EN 2018

NO 33

Special Report

Combating desertification in the EU: a growing threat in need of more action

(pursuant to Article 287(4), second subparagraph, TFEU)

EUROPEAN
COURT
OF AUDITORS

AUDIT TEAM

The ECA's special reports set out the results of its audits of EU policies and programmes, or of management-related topics from specific budgetary areas. The ECA selects and designs these audit tasks to be of maximum impact by considering the risks to performance or compliance, the level of income or spending involved, forthcoming developments and political and public interest.

This performance audit was carried out by Audit Chamber I Sustainable use of natural resources, headed by ECA Member Nikolaos Milionis. The audit was led by ECA Member Phil Wynn Owen. He was supported in the preparation of the report by Gareth Roberts, Olivier Prigent, Katharina Bryan, and Victoria Gilson from his private office; Colm Friel, Principal Manager; Ramona Bortnowschi, Head of Task; Jan Huth, Deputy Head of Task; Paulo Braz, Antonio Caruda Ruiz, Marcos Homrich Hickmann, Ioan Alexandru Ilie, Michela Lanzutti, Michail Konstantopoulos, Ioannis Papadakis, Ernesto Roessing, and Raluca-Elena Sandu, Auditors. Richard Moore provided linguistic support. Rachel O'Doherty provided secretarial assistance.

From left to right: Olivier Prigent, Phil Wynn Owen, Marcos Homrich Hickmann, Katharina Bryan, Antonio Caruda Ruiz, Jan Huth, Ramona Bortnowschi, Colm Friel, Victoria Gilson, Gareth Roberts, Ernesto Roessing, Richard Moore.

CONTENTS

	Paragraph
Abbreviations	
Executive summary	I - VIII
Introduction	1 - 24
Desertification in the EU – a growing threat driven by climate change and human activity	1 - 7
Climate change scenarios confirm the EU's increased vulnerability to desertification	8 - 10
The UN framework for combating desertification	11 - 14
Combating desertification in the EU	15 - 24
Audit scope and approach	25 - 27
Observations	28 - 71
The Commission and Member States collect data relevant to desertification and land degradation, but the Commission does not make adequate use of it	28 - 40
The Commission and the Member States collect data related to desertification	29 - 37
There is no agreed methodology for assessing desertification and land degradation within the EU	38 - 40
The EU is taking steps to combat desertification, but with limited coherence	41 - 56
No specific legislation on desertification and soil exists at EU level	43 - 44
EU strategies, policies and spending programmes contribute to combating desertification, but do not specifically focus on it	45 - 56
EU-financed projects related to desertification can have a positive impact, but there is no relevant performance information on desertification	57 - 66
EU projects can have a positive impact on combating desertification	60
But there are concerns about their long-term sustainability	61 - 64
Limited use and scope of cost-benefit analysis	65
Projects' performance on desertification and land degradation was not assessed by Member State authorities	66

The Commission has not assessed progress towards meeting the commitment to land degradation neutrality by 2030 67 - 71

Conclusions and recommendations 72 - 78

Annex I – Mapping of areas at risk of desertification in selected Member States

Annex II – Additional data related to desertification monitored by the Commission

Annex III – Summary of projects relevant to desertification visited during the audit

The Commission's replies

ABBREVIATIONS

CAP	Common Agricultural Policy
CORINE	Coordination of information on the environment programme
DG AGRI	European Commission's Directorate-General for Agriculture and Rural Development
DG CLIMA	European Commission's Directorate-General for Climate Action
DG ENV	European Commission's Directorate-General for the Environment
DG ESTAT	European Commission's Directorate-General for Statistics
DG JRC	European Commission's Directorate-General Joint Research Centre
DG RTD	European Commission's Directorate-General for Research and Innovation
EAFRD	European Agricultural Fund for Rural Development
EEA	European Environment Agency
ERDF	European Regional Development Fund
EUSF	European Union Solidarity Fund
IPCC	Intergovernmental Panel on Climate Change
LUCAS	Land Use/Cover Area frame statistical Survey
NAP	National Action Programme to combat desertification under the UNCCD framework
RCP	Representative Concentration Pathway
RDP	Rural Development Programme
SDG	Sustainable Development Goal
SFD	Soil Framework Directive
UNCCD	United Nations Convention for Combating Desertification

