI MAFWE MOEPP AREC	
	Strengthening the environment for efficient Research and Development on DLDD related issues	Budget of the Republic of Macedonia GEF	HESI MOEPP MAFWE MES	

		UNDP UNEP IPA projects		
	Development of the erosion map	GEF Budget of the Republic of Macedonia	MOEPP MAFWE MES HESI	
	Implementation of Digital Soil Mapping in elaboration of thematic maps related to various types of land degradation (soil sealing, soil salinization, soil compaction, loss of organic matters etc,)	FAO GEF BRM	MAFWE MOEPP MES HESI	
	Setting up and maintenance of a sound statistical base for DLDD	IPA /donors/Budget of the Republic of Macedonia	State Statistical Office/MOEEP/MAFWE	
Awareness rising of the public for issues related to DLDD	Elaboration of Communication Strategy for DLDD issues			
	Organization of trainings and workshops for DLDD issues for the stakeholders on central and local governmental level	BRM	MOEPP	
	Design and realization of media campaign for DLDD	MOEPP	MOEPP CSO's	
	Establishment of National Training and Technology Transfer centre in the area of DLDD (NTTTC)	BRM	MAFWE MOEPP	

Implementation of priority actions, as well as other activities identified in the NAP mostly depend on ensuring finances, although other resources, primarily human resources and expertise for specific land management issues are crucial for certain activities.

3) Potential Sources of Financing

Sources of funding identified in the IFS are divided in three categories - internal, external and innovative sources of funding. These three categories would be further elaborated below.

3.1. Internal Sources of Financing

Internal sources of financing for land management mostly consist of state budget, municipal budgets and domestic funds, if existent.

The state (national/central) budget in the Republic of Macedonia represents plan (assessment) of expected revenues and planned expenditures for the period of one fiscal year. It needs to be approved by the Parliament and refers to a period between January 1 and December 31. Starting from 2015, the Republic of Macedonia has started outlining mid-term budget frame referring to three years (included in the Economic Reform Programme), which is rather indicative. The annual budget serves as main source of financing the work of the institutions and activities in different fields.

In the case of the Republic of Macedonia, the allocations from the state budget to the Ministry of Environment and Physical Planning and Ministry of Agriculture, Forestry and Water Management represent main source of financing of the activities related to land management. Direct allocations for land management has been mostly done through the Financial Programme for Support in Agriculture, implemented by MAFWE, but these finances are rather limited. The total allocations for 2015 has been Den. 2 million (around 32.500 Euro), aimed for financing of physical, chemical and other analysis of the agricultural land. This amount, as well as purpose of use of finances has been insufficient for any serious actions for land management.

Apart of the mentioned Programme, other direct allocations for land management has not been noted recently. Related activities to land management have been covered within the regular operations of the major institutions in the field of land management – MOEEP and MAWFE, particularly activities related to capacity building which includes land management, too. In addition, there are other institutions with certain competence in the area of land management, as listed in the Table 2. However, no specific information about the allocations for land management from the budgets of the respective ministries is available, nor on local level from the budgets of municipalities.

Table 2. Institutional set-up for land management in the Republic of Macedonia

Institution	Responsibilities
Ministry of Environment and Physical Planning (MOEPP)	- Prepares new, improves and proposes changes to the exiting legislation, in accordance with European Union and monitoring their implementation through state environmental inspectorate. - Elaborates and implements sectorial strategies and policies of nature and environment protection including management of protected areas/unit, soil and water protection. Responsible for water law implementation too. - Liaises and coordinates work with other ministries, local municipality administration, public institutions, donors and private actors operating in the fields of nature and environmental protection. - Water sector within MOEPP is responsible for water permits, giving concessions for water use for energy, planning in water sector, various activities according to water law and EU Water Framework directives. - Prepares the necessary documentation for participation and membership in organization, conventions, protocols and agreements in their areas of competences.
Ministry of Agriculture, Forestry and Water Management (MAFWE)	- Prepare, improves and proposes changes to the exiting legislation, in accordance with European Union. - Inspection and monitoring of implementation of legislation related to forest management and hunting through state inspectorates for forestry and hunting, - Prepares and follows the implementation of sectorial strategies and policies of agriculture, forestry and rural development. - Department of Water Management has the mission of sustainable and effective management of the irrigation system and drainage. Drafts, improves and proposes technical norms related with the soil and irrigation. - Department of forestry is responsible for creation of forest policy. - Forest police guard is responsible for protection of all forest primarily against illegal logging, but also form other biotic and abiotic factors.

The table above shows the complex structure of land management. The major institutions in this area has been MOEEP and MAFWE, although there are other actors relevant for specific issues in land management, too. As mentioned above, some of the competences of the institutions overlap, while some have not been clearly defined. Furthermore, strategies, annual plans and other planning documents of the institutions with competence for DLDD do not contain substantial activities related to the DLDD. This is partially attributable to the lack of major planning documents (such as this NAP) that would serve as base for operational planning of the institutions. This implies insufficient allocations of finances from the national and local budgets for land management issues.

Recommendations for improvement of the current condition are the following:

- Mapping of current DLDD domestic finances that have been indirectly disbursed on issues related to land management within the framework of regular activities of MOEEP, MAFWE and other relevant institutions in purpose of their setting as regular allocations for land management;
- Ensuring regular allocation from the central and local budgets for DLDD issues. The commitment of the relevant institutions for financial allocation for DLDD projects should be sustainable in purpose of achieving valuable results;
- Increase of awareness about DLDD in the budgetary units in the respective institutions at the central and local level for incorporation of DLDD projects into the annual budgeting for the respective years of implementation;
- Integration of DLDD issues included in the NAP, as well as other strategic and operational documents in the annual operational financial planning at the central and local level;
- Creation of mechanisms for linking available domestic and international financial sources for DLDD. In this regards, Programme Based Approach (PBA) in the area of Environment, a mechanism for coordination of the donors that already exists (under auspices of the Sector for European Integration in the Government of the Republic of Macedonia) might be modified or upgraded to cover DLDD as a specific topic;
- Setting of a base within MOEEP for evidence of the projects/allocations from central and local budget for land management issues, in purpose of better management of the available funds.

