EUROPEAN
COURT
OF AUDITORS

Background paper

Desertification in the EU

June 2018

Desertification is a form of land degradation in drylands. It results from unsustainable land management practices and climatic factors. Thirteen EU Member States, not only in the Mediterranean region, but also in Central and Eastern Europe, have declared that they are affected by desertification. Desertification is a consequence, but also a cause of climate change: it is aggravated by more droughts, rising temperatures, less precipitation, and it also magnifies climate change by reducing the capacity of soil to retain carbon.

Desertification is a cross cutting challenge for many EU policy areas such as climate, environment, agriculture, research and cohesion. EU support for combating desertification can be provided through several funding programmes from different policy areas, such as Rural Development, Environment, Cohesion or Research.

The ECA is examining whether the risk of desertification is being addressed effectively and efficiently in the EU. The audit includes visits to EU projects addressing desertification in five Member States (Cyprus, Italy, Portugal, Romania and Spain), which are being used to assess the implementation and the monitoring of the EU's desertification-related strategies.

If you wish to contact the audit team, you may do so at the following email address:
ECA-Desertification-Audit@eca.europa.eu

CONTENTS

WHAT IS DESERTIFICATION?

Desertification is defined by the United Nations Convention to Combat Desertification (UNCCD) as "land degradation in arid, semi-arid and dry sub-humid areas (drylands) resulting from various factors, including climatic variations and human activities". Climatic variations include the decrease in precipitation, drought, or soil and moisture loss on a global level. Human activities include overgrazing, deforestation, removal of the natural vegetation cover and unsustainable agricultural activities in vulnerable ecosystems.

These activities result in diminished food production, soil infertility, a decrease in the land's natural resilience and reduced water quality. Desertification causes poverty and may result in loss of livelihoods, obliging affected people to migrate.

Desertification does not imply the presence of deserts. It can occur far from any climatic desert, and the presence or absence of a nearby desert has no direct relation to the desertification process.

There are fine lines between drylands, desertified lands and deserts, but, once they are crossed, it is hard to return, as restoring soil is a slow process. It can take 500 years for 2.5 cm of soil to form but only a few years to destroy it[1]. It is much more cost-effective to protect drylands from degradation than to reverse the process.

Once permanently degraded, land can still be used for other human activities (e.g. building houses and roads, installing solar panels, etc.) and thus it might be economically viable – but its biodiversity, soil productivity and habitats, as well as its function in keeping the ecosystem alive, and producing food, is lost.

Definitions

Desertification is defined by the United Nations Convention to Combat Desertification (UNCCD) as "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities"[2]. **Desertification is** a form of **land degradation** when it occurs **in drylands**.

Land degradation is defined as the **reduction or loss of biological or economic productivity**, which the land cannot recover by itself without help. Land degradation is the process of turning fertile land into less or non-productive land and, hence, generally caused by humans. Land degradation and desertification are complex phenomena driven by un-adapted human activity in combination with land and climatic constraints.

Drylands are **arid, semi-arid and dry sub-humid areas** in which the ratio of annual precipitation to potential evaporation and plant transpiration falls within a range from 0.05 to 0.65. Drylands are prone to frequent droughts.

Deserts are **hyper-arid, barren areas** where little precipitation occurs and consequently living conditions are hostile for plant and animal life.