EXECUTIVE SUMMARY

I. Desertification, a form of land degradation in drylands, is a growing threat in the EU with significant effects on the use of land. The term is usually used to describe human- and climate-related processes leading to problems affecting dry areas, such as diminished food production, soil infertility, decreases in the land's natural resilience, and reduced water quality. Projections on climate change in Europe show that the risk of desertification is increasing. Hot semi-deserts already exist in southern Europe, where the climate is transforming from temperate to dry. This phenomenon is extending northwards. The long period of high temperatures and low rainfall in Europe in the summer of 2018 reminded us of the pressing importance of this problem.

II. We examined whether the risk of desertification in the EU was being effectively and efficiently addressed. We assessed whether the Commission had made adequate use of available data and whether the EU had taken steps to combat desertification in a coherent way. We audited projects addressing desertification in the EU, and examined whether the EU's commitment to achieving land degradation neutrality by 2030, whereby the amount and quality of land resources remains stable or increases, is likely to be achieved.

III. We conclude that, while desertification and land degradation are current and growing threats in the EU, the Commission does not have a clear picture of these challenges, and the steps taken to combat desertification lack coherence. The Commission has not assessed progress towards meeting the commitment to achieving land degradation neutrality by 2030.

IV. Although the Commission and the Member States collect data about various factors with an impact on desertification and land degradation, the Commission has not analysed it to come up with a conclusive assessment on desertification and land degradation in the EU.

V. There is no EU-level strategy on desertification and land degradation. Rather, there is a range of strategies, action plans and spending programmes, such as the Common Agricultural Policy, the EU Forest Strategy, or the EU strategy on adaptation to climate change, which are relevant to combating desertification, but which do not focus on it.

VI. Desertification-related EU projects are spread across different EU policy areas – mainly rural development, but also environment and climate action, research, and regional policy. These projects can have a positive impact on combating desertification, but there are some concerns about their long-term sustainability.

VII. In 2015, the EU and Member States committed to achieving land degradation neutrality in the EU by 2030. However, there has not been a full assessment of land degradation at EU level, and no methodology has been agreed on how to do so. There has been no coordination between the Member States, and the Commission has not provided practical guidance on this topic. There is not yet a clear, shared vision in the EU about how land degradation neutrality will be achieved by 2030.

VIII. Based on the above, we make recommendations to the Commission aimed at better understanding land degradation and desertification in the EU; assessing the need to enhance the EU legal framework for soil; and stepping up efforts towards delivering the commitment made by the EU and the Member States to achieve land degradation neutrality in the EU by 2030.

INTRODUCTION

Desertification in the EU – a growing threat driven by climate change and human activity

1. Europe is increasingly affected by desertification. The risk of desertification is most serious in southern Portugal, parts of Spain and southern Italy, south-eastern Greece, Malta, Cyprus, and the areas bordering the Black Sea in Bulgaria and Romania. Studies have reported these areas to be often impacted by soil erosion, salinisation, loss of soil organic carbon, loss of biodiversity and landslides[1]. The long period of high temperatures and low rainfall in Europe in the summer of 2018 reminded us of the pressing importance of this problem.

2. Desertification is a form of land degradation in drylands. The term is used to describe human- and climate-related processes leading to problems affecting dry areas: for example, lower food production, soil infertility, decreases in the land's natural resilience, and reduced water quality (see ***Box 1***).

Box 1 – Key terms

Desertification means "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities"[2]. Desertification can bring about poverty, health problems due to wind-blown dust, and a decline in biodiversity. It can also have demographic and economic consequences, forcing people to migrate away from affected areas. Desertification does not describe conditions in areas traditionally described as "deserts". Rather, it refers to drylands.