3.2. External Sources of Financing

External sources of financing for land management has been very important, as there is lack of domestic sources for this purpose. There are various external sources available to the Republic of Macedonia that include support of the environmental issues.The most relevant programmes/Funds are listed below.

- **AF – Adaptation Fund**

The Adaptation Fund was created under the United Nations Framework Convention on Climate Change. The fund is designed to finance climate change adaptation projects and programs based on the priorities of eligible developing countries. Its primary funding comes from a 2% share of proceeds of the Certified Emission Reductions issued by Kyoto Protocol's Clean Development Mechanism. The Fund has committed US$ 318 million in 50 countries since 2010 to climate adaptation and resilience activities.

- **Austrian Development Agency (ADA)**

Austrian Development Agency (ADA) is the operational unit of Austrian Development Cooperation. It has three major themes of work: reducing poverty, building peace and protecting the environment. About 500 projects and programmes and more than EUR 100 million in funding are implemented every year to improve the standard of living in developing countries. ADA is primarily engaged in sectors where Austria has proven know-

how and long-standing experience: water supply and sanitation, renewable energies, climate protection, agriculture and forestry, private sector and development as well as human security, human rights and rule of law.

- **CEB – Council of Europe Development Bank**

  The Council of Europe Development Bank (CEB) is a multilateral development bank which provides finances and technical expertise for projects with a high social impact in its member states. It has 41 members. In this manner, it actively promotes social cohesion and strengthens social integration in Europe.

  The CEB contributes to the implementation of socially oriented investment projects through four sectorial lines of action, namely:

  - Strengthening social integration
  - Managing the environment
  - Supporting public infrastructure with a social vocation
  - Supporting micro, small and medium-sized enterprises (MSMEs)

- **CEI - Central European Initiative**

  The Central European Initiative (CEI) is a regional intergovernmental forum committed to supporting European integration through cooperation between and among its member states and with the European Union (EU), other interested public institutions or private and non-governmental organizations (NGOs), as well as international and regional organizations. CEI provides support in wide range of areas – research and innovation, education, sustainable development, climate, environment and rural development, energy efficiency, SMEs and business development, etc. CEI actions in the area of *Climate, Environment and Rural Development* are closely in line with the Europe 2020 Strategy. The activities are financed through CEI Cooperation Fund, CEI Know-how Exchange Programme and CEI Fund at the EBRD.

- **EBRD – European Bank for Reconstruction and Development**

  The EBRD is an international financial institution that supports projects from central Europe to central Asia and southern and eastern Mediterranean. The EBRD has 64 members and allocated investment of €8.9 billion in 2014. It invest primarily in private sector clients whose needs cannot be fully met by the market. The EBRD aims to promote market economies that function well – where businesses are competitive, innovation is encouraged, household incomes reflect rising employment and productivity, and where environmental and social conditions reflect peoples' needs.

- **EIB – European Investment Bank**

  EIB supports projects that make a significant contribution to growth and employment in Europe. As part of their counter-cyclical approach, their activities focus on four priority areas:

- Innovation and skills
- Access to finance for smaller businesses
- Climate Action
- Strategic Infrastructure

- **EU Instrument for Pre-Accession Assistance (IPA)**

The Instrument for Pre-Accession (IPA) is the European Union's financial instrument to support the accession process on the Western Balkans and Turkey. IPA was created in 2007 and consist of five components:

- Assistance for transition and institution building;
- Cross-border cooperation (with EU Member States and other countries eligible for IPA);
- Regional development (transport, environment, regional and economic development);
- Human resources (strengthening human capital and combating exclusion) and
- Rural development.

Environment has been included in the third component, which enables direct allocations for land management, although assistance from other components could be used, as well, primarily Component I for capacity building in the area of land management and Component V, as there are land management issues closely related to the rural development.

IPA has been planned for the period of seven years. The IPA I assistance provided for the Republic of Macedonia in the period 2007- 2013, through the five components, amounts to EUR 615.2 million. The allocations for the third component which includes environment has been EUR 200.4 million. Up till end of 2013, only 37.3% of the total IPA I for the Republic of Macedonia has been used, which indicates need for better absorption of the IPA funds. The indications for use of the third component are around 25%, although it must be stressed out that there is a lack of systematized, available and reliable data for absorption of the IPA assistance, which is also an issue which should be addressed by EC and national authorities.

IPA II (2014-2020) has been set in different manner by use of strategic approach. The five components has been replaced with sectors for support, which mainly include all sectors previously covered in IPA I, but the sectoral approach is expected to ensure better response to the needs of the country, as well as more efficient use of the assistance. The main strategic document setting priorities for IPA II (2014-2020) for the Republic of Macedonia is the Indicative Strategy Paper, adopted in August 2014. The Strategy Paper sets out the priorities for EU financial assistance for the period 2014-2020 to support the Republic of Macedonia on its path to EU accession. The financial assistance under IPA II shall mainly be located into eight sectors:

1) Democracy and governance
2) Rule of Law and fundamental rights
3) Environment
4) Transport

5) Competitiveness and innovation
6) Education, employment and social policies
7) Agriculture and rural development
8) Regional cooperation and territorial cooperation

As evident from the mentioned sectors, environment has been included into the sectors for assistance from IPA II, implying that this instrument should be used more effectively for improvement of the state of affairs into the land management.

- **EU Programme on Environment and Sustainable management of Natural Resources including energy (ENRTP)**

The thematic program of European Union for Environment and Sustainable Management of Natural Resources including Energy (ENRTP) helps developing countries and partner organizations to address environmental and natural resource management issues. Moreover, it helps to meet their obligations under multilateral environmental agreements and to take international policy leadership in such areas as fighting climate change, tackling land degradation and desertification, biodiversity protection and proper management of chemicals and wastes.

- **EU Programme Horizon 2020**

Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. By coupling research and innovation, Horizon 2020 is helping to achieve this with its emphasis on excellent science, industrial leadership and tackling societal challenges. The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

- **FAO – Food and Agriculture Organization of the United Nations**

FAO has three main goals: the eradication of hunger, food insecurity and malnutrition; the elimination of poverty and the driving forward of economic and social progress for all; and, the sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources for the benefit of present and future generations. The total FAO Budget planned for 2014-15 is USD 2.4 billion. FAO supports different projects contributing to the mentioned major goals, applying results-based management.