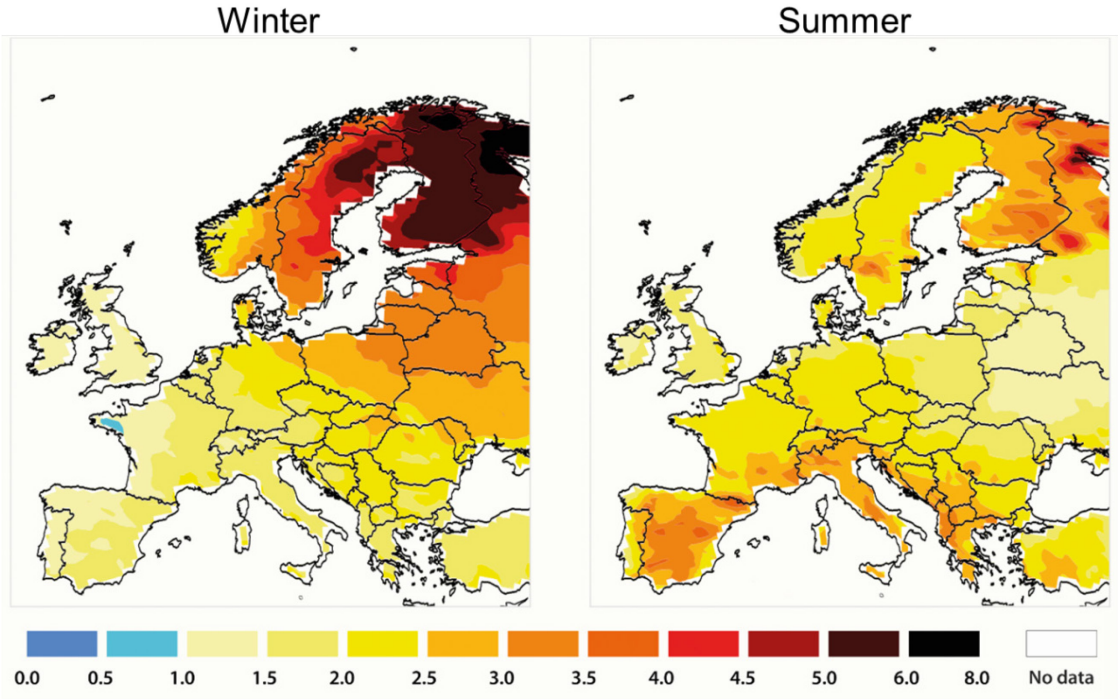
Drought is a phenomenon that occurs when **precipitation has been significantly below normal** recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems. Drought and desertification are closely related phenomena, but drought is a **periodic short- or mid-term** event, unlike desertification, which is a long-term phenomenon. Persisting over months or years, drought can affect large areas and may have serious environmental, social and economic impacts. While droughts have always occurred, their incidence and impact are exacerbated by climate change and human activities that are not adapted to the local climate.