Land degradation means a reduction or loss in biological or economic productivity[3]. It is the phenomenon through which fertile land becomes less productive. It is generally caused by human activity. Aside from productivity, other factors such as land cover, soil erosion or soil organic carbon can be used to assess land degradation. Other definitions of land degradation emphasise the

---

[1] Montanarella, L., Toth, G., JRC, "Desertification in Europe", 2008.

[2] See the 1994 United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD), Article 1.

[3] Ibid.

deterioration of biodiversity and ecosystem services[4]. The related concept of land degradation neutrality is defined by the UNCCD as "a state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems."

Drylands or arid, semi-arid and dry sub-humid areas, are areas in which the ratio of annual precipitation to potential evaporation and plant transpiration, the aridity index, is between 0.05:1 and 0.65:1[5]. Drylands are prone to frequent droughts.

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[6]. 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. When they persist over months or years, droughts can affect large areas and may have serious environmental, social and economic impacts. While droughts have always occurred, their frequency and impact have been exacerbated by climate change and human activities that are not adapted to the local climate.

Aridity is a climate phenomenon characterised by a shortage of water[7]. It is a long-term phenomenon, being measured by comparing long-term average water supply (precipitation) to long-term average water demand (evaporation and plant transpiration).

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

---

[4] See e.g. Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, "Assessment Report on Land Degradation and Restoration".

[5] See the 1994 United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD), Article 1.

[6] Ibid.

[7] World Atlas of Desertification, JRC, 2018.

3. Desertification is caused by both human activity and climate change.

- **Human activities**. Overuse or inefficient use of water, e.g. through poor irrigation techniques, reduces the overall water supply in an area, potentially leading to vegetation loss and eventually desertification. Overgrazing and deforestation[8] can lead to desertification because both remove or damage the vegetation that protects the land and keeps it moist and fertile. Studies have found that land abandonment can be a factor making land more vulnerable to land degradation and desertification[9]. However lack of human activity can also bring benefits, such as soil recovery, increased biodiversity or active reforestation[10].

- **Climate change**. As average temperatures rise and droughts and other severe weather events increase in frequency and intensity due to climate change (see ***paragraph 9***), dryland degradation (and thus desertification) tends to increase. When land is extremely dry, it is susceptible to erosion including during flash floods, when topsoil is quickly swept away, further degrading the land surface[11].

4. Desertification, in turn, can also affect climate change. It has a negative effect on climate change.

- Soil degradation emits greenhouse gases into the atmosphere, risking further climate change and biodiversity loss (see ***Figure 1***). Biomass and soil carbon stocks

---

[8] Overgrazing occurs when farmers have too many livestock in a small area or when they keep livestock in an area for too long. Deforestation is often caused by harvesting wood for fuel or to make room for farming or housing.

[9] See Rubio, J. L. and Recatalá, L., "The relevance and consequences of Mediterranean desertification including security aspects", Centro de Investigaciones sobre Desertificación, Valencia, Spain, 2006 or Salvati, L. and Bajocco, S. "Land sensitivity to desertification across Italy: Past, present, and future", *Applied Geography 31*, 2011.