- **FFEM – French Global Environment Facility**

The French Facility for Global Environment (FFEM) has been working to promote protection of the global environment in developing countries since it was established by the French government in 1994. FFEM encourages developing countries to implement strategies, programs and projects regarding sustainable development in areas important for global environmental protection:

- Biodiversity,
- Climate change,
- International waters,
- Land degradation, including desertification and deforestation,
- Persistent organic pollutants,
- Stratospheric ozone layer.

- **GEF – Global Environment Facility**

The Global Environment Facility (GEF) was established in 1992 to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided $14.6 billion in grants and mobilized an additional $74.3 billion in financing for more than 4,000 projects. The GEF has become an international partnership of 183 countries, international institutions, civil society organizations, and private sector to address global environmental issues. As an independent financial organization, GEF provides support to projects that relate to biodiversity, climate change, international waters, land degradation, ozone layer and persistent organic pollutants.

- **Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH - GIZ**

GIZ (*German Corporation for International Cooperation*) has over 50 years of experience in a wide variety of areas, including economic development and employment, energy and the environment, and peace and security. GIZ conducts projects financed by the German Federal Ministry for Economic Cooperation and Development (BMZ), as well as other donors. It has been active in the Republic of Macedonia for longer period of time.

- **IUCN – International Union for Conservation of Nature**

The IUCN program 2013-2016 seeks to mobilize the community to work on the conservation of biological diversity, sustainable development and poverty reduction in joint efforts to stop the loss of biodiversity and implement solutions based on natural features in order to preserve biodiversity, combat climate change, strengthen equity, poverty reduction and in this way to improve the welfare of people.
The program has three areas of work:

a) Valuing and conserving nature
b) Effective and equitable governance of nature's use
c) Deploying nature-based solutions to global challenges in climate, food and development

- **KfW Development Bank**

KfW Development Bank is institution acting on behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ). The aim of the Bank is to support projects related to reduce of poverty and to protect the climate and the environment. KfW finance investments and reform programmes in a range of sectors including health, education, water supply, energy, rural development and financial

system development. The type of projects and programmes that KfW support varies significantly, depending on local needs and the general conditions in place.

- **MAVA Foundation**

  MAVA is a swiss-based philanthropic foundation established in 1994, with an exclusive focus on the conservation of biodiversity. The Foundation tend to work through partnerships with other organizations and so far, it has supported 700 projects, implemented by over 280 different organizations. These include international and local NGOs, research institutions, universities and occasionally government bodies or individuals. MAVA has four programmes, including Programme on **Sustainable Economy**, which explores how to ensure economic prosperity, within the resources of one planet, addressing the issue of overconsumption of natural resources beyond their capacity to regenerate.

- **MCFEA – Mitsubishi Corporation Fund for Europe and Africa**

  The Mitsubishi Corporation Fund for Europe and Africa (MCFEA) is a charitable foundation established in 1992 by Mitsubishi Corporation and Mitsubishi Corporation (UK) Plc. The aims of the MCFEA are to promote environmental conservation, education and research into the environment and poverty alleviation. In particular, the MCFEA aims to encourage the appreciation and conservation of flora and fauna with an emphasis on endangered species.

- **Oak Foundation**

  Oak Foundation commits its resources to address issues of global, social and environmental concern, particularly those that have a major impact on the lives of the disadvantaged. The vision of the Foundation is to achieve a zero-carbon global economy and the recovery of marine fisheries and habitats. In keeping with its vision and mission, the Foundation aims to protect the oceans and the climate by contributing to the development of responsible global and local governance mechanisms; and catalyse transformational changes in the way oceans and climate are perceived and exploited, for a more socially and environmentally sustainable society.

- **PPIAF – Public-Private Infrastructure Advisory Facility**

  The Public-Private Infrastructure Advisory Facility (PPIAF) is a multi-donor trust fund that provides technical assistance to governments in developing countries in support of the enabling environment conducive to private investment, including the necessary policies, laws, regulations, institutions, and government capacity. It also supports governments to develop specific infrastructure projects with private sector participation.

- **World Bank**

  The World Bank is a vital source of financial and technical assistance to developing countries around the world. The World Bank Group comprises of five institutions, managed by their member countries. These institutions are: The International Bank for Reconstruction and Development (IBRD) which lends to governments of middle-income and creditworthy low-income countries; The International Development Association (IDA) that provides interest-

free loans and grants to governments of the poorest countries; The International Finance Corporation (IFC) which help developing countries to achieve sustainable growth by financing investment, mobilizing capital in international financial markets, and providing advisory services to businesses and governments; The Multilateral Investment Guarantee Agency (MIGA) created in 1988 to promote foreign direct investment into developing countries to support economic growth, reduce poverty, and improve people's lives and The International Centre for Settlement of Investment Disputes (ICSID) provides international facilities for conciliation and arbitration of investment disputes. The World Bank provide low-interest loans, zero to low-interest credits, and grants to developing countries. These support a wide array of investments in such areas as education, health, public administration, infrastructure, financial and private sector development, agriculture, and environmental and natural resource management. Some of World Bank projects are co-financed with governments, other multilateral institutions, commercial banks, export credit agencies, and private sector investors. The Bank has been active in the Republic of Macedonia for a long period of time and provides possibility for support of the environmental projects.

The list of external sources for support of the projects in the area of environment, including land management is rather extensive, which implies various possibilities for the potential beneficiaries in the Republic of Macedonia. The external sources could substantially alleviate the deficiency in internal sources for land management. However, it could be argued that the external funds have not been used sufficiently in the Republic of Macedonia, mostly owing to capacity issues in the institutions dealing with land management and limited research network in this field, as discussed above. In addition, there is a problem with low awareness about DLDD issues and available Funds, which indicates urgent need for the respective institutions (primarily MOEPP) to undertake campaign in this field.