IMPACT OF DESERTIFICATION IN THE EU

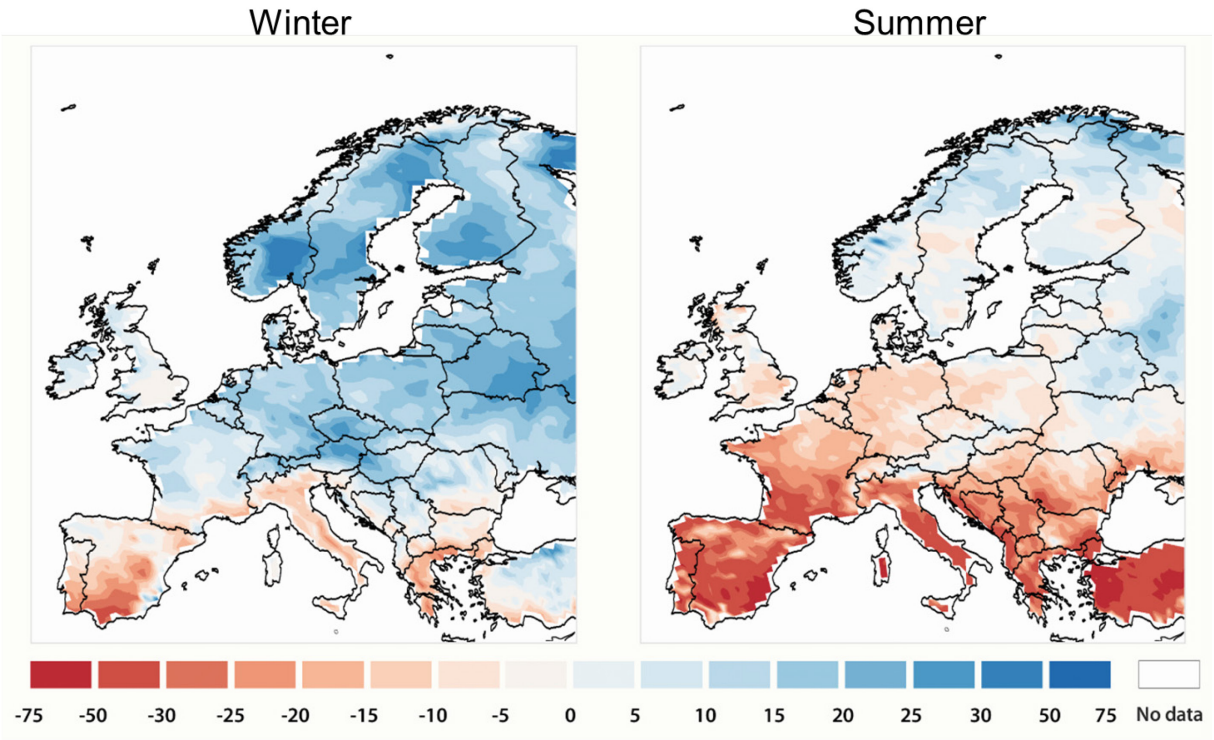
Even if the objective of the Paris Agreement is achieved – keeping the rise in global temperature this century well below 2°C – temperatures will increase by far more than 2°C in certain regions (see ***Figure 1***). In the summer, temperatures could increase by an average of 3 to 4°C in most of Spain and in northern Scandinavia. Summer precipitation is expected to decrease by more than 50% on much of the EU's Mediterranean coast. In parallel, the frequency of extreme weather events such as droughts and floods will increase. Water shortages and higher temperatures, which increase evaporation, combined with soil erosion intensified by extreme weather events, increase the risk of desertification in Europe. Processes resulting in desertification occur extensively both in Mediterranean and Central and Eastern European countries[3].

Figure 1: Seasonal temperature change, in °C (a) and change in seasonal precipitation in % (b) for 2071-2100, compared with 1961-1990 (2°C global increase scenario)

a)