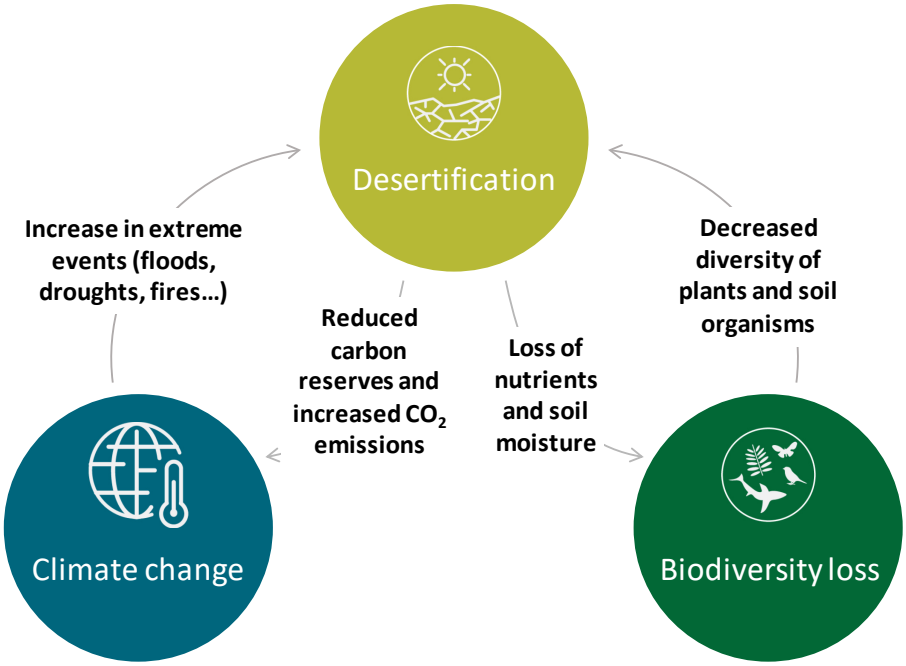
[10] Rey Benayas, J. M., Martins, A., Nicolau, J. M. and Schulz, J. J., "*Abandonment of agricultural land: an overview of drivers and consequences*", CABI Publishing, 2007.

[11] See the Court's Special Report No 25/2018 "Floods Directive: Progress in assessing risks, while planning and implementation need to improve".

are vulnerable to loss to the atmosphere as a result of projected increases in the intensity of storms, wildfires, land degradation and pest outbreaks[12].

– Soil restoration gradually absorbs greenhouse gases from the atmosphere, allowing trees and vegetation to grow. These plants can then absorb more carbon. In areas where the soil is degraded, this process cannot function – and carbon is not absorbed from the atmosphere.

Figure 1 – Relationship between desertification, biodiversity loss and climate change



Source: ECA, based on World Resources Institute, Ecosystems and Human Well-being: Desertification Synthesis, 2005, p. 17.

[12] Intergovernmental Panel on Climate Change (IPCC), "Global Warming of 1.5°C", 2018, Approval Session, pp. 3-72; Settele, J. et al., "Terrestrial and Inland Water Systems", *Climate Change 2014: Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,* [Field, C. B., Barros, V. R., Dokken, D. J., Mach, K. J., Mastrandrea, M. D., Bilir, T. E., Chatterjee, M., Ebi, K. L., Estrada, Y. O., Genova, R. C., Girma, B., Kissel, E. S., Levy, A. N., MacCracken, S., Mastrandrea, P. R. and White, L. L. (eds.)]. Cambridge University Press, 2014, pp. 271-359.; Seidl, R. et al., "Forest disturbances under climate change", *Nature Climate Change, 7*, 2017, pp. 395-402, 7 doi:10.1038/nclimate3303.

5. In 2008, the European Environment Agency (EEA) carried out a study[13] on desertification in southern, central and eastern Europe, covering 1.68 million km^2. In 2017, a follow-up study[14], based on the same methodology, was carried out. This research showed that the amount of territory with a high or very high sensitivity to desertification had increased by 177 000 km^2 – an area approximately equivalent to the size of Greece and Slovakia combined – in less than a decade (see ***Table 1***).

Table 1 – Sensitivity to desertification in southern, central and eastern Europe, 2008 and 2017

	2008		2017		Difference between 2008 and 2017	
	thousand km^2	%	thousand km^2	%	thousand km^2	%
Very high	10	1	28	2	+18	+1.1
High	224	13	383	23	+159	+9.5
Moderate	419	25	381	23	-38	-2.2
Low	560	33	475	28	-85	-5.1
Very low	467	28	413	24	-54	-3.2
TOTAL	**1 680**	**100**	**1 680**	**100**	**-**	**-**

Source: ECA, based on Prăvălie et al., 2017.