Recommendations for improvement of the current condition:

- Undertaking awareness rising campaign about DLDD issues and available Funds for support of the projects in this field, increasing elaboration of brochures and other materials;
- Increasing the capacity at the national and local level to apply for and use the available international Programmes for DLDD;
- Tailoring and conducting training in the respective institutions about available financial sources, application rules of the specific programmes (IPA, etc.), project cycle management and other specific trainings according to the needs;
- Matching domestic with international financial support by co-financing and other mechanisms;
- Encouraging participation of the research institutions into the EU and UN Programmes for DLDD, aiming to transfer of knowledge and technology;
- Promoting networking of the domestic research institutions within the country and abroad;
- Development of database of available funds for support of DLDD issues.

3.3. Innovative sources of financing

UNCCD has identified several financial mechanisms for SLM and DLDD, that could be perceived as innovative sources of funding in the Republic of Macedonia. These mechanisms include different types of regulations and direct or indirect payments schemes provided by the state, instruments provided by the investment and commercial banks, as well as joint ventures of stakeholders, including public-private partnerships. Microfinance and Incentive and Market Based Mechanisms could be regarded as most relevant for the Republic of Macedonia.

Microfinance is a financial mechanism aiming to provide support to small stakeholders who lack access to finances for investment that could contribute to SLM and DLDD. The financial support could take form of grants, credit lines, loans under favourable terms and other financial instruments. Projects eligible for financing usually include investment for better agricultural techniques, capacity building and education, income diversification, improved access to credit for women, and improved soil, water and forest conservation. Microfinance can at the same time help foster poverty reduction, gender empowerment and climate change. It could be used in many areas relevant for DLDD – agriculture, forestry, water-management, eco-tourism, etc. The sources for microfinance mechanism could be provided from state budget, private funds, investment and commercial banks.

According to UNCDD, the incentive and market based mechanisms could be categorised into four types:

- Public payment schemes to private land and forest owners who implement sustainable land management practices. These schemes mostly include subsidies and tax incentives for investment and activities related to SLM and contributing to DLDD.
- Open trading between buyers and sellers of property or services affecting balance of the ecosystems. This type includes mechanisms such as tradable development rights, conservation banks, trading of emission reductions, etc.
- Self-organized private deals between individual beneficiaries of ecosystem services and providers of those services. This type includes mechanisms such as purchase of development rights (related to ecosystem service), direct payments for environmental services, as well as conservation concessions;
- **Eco-labeling** of products that assures buyers that production processes involved have a neutral or positive effect on ecosystem services. These products are sold to consumers who are willing to pay a higher price. The mechanisms include marketing labels and certification schemes.

Apart of abovementioned, there are other mechanisms that could be used for financing activities related to DLDD. Particularly important are joint ventures of stakeholders, including public-private partnerships, as innovative mechanisms that could significantly contribute to ensuring ownership (as precondition for better results) from public and private sector to the activities related to DLDD. Also, significant mechanisms are green funds established by the state, which

could also include partners from the private sector, designated to fulfilment of particular goals related to DLDD.

In the Republic of Macedonia, the awareness about the financial mechanisms for DLDD is primarily related to state schemes and microfinance instruments. However, the application of financial instruments aiming to combat land degradation and desertification is rather scarce and should be further developed.

Recommendations for improvement of the current condition:

- Ensuring allocations for microfinancing of projects for sustainable land management from the national and local budgets;
- Development of programmes for encouraging commerical banks to support land management projects;
- Promotion of the public-private partnerships for treating DLDD issues;
- Promotion of inter-municipal cooperation in the area of DLDD and SLM;
- Ensuring support to the private companies for research, development and application of technologies in the area of DLDD;
- Development and promotion of the incentive and market-based mechanisms by the respective institutions.

ANNEX IV: COMMUNICATION PLATFORM FOR THE IMPLEMENTATION OF NATIONAL ACTION PLAN ALIGNED TO THE UNCCD 10 YEAR STRATEGY

1) Public awareness and the National Action Plan to Combat Desertification (NAP)

This Communication Platform is meant as support and starting point for the Ministry of Environment and Physical Planning in its endeavors to raise awareness regarding combating desertification within the Republic of Macedonia. It lays out a strategic approach to the communication and awareness raising activities needed to support the implementation of the National Action Plan to combat desertification (NAP).

1.1. Combating desertification and a NAP for a better future

The process of *combating desertification* is not often figuring in the media and in our surroundings. Most of us do not have a clear understanding of its implications nor do we interpret it uniformly.

Often, when people think of dry lands, they associate them with deserts and hostile living conditions, economic hardship and water scarcity. But that is not what dry lands are about. These areas, where rainfall is low and evaporation high, may be fragile, but if managed well they are also fertile and capable of supporting the habitats, crops and livestock that sustain nearly one-third of humanity.

Desertification occurs when individual land degradation processes combine to affect large areas of dry lands. This unified process endangers the livelihoods of rural people in dry lands, particularly the poor, who depend on livestock, crops, limited water resources and fuel wood. Conversion of rangelands to croplands brings about a persistent loss of productivity and biodiversity, accompanied by erosion, nutrient depletion, salinity and moisture reduction in soil. In many countries, combating desertification and promoting development are virtually one and the same, due to the social and economic importance of natural resources, agriculture and animal husbandry.

While climate change is a cause of desertification and one of the biggest threats for dry land populations today, dry land areas are also key to limiting global climate change. Land use, land use change and forestry (LULUCF) account for about 20 per cent of global greenhouse gas emissions. Addressing land degradation in dry lands reduces emissions by increasing the ability to store greenhouse gases in soil and plants. As dry lands naturally cover vast areas on this planet, there is tremendous scope for avoiding and capturing CO2 emissions by protecting soils and restoring degraded land. It is obvious that mitigating desertification is essential in the battle against climate change.

In hardly any ecosystem other than dry lands are the interactions between the challenges of climate change and the conservation of biodiversity so closely linked with food security and poverty reduction. So we need to address these issues jointly and understand how they affect each other to find solutions that work. This requires cooperation between experts in different fields and in the mechanisms provided by the global community. In this, the United Nations Convention to Combat Desertification (UNCCD) plays an important role between dry land and non-dry land countries promoting scientific and technological excellence, raising public awareness and mobilizing resources so as to “prevent, control and reverse desertification/land degradation and mitigate the effects of drought”.