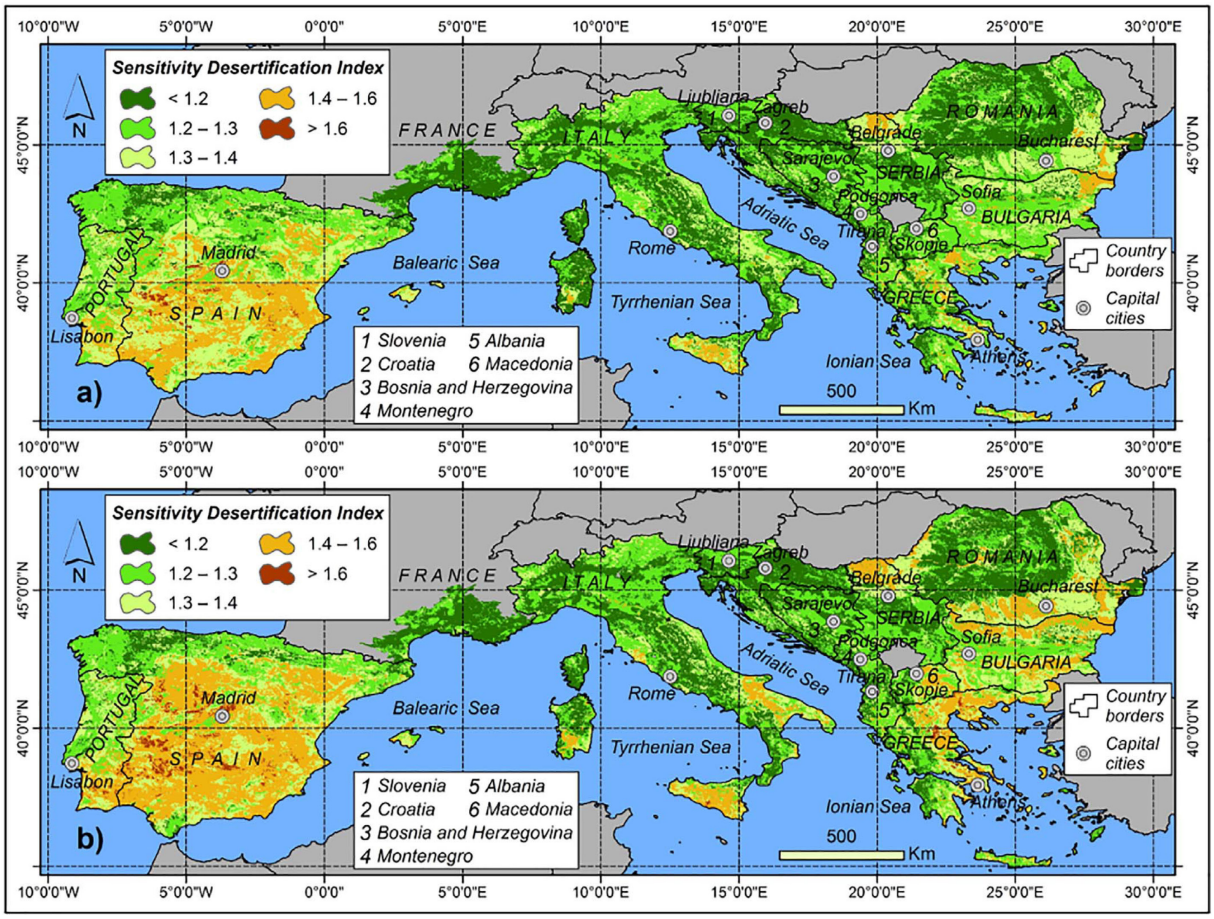
b)



Source: Adapted from Climate Impacts in Europe, the JRC PESETA II project, 2014. Data from Dosio and Paruolo 2011 and Dosio et al, 2012.

According to the European Environment Agency (EEA) 2008 data, in the areas of Southern, Central and Eastern Europe for which data was available, 8 % of the territory, corresponding to about 14 million hectares, showed “very high” and “high sensitivity” to desertification. The affected part increases to more than 40 million hectares if moderate sensitivities are also taken into account. The situation is most serious in Southern Portugal, a large part of Spain, Sicily, south-eastern Greece, Cyprus, and the areas bordering the Black Sea in Bulgaria and Romania. A recent study (see ***Figure 2***) confirmed the unfavourable desertification trend in the EU.

Figure 2: Spatial representation of the 2008 Sensitivity Desertification Index (a) and improved (new) Sensitivity Desertification Index (b) with the new Climate Quality Index (2017)



Source: Remus Pravalie, Cristian Patriche, Georgeta Bandoc, Quantification of land degradation sensitivity areas in Southern and Central Southeastern Europe, 2017.

Note: Cyprus was not included in the study.

Thirteen Member States have declared themselves affected by desertification under the United Nations Convention to Combat Desertification: Bulgaria, Croatia, Cyprus, Greece, Hungary, Italy, Latvia, Malta, Portugal, Romania, Slovakia, Slovenia and Spain. The EU has not declared itself as a party affected by desertification.

ADDRESSING DESERTIFICATION

Tackling desertification can be addressed by the following actions:

- climate change mitigation, through the reduction of CO_2 emissions at source;
- proactively preventing land degradation;
- reactively reducing and rehabilitating desertified land.

There can be some overlaps between these actions. For example, proactive land management to increase the carbon sequestration capacity can also be counted as climate change mitigation action, since it reduces greenhouse gas concentrations in the atmosphere.

In a proactive approach, tackling desertification aims to make land more resilient, which also reduces the vulnerability of society to the disturbances caused by desertification. Some prevention measures are listed in ***Table 1***.