As the dynamics of land, climate and biodiversity are so intimately connected, the UNCCD works closely with the other two ‘Rio Conventions’, the Convention on Biodiversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC) (each of the three conventions derives from the 1992 Earth Summit in Rio de Janeiro), to meet these complex challenges with an integrated approach and the best possible use of natural resources.

Furthermore, these complex challenges are not possible without public participation. Without it the wished-for development simply will not happen. Therefore, it is necessary to create and maintain

public awareness to achieve the kind of public responsibility needed in the development processes within society.

The participatory and strategic process has resulted in a comprehensive National Action Plan for combating desertification for the Republic of Macedonia. Action Plan has been made in accordance with UN requirements and is thus an important stepping stone in inclusion of Republic of Macedonia in the world's processes of combating desertification. The NAP has been developed by national experts. They have anchored the process and the Plan in the Macedonian context and organizational setting in order to make it sustainable and their work has created a crucial awareness throughout workshops comprising of more than 50 persons in each workshop.

The NAP was developed into several phases that builds up to the full implementation of the NAP:

1. Development of Framework and supporting tools/documents (Assessment of DLDD, Project website for advocacy, awareness raising, education and capacity building addressing DLDD;
2. Assessment of Socioeconomic conditions, policies and institutional assessment that will build the foundation for participative first NAP development and Policy framework to support national efforts on DLDD;
3. Scientific, technology and knowledge gaps assessments, baseline information on DLDD are available, including national monitoring and vulnerability assessment, and other relevant biophysical and socio-economic data are used to develop NAP;
4. Development of Financial Mechanism and technology need for NAP implementation.

1.2. The National Council for Sustainable Development and its role in NAP implementation

Although the leading role and responsibility for the NAP implementation lies in the Ministry of Environment and Physical Planning in collaboration with the Ministry of Agriculture, Forestry and Water economy, the National Council for Sustainable Development (NCSD) could have a crucial role in the NAP implementation. NCSD will monitor the implementation, coordinate programmes and push and pull in the right directions. The council will also advocate for sustainable development within the Republic of Macedonia and could significantly contribute for raising public awareness and encourage public participation. One of the objectives of the Convention is dealing with awareness: "the parties shall cooperate in undertaking and supporting public awareness and educational programmes to promote understanding of the causes and effects of desertification and droughts and of the importance of meeting the objective of the Convention".

Operational objective nr.1(OO1) of the 10-year Strategy under the UNCCD calls on advocacy, awareness raising and education.

NCSD and its technical working groups supported by the Ministry of Environment and Physical Planning in collaboration with the Ministry of Agriculture, Forestry and Water economy could be responsible for carrying out and initiating activities related to awareness raising within the Republic of Macedonia. They could set up programmes and activities and rely on existing organizations, institutions and network partners to achieve their goals.

2) Preconditions for an operational communication platform

There are some crucial preconditions for the implementation of the Communication Platform.

Three of them are mentioned below:

1. Expertise within the field of communication and awareness raising and financial resources is needed. Public Communication Office within the Ministry of Environment and Physical Planning could undertake this role, coordinate and implement the activities and press work.

2. The underlying principles and values behind combating desertification include openness and transparency in all processes carried out in the name of sustainable development. These principles should also guide all communication and awareness rising issuing from the implementation of the Communication Platform for the NAP for combating desertification. Furthermore, it is imperative that all communication invite the stakeholders to engage in dialogue with each other, with administration and with the NCSD. Dialogue will be a key element in bringing about the looked for changes in attitude and behavior needed to implement the NAP for combating desertification, in a path of reaching sustainable development.

3. Creating increased awareness among the stakeholders in Macedonia is important to support not only the participation but indeed the implementation of the NAP. To provide continuity in the process of implementation of the NAP and planned awareness raising programmes it need to be anchored somewhere central like the NCSD which will advise and guide the process of implementation in the future. Furthermore, meeting this precondition cannot stand alone. It is important to support the Ministry of Environment and its partners to implement and further develop the Communication Platform.

3) The *why*? – Ambitious objectives and a firm direction

Why is it necessary to have the communication platform and what are the objectives? The platform is developed to

- give a direction of the awareness raising needed to support the implementation of the NAP
- focus the messages communicated to the stakeholders and
- use available resources in a cost-effective fashion.

The objectives of the communication platform should be both ambitious and realistic. The success of the awareness raising activities rely mainly on the ability to build lasting relationships with the stakeholders since the implementation of the NAP demands a change of *BOTH* attitude *AND* behavior. Therefore, the Ministry and its partners should focus on relation building and capacity building activities in the beginning.

The overall objectives of the communication platform:

1. Increased awareness of combating desertification and its implications among the specific stakeholders and the general public in Republic of Macedonia.

2. Participation of the stakeholders and the public in the implementation of the NAP to combat desertification in the Republic of Macedonia

Specific Objectives of the communication platform:

1. Stakeholders are increasingly aware of combating desertification and its implications on their lives/situation and possibilities
2. Implementation of the NAP to combat desertification is on the public/political agenda
3. Increased capacity of key stakeholders to communicate and present combating desertification and the NAP to the public

4) The *who* and *what*? –The stakeholders and key messages

Who are our target groups and what are the key messages we would like them to understand and act upon? It is necessary to find issues that the stakeholders find interesting and can relate to such as health, environment, prices on different products etc.

This is a major key to their finding their own role in the implementation. As mentioned above, the NAP to combat desertification is the step forward in reaching sustainable development within Macedonia which is a stepping stone for EU membership.

This brings about two key messages:

1. Implement the NAP and move forward in reaching sustainable development in the Republic of Macedonia is well on the way to EU membership.

2. You have a role in the implementation process and you will gain if you participate in it.

These key messages take on different forms when they are directed at the different stakeholders and vary according to the relevant perspectives. This is demonstrated in the subchapters below describing the different stakeholders.