Table 1: Prevention measures for desertification – proactive approach

Prevention measures to combat desertification
Include sustainable land management, drought-risk management and biodiversity considerations in the design, implementation and monitoring of adaptation action at local, regional and national level
Increase awareness of desertification and its consequences
Integrate land and water management
Protect vegetative cover
Mix farming practices in the dry sub-humid and semiarid zones (i.e. balance pastoral and cropping land use)
Monitor land: integrate use of satellite-based remote sensing or aerial photographs with ground-based observations to provide consistent, repeatable, cost-effective data on vegetation cover
Use plant and animal species adapted to changing climate and conditions

Source: Adapted from Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Desertification Synthesis. World Resources Institute, Washington, DC.

In contrast, when the desertification process has already started, current pressures on the ecosystem (climate change, overgrazing, and large-scale irrigation) may lead to further desertification. Some interventions can help to restore the dryland ecosystems (see ***Table 2***).

Table 2: Measures to restore desertified land – reactive approach

Measures to restore desertified land
Diversify production (crops and animals), avoid monocultures
Enrich soil with organic matter
Reforest
Reintroduce selected species, control of invasive species
Control erosion through the construction of terraces, fences or barriers from local plant species, woven palms, planted hedges, the planting of vegetation whose roots protect and fix the soil, and the prohibition of livestock from grazing to protect the plantation areas.
Use plant and animal species adapted to changing climate and conditions

Source: Adapted from Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Desertification Synthesis. World Resources Institute, Washington, DC.

Addressing desertification can have multiple local and global benefits and help to mitigate climate change and biodiversity loss. Environmental management approaches for combating desertification, mitigating climate change, and conserving biodiversity are interlinked in many ways.

REGULATORY ENVIRONMENT, EU STRATEGIES, ACTION PLANS AND POLICIES

The United Nations Convention to Combat Desertification (UNCCD) is an international, global agreement aimed at promoting a global response to desertification. The UNCCD provides a legally binding agreement on land issues, on adaptation, mitigation and resilience, that addresses land degradation and desertification. The parties to the UNCCD, including the EU, confirmed their commitment to achieving Land Degradation Neutrality by 2030, by avoiding, minimising and reversing land degradation trends in such a way that the overall balance of biologically and economically productive land remains stable or increases in relation to the current situation[4].

The EU does not have a dedicated strategy or a specific legal framework for desertification. Aspects of desertification are addressed under various strategies, action plans and policies.

Regarding soil, in September 2006, the Commission adopted a **Thematic Strategy for Soil Protection**[5], underlining that soil degradation processes or threats can ultimately lead to desertification. The objectives of the strategy are to ensure a sustainable use of soil by preventing further soil degradation and preserving its functions, as well as by restoring degraded soil to a level of functionality consistent at least with current and intended use. In 2012, the Commission issued a report on the Implementation of the Soil Thematic Strategy and ongoing activities[6], acknowledging the four pillars of the 2006 strategy: awareness raising, research and integration with other policies and legislation. The report confirmed the unfavourable trend of desertification and a loss of productive capacity of the soil in recent decades. However, the proposal for an EU Directive establishing a framework for the protection of soil was withdrawn by the Commission in May 2014, as the Council could not gather a qualified majority of Member States.

In April 2013, the Commission adopted the 2013 **EU Adaptation Strategy for climate change**[7], to encourage Member States and cities to take adaptation action. It stresses the necessity for the EU to take adaptation measures to deal with the economic, environmental and social costs of climate impacts, based on a number of actions. In 2016, the Commission launched an evaluation of the adaptation strategy to examine its implementation and performance. It is planned to be completed by the end of 2018.

In November 2013, the EU adopted the **General Union Environment Action Programme (EAP)**[8], with the aim of achieving sustainable land management, soil protection and the remediation of contaminated sites by 2020. An Expert Group was set up to implement the EAP's soil protection provisions.

The river basin management plans required under the Water Framework Directive[9], and the flood risk management plans required under the Floods Directive[10] can also play an important role in addressing soil issues, as do national forest programmes, sustainable forestry practices and forest fire prevention measures.

The implementation of the Common Agricultural Policy (CAP) can also have effects on agricultural soils.

The economic cost of soil degradation is estimated by the Commission to be in the order of tens of billions of euros[11]. However, soil is not subject to a comprehensive and coherent set of rules in the EU.

ROLES AND RESPONSIBILITIES

European Commission departments and activities

Several Commission Directorates-General deal with desertification, including those for Environment, Climate Action, Agriculture and Rural Development, and Research and Innovation,

In addition, the Commission's Directorate-General Joint Research Centre (JRC), collects and monitors data on soil, climate, and drought, including managing the European Drought Observatory. JRC develops integrated methodologies and indicators for assessing and mapping land degradation and desertification, which are being used to compile the World Atlas of Desertification – expected to be published later in 2018.

Spatial monitoring of desertification is regularly part of EU-funded research projects. Copernicus, the EU's earth observation programme, also provides useful information for monitoring various indicators connected to desertification, such as the vegetation index and seasonal biomass productivity.

Council

The aim of the Council Working Party on International Environment Issues is to prepare the EU's positions for international negotiations related to environmental and climate change issues and to examine the Commission's legislative proposals in its field of expertise. A sub-working party on desertification, composed of experts from each Member State, has been set up.

EU FINANCING FOR MEASURES TO ADDRESS DESERTIFICATION

European structural and investment funds

One of the thematic objectives of the European Structural and Investment Funds is 'Climate change adaptation and risk prevention', and one of the priorities of the European Agricultural Fund for Rural Development is 'Restoring, preserving and enhancing ecosystems related to agriculture and forestry'. Measures to address desertification can be financed using these funds, but the exact figures for funds planned and used specifically to address desertification are not known.

Other EU funding instruments

Other EU funding instruments, which could be used for identifying and combating desertification, are the Horizon 2020 research programme and the LIFE instrument for the environment.

MAIN ISSUES IDENTIFIED WHEN PREPARING THE AUDIT

When preparing our audits, we carry out an issue analysis of the policy area or programmes that we intend to examine. Since these issues are identified before the audit work commences, they should not be regarded as audit observations, conclusions or recommendations.

In the course of the audit on desertification, we are looking at the following questions in greater depth in relation to the issues identified:

- Do the Commission and the Member States have reliable information on areas at risk of desertification – including an effective monitoring system?

- Do the Commission and the Member States have a sound framework to address desertification?

ABOUT ECA SPECIAL REPORTS AND BACKGROUND PAPERS

Our special reports set out the results of audits of EU policies and programmes or management topics related to specific budgetary areas.

Background papers provide information based on preparatory work undertaken before the start of an on-going audit task. They are intended to be a source of information for those interested in the audited policy and/or programme.

If you wish to contact the audit team, you may do so at the following email address:

ECA-Desertification-Audit@eca.europa.eu.

[1] United Nations Convention to Combat Desertification, http://www.zaragoza.es/contenidos/medioambiente/onu/issue06/1128-eng.pdf

[2] See United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD), Article 1.a.

[3] Luca Montanarella, Gergely Toth, Desertification in Europe, Joint Research Centre 2008.

[4] Target 15.3 in the framework of the Sustainable Development Goals.

[5] Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy for Soil Protection, COM (2006) 231 final.

[6] Report from the Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Regions - The implementation of the Soil Thematic Strategy and ongoing activities, COM (2012) 46 final.

[7] Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - An EU Strategy on adaptation to climate change, COM (2013) 216.

[8] Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet' (OJ L 354, 28.12.2013, p. 171–200).

[9] Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy of 23 October 2000.

[10] Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks of 23 October 2007.

[11] Commission staff working document; impact assessment of the thematic strategy on soil protection; SEC (2006) 620.