4.1 The government, the political scene and the experts

The political agenda plays an important role in how policy areas are handled on the level of strategy and implementation within central and local government. There is a fragile awareness of desertification but any will and action is closely tied to the political scene. That's why a key point will be to put combat desertification on a higher political agenda.

Often lack of action is founded on lack of awareness and not will and this is a very important point. The task will be to point out areas of interests. Therefore, key messages should point out areas where implementation of the NAP will provide them with tangible results that will begin a positive development towards a sustainable Macedonia.

An example is that by adopting the NAP, Macedonia takes an important step towards sustainable development and thus EU membership. Initiatives supporting combating desertification and reaching sustainable development will be eligible for donor support. There are many projects and programmes waiting to be implemented and this to be done successfully with donor aid.

Decision makers within the government and the political sphere need experts in different fields. These experts give them advice on how to interpret topics of a complex character. They are therefore important stakeholders and should be made aware of the NAP and the mechanisms of sustainable development. The international experiences and results are very important in this context because they can further promote the messages coming from the NAP. This is also the case when Macedonian experts give presentations or publicize papers abroad in scientific journals.

4.2 The public and their role in combating desertification

The interests of the public are many and they vary according to their situation in life. Parents may have a different perception of the situation in the country than pensioners; students see things in a different light than employees in the private sector; living in a rural or urban area also plays a role in how everyday life is seen and lived.

However, as mentioned above, it is of the utmost importance that the public participates in the processes leading to sustainable development within the country. And that they are shown and convinced that this development will benefit their own situation.

Awareness of one's own role as a citizen and the benefits achieved by participating should therefore be key messages in all awareness activities targeted at the general public. The specific formulation of the messages will depend on the chosen media.

As an example, the implementation of a National strategy for water also depends on the citizens acting as prescribed in the strategy. Farmers should be made aware of their role in preserving a vital natural resource from pollution and all citizens should be shown how they can save water in their daily routines also with the aim to save money. Because they will not only be securing the water resources but they will also influence how much they should pay for their water.

4.3 The Macedonian media and a relation building approach

The media plays a powerful role in Macedonia with 11 national TV stations and more than 54 TV local stations across the country. On average, Macedonians watch TV for more than 5 hours every day. The news programmes are probably a major reason for this high average. We must also assume that the TV often is turned on as per automatic.

Therefore, a first step will be to make the media in Macedonia aware of their role in the implementation of the NAP. At best they should be both promoters of sustainable development and the watchdogs of society all in the spirit of free press and transparency. If a production plant is polluting above the permitted levels the press should point this out and hopefully the responsible authorities will act, if not before then after the story has been released.

In other words, the ideal media should push and pull in the right direction to achieve good results and thus help secure a better future for Macedonia. Other countries have shown the impact of good journalism in this field and especially within topics related to the environment. The journalists have played a major role in making the public realize what they themselves can do to improve their own situation and that of society as a whole.

For now, the focus on political topics is a reality and has to be used as a starting point for building good relations to the media. The EU accession is a political topic that could pave the way for the NAP and its implementation since they are so closely linked. The key messages could thus be angled to be of interest to the press AND to the public at the same time.

As an example, certain requirements must be met in the process of EU accession. They cover all sectors of society and these *are* topics with a strong angle of both politics and sustainable development. Furthermore, there are several points of interest for the general public such as issues related to environment, health, economics, agriculture, transport and tourism.

4.4 The private sector – one way to a positive spiral

The NAP aims at generating a positive atmosphere for investors both domestic and internationally. Investors are interested in getting a good return on investment *and* in the solidity of the businesses they invest in. Whenever new incentives or improved conditions for the private sector are put forward and adopted, the story should be told. The message should be that investments in enterprises based on sustainable principles will succeed and give a solid return on investment. The positive spiral for Macedonian economy should also be part of the message since this will further improve returns and solidity.

These issues are of course linked to the financial sector and to the international scene. Therefore, it is important to communicate these messages to investors abroad. The NAP would do well to ally themselves with the *Macedonian Chamber of Commerce*, *American Chamber of Commerce* in Macedonia*, Invest in* Macedonia and other organizations and institutions like these to cooperate in communicating investment possibilities in Macedonia.

4.5 Donors and their will to aid implementation

Donors are essential not only in developing the NAP but also in implementing sustainable projects and programmes in accordance with the NAP henceforward. Therefore, they should not only be made aware about the NAP but also of the implementation and the pilot and demonstration projects selected for the different phases of its implementation. The matches of donor programmes should be the focus for communicating with them.

4.6 Students and pupils on the way to a new future

Pupils and students symbolize more than anything the future of Macedonia. They are easily engaged and have an interest in the world around them. Their curiosity and longing to make a difference is a fertile sowing ground for sustainable development. They also have an influence towards their parents and family. Therefore, they are very important stakeholders for the Communication Platform. Furthermore, students within higher education are close to reaching a stage in life where they begin to have influence on decision making and will tend to involve themselves in society and the issues of today.

One way of reaching the young people is by incorporating DLDD issues into the curriculum of schools and universities. It is apparent that such initiates have a profound effect as is the case with environmental issues. The challenge is to keep the momentum when the students leave their formal education and venture out into society as employees and possibly decision makers. Therefore, the education has to begin at an early stage and continue all through their education. Other channels should be put to use such as students' organizations, youth clubs and perhaps cafés.

4.7 Organizations and their key issues

The different stakeholders in society can be reached via organizations, institutions and networks. As an example, NGOs in Macedonia are already natural partners in planning and implementing governmental campaigns and projects.

The organizations, institutions and networks represent the general public and specific stakeholders. In order to have a dialogue and include them in the awareness activities, it is important to map their missions, objectives and underlying interests. Below are mentioned a few examples:

Local government:

At the local level, the Association of the Units of Self-Government of the Republic of Macedonia (ZELS) can encourage promotion of land degradation issues. They are among other areas engaged in decentralized economic development and EU accession.

Consumers and schools:

Consumer Organization of Macedonia is a well-established organization representing the Macedonian consumers. It is an umbrella organisation with representation in many cities across the country and is thus in a position to reach out to many citizens. They also work with consumer education on the levels of pre-school and primary school.

Local communities and the environment:

Green Agenda Network is the sharing pool of the project "Joining Forces for Sustainable Future in the Western Balkans". It gathers NGOs and local communities from: Albania, Bosnia & Herzegovina, Kosovo, Serbia, Macedonia, and Montenegro. There are also many other regional initiatives that fostering regional cooperation and networking.

5) The *how*, *where* and *when*? – Short-term actions

The actions should follow the three phases:

1. Focus
2. Mature
3. Implement

Within the first phase (Focus) of the NAP, ***Raising DLDD Awareness and Commitment*** *might* consists of the following actions:

Action No. 1: Prepare a comprehensive assessment of DLDD awareness and commitment covering all walks of life in the Republic of Macedonia.

Action No. 2: Based on this, prepare a comprehensive, time bound and resource allocated plan and programme for raising DLDD awareness and commitment.

Action No. 3: Implement the DLDD Awareness and Commitment Raising Plan and Programme including a number of selected pilot and demonstration projects with high impact, demonstration and replication value.

Furthermore, this actions build-up to and support the implementation of maturing Macedonia for DLDD.

5.1. Basic requirements when launching the awareness activities

There are some basic elements which should be developed from the beginning: A graphical design line, a continuously updated web site and basic presentation material about the NAP and its implications including press kit.

The project Support to the Republic of Macedonia for development of National Action Plan aligned to the UNCCD 10 Year Strategy and Reporting Process under UNCCD (the NAP Project) has produced a design line taking both the concept of DLDD and the Macedonian context into consideration. The design line does not belong to any particular entity and can thus easily be used. It is ready to use and has already been applied when promoting the NAP.

Likewise, the present MoEPP web site would serve as a natural starting point since it already has a design that matches the stakeholders mentioned above. As a basic principle, the web site must continuously be updated and revised according to the developments with regard to the implementation of the NAP. It is also important to keep the English part of the site updated with because of potential and existing donors and international cooperation.

The NAP project could also produce CD-ROM presentations of the NAP and the design line includes a data sheet to be used as basic information material.

5.2. Assess the awareness and commitment of the Macedonian stakeholders

The assessment of the DLDD awareness and commitment among Macedonian stakeholders can be made using a variation of methods and to achieve the best results a combination of them are to be recommended. For example, a broader questionnaire could be used throughout the country targeting groups of well-defined stakeholders and citizens. This questionnaire should be easily processed and interpreted when returned. At the same time, a number of qualitative more in depth interviews could be conducted with very few representatives from the same groups of stakeholders. Together, these two methods will help directing the direction of future DLDD awareness activities and their content.

When designing the questionnaire, it is important to consider the kind of information needed.

What questions should be answered in order to gain the sought for assessment? Putting a straightforward question such as “Do you know what DLDD is and can you define it?” “Are you committed to participating in making Macedonia successful in combating desertification ?” will probably not result in the most useful assessment. It would be better to ask questions that focus on principles behind DLDD and decision making processes. It would also prove useful to design one general section for all and specific sections for specific stakeholders targeting issues relevant to their position in society.

The questionnaire should be prepared by experts in communication, questionnaires and DLDD in a Macedonian context.

5.3. Internal communication as a sound base for outreaching activities

Before venturing too far abroad, it would be a sound precaution to decide on an internal communication strategy within the Ministry of Environment and Physical Planning itself and between the Ministry and its partners and close network. It will be crucial for the Ministry to listen to the needs of their partners and network in order to achieve an open and transparent communication with them. Otherwise their role as ambassadors for the implementation of the NAP will risk becoming impaired.

Perhaps an internal two-page monthly newsletter could be useful keeping everyone belonging to the inner circle updated on events and status. Another possibility is to establish a project web. This could support the need for a continuous internal dialogue taking into consideration that the involved parties may be geographically widespread. The organizational set-up will also play a role in how the communication flows.

5.4. Capacity building the society through key stakeholders

State administration has already played an important role in the making of the NAP. The local and national levels have been involved during the NAP project. They have also been targeted through the awareness activities during the final phase of the NAP project: The sounding and hearing process within central government and institutions, a workshops inviting local stakeholders and last but not least an executive meeting for employees with high-level positions in the ministries.

These activities cannot stand alone and a structured approach to capacitating the technical working groups of the NCSD, parliamentarians and the media is crucial in conveying the two key messages to the general public and get them and other stakeholders to participate in the process of combating desertification in Macedonia:

1. Implement the NAP and the Republic of Macedonia is well on the way to EU Membership (even no directly, but as a final goal of reaching sustainable development in the Country).

2. You have a role in the implementation process and you will gain if you participate in it.

Besides being targeted themselves, the Ministry of Environment and Physical Planning and its Public Communication Office , should coordinate, plan and implement the activities.

The NCSD, its technical working groups, partners and network

The NCSD and its technical working groups are the most crucial NAP ambassadors in and outside Macedonia. Together with their partners and network they should be able to convey the essence of the NAP and its implications very quickly. They will act as role models for decision makers and all stakeholders in society and therefore their public performances must be very professional.

The capacity building activities can be divided into three major groups where the participants become:

1. able to implement the communication platform

2. professional presenters who are aware of how to communicate with their target groups forming their messages according to the interests, needs, considerations and situations of these groups

3. confident with the press and with giving interviews

The best effect would be to combine activities between training sessions and on-the-job-training.

The trainers should be professional presenters, journalists and communication experts presenting Macedonian and international experience.

Parliamentarians and civil servants

Political will is a precondition for implementing the NAP. However, it cannot be taken for granted. Therefore, the parliamentarians, local politicians and the civil servants who draft and implement policies have to be targeted in capacity building awareness activities.

The activities should create an open and constructive dialogue with experts, institutions and organizations working within the field of land degradation and combating desertification. Only by making the politicians and civil servants feel confident that they understand and are committed to the NAP, can it be implemented successfully. As a very important outcome, this approach can help build the much looked-for trust between scientists and the administrators.

As a natural consequence of the second overall objective of this Communication Platform – ***Participation of the stakeholders and the public in the implementation of the NAP in the Republic of Macedonia*** – it is imperative that the confidence of politicians and civil servants is increased when including the public and other stakeholders in decision making processes. They have to break the old patterns and convince the public and the stakeholders that their participation is needed and that they are listened to.

Politicians should also be able to explain and illustrate the reasoning behind their decisions once they have made them. All too often hearing and sounding processes including the public and other stakeholders are left out for the sake of rationalization. Instead, they are kept in close circles.

The capacity building activities can be divided into four major groups where the politicians and civil servants become:

1. familiar with the concept of NAP to combat desertification and the NAP and its implication

2. professional presenters who are aware of how to communicate with their target groups forming their messages according to the interests, needs, considerations and situations of these groups
3. confident with the press and with giving interviews
4. (especially for civil servants) able to plan and implement well-disposed sounding and hearing processes.

The activities could take the form of workshops, specific training courses, on-the-job-training revolving around planning and implementing a concrete pilot and demonstration project. The trainers should be professional presenters, journalists and communication experts presenting Macedonian and international experience.

The media

The media is a crucial target group for the Ministry and its Office for communication with public and the Communication Platform. Capacitating them could prove a sound and rewarding method for beginning a constructive relation building programme with them while at the same time including members of the press in some of the above-mentioned capacity building activities. This is a demonstration of how the NAP needs the media and the media needs to know more about the NAP and its implementation.

The activities should revolve around practical and case-oriented training sessions including short presentations combined with group discussions and actual training in disseminating stories about the implementation of the NAP. The discussions could be about the role of the journalists, the working relationship with the Ministry and the Office for Communication with public and the use of experts and other central sources.

The activities should be implemented by the Ministry of Environment and Physical Planning and its Office for communication with public, experts in lend degradation and combating desertification and the NAP with a flair for communicating, communication experts and journalists.

5.5. Strategy for attracting the media

One of the first awareness activities will be to develop a press strategy that also outlines a strategy for attracting the media. The capacity building activities will be part of this strategy and of building the relationship with the media. Another initiative could be to engage in dialogue with the editors in chief and the owners of the different media. This could prove very constructive.

A simple press strategy would be recommended as a starting point. It can then be developed further as the implementation of the NAP progresses. Mapping the press and creating a press database is part of this activity.

5.6. International cooperation and exposure

The Republic of Macedonia is often represented at international conferences and whenever possible it benefits the country to expose results and know-how in specific fields including combating desertification. Opportunities like this should be used for international as well as national exposure and the Ministry of Environment and Physical Planning should have both press kit and information material ready for such occasions

Whenever the NAP to combat desertification, its implementation or other related issues are being presented at international conferences this should be used to create awareness of the fact that Macedonia plays an important role internationally with regard to combating desertification:

1. Other countries are looking for inspiration from the Macedonian experience.

2. Likewise, international know-how and experience should also be disseminated within Macedonia.

This correlation between international exposure and national awareness increase the credibility of the Country, the Ministry and all the stakeholders involved in implementing the NAP to combat desertification.

5.7. Solid evidence – pilot and demonstration projects

The pilot and demonstration project will be a source of cases demonstrating combating desertification in progress and will thus provide material for the implementation of press strategy and many other awareness activities.

As soon the selection system is set up for projects to be proposed, selected and implemented, and what their objectives and results are, an activity plan for disseminating this should be made.

The plan should include details on how and when to communicate

1. the proposed projects to potential donors

2. the selected projects and their objectives to the public and other stakeholders

3. the results, effects and perspectives to the public and other stakeholders

6) Timing of activities during the first three years

The communication platform will develop in step with the NAP implementation acquiring new experience and knowledge. Therefore, the time plan only covers the first three years of implementing the NAP. The majority of activities should be implemented by the Ministry of Environment and Physical Planning in cooperation with other stakeholders, national experts, and communication experts and journalists with national and international experience.

No	Activities	YEAR ONE				YEAR TWO				YEAR THREE			
		1stQ	2ndQ	3thQ	4thQ	1stQ	2ndQ	3thQ	4thQ	1stQ	2ndQ	3thQ	4thQ
1	Basic requirements												
1.1	Graphic align line												
1.2	Continuously updating web site												
1.3	Basic Information material												
1.3.1	Prepare cd- rom on final NAP												
1.3.2	Prepare datasheets with basic information												
1.3.3	Develop information material continuously												
2	Assessment of awareness and commitment												
2.1	Prepare questionnaire for quantitative assessment												
2.2	Prepare interview guide for qualitative assessment												
2.3	Select representatives for quantitative assessment												
2.4	Select representatives for qualitative assessment												
2.5	Send out and collect questionnaire												
2.6	Conduct interviews												
2.7	Systemize and synthesize information gathered												
2.8	Adjust the platform and plan of action												
3	Internal communication												
3.1	Map the need for internal communication												

3.2	Prepare an interview guide												
3.3	Interview representatives from the stakeholders, partners and network												
3.4	Systemize and synthesize information gathered												
3.5	Prepare an internal communication strategy and actions												
3.6	Implement the actions												
4	Capacity building												
4.1	Capacity building of stakeholders, partners and network												
4.1.1	Workshop for stakeholders, partners and network: Press handling & presentations												
4.1.2	On-the-job training of the national specialists												
4.1.3	On-the-job training of the PCU staff: How to implement the platform												
4.2	Workshop for parliamentarians, central and local government representatives												
4.2.1	How to better understand combating desertification and the NAP for combating desertification (all)												
4.2.2	How to plan and conduct the sounding and hearing process (esp. government representatives)												
4.2.3	How to handle the press and present your issues (all)												
4.3	Workshop for the media												
4.3.1	How to better understand combating desertification and the NAP (media)												

4.3.2	How to find your role as a journalist as driving engine of combating desertification												
5	Media strategy												
5.1	Develop a press strategy (focus on attracting the media and relation building)												
5.2	Implement the press strategy												
6	International communication												
6.1	Map international activities in the coming 6 months and follow up												
6.2	Develop a plan (including material) to promote and contribute - and follow up												
6.3	Implement the plan												
7	Pilot and demonstration projects												
7.1	Develop a communication plan												
7.2	Implement the communication plan												