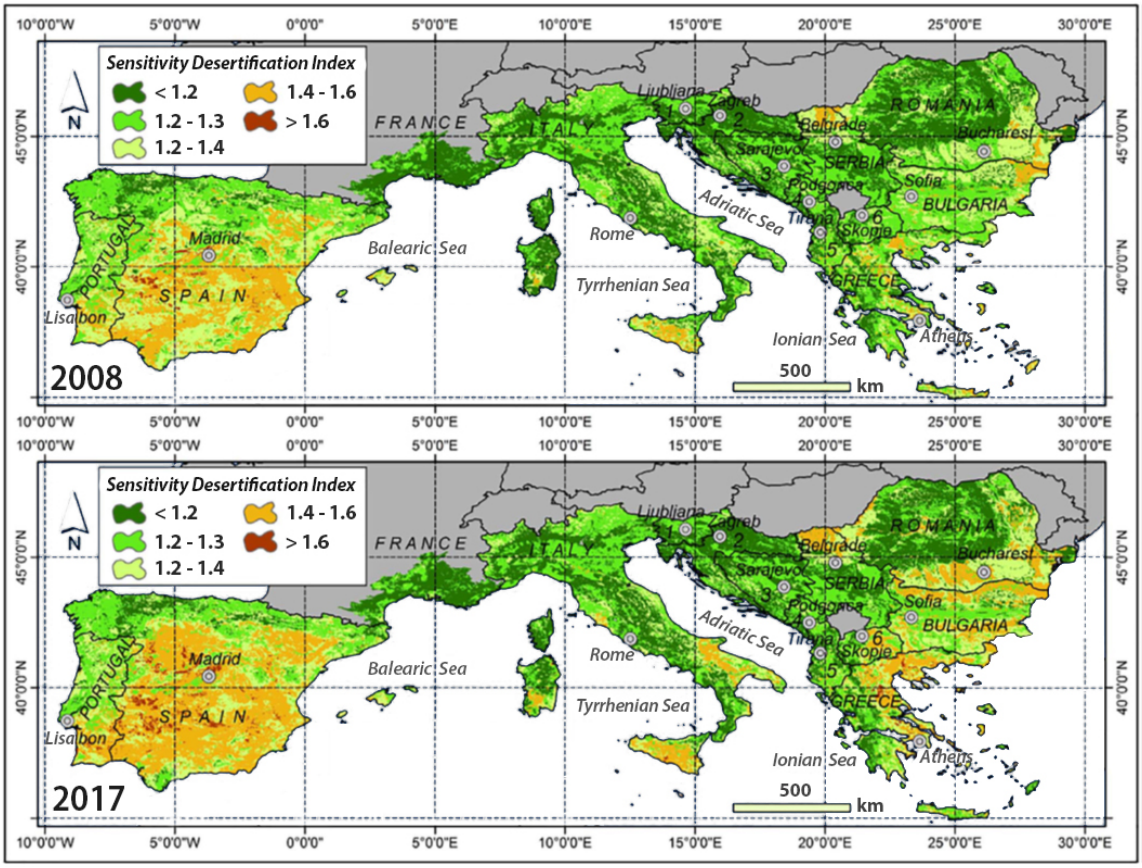
6. Based on the follow-up study, ***Figure 2*** shows the deteriorating situation in southern Europe and the Balkans.

---

[13] The study covered Portugal, Spain, southern region of France, Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Albania, Greece, FYROM, Romania and Bulgaria.

[14] Prăvălie, R., Patriche, C., Bandoca, G., "Quantification of land degradation sensitivity areas in Southern and Central Southeastern Europe. New results based on improving DISMED methodology with new climate data", *Catena – An Interdisciplinary Journal of Soil Science – Hydrology – Geomorphology focusing on Geoecology and Landscape Evolution,* No 158, 2017; pp. 309-320.

Figure 2 – Sensitivity Desertification Index in the EU[15] for 2008 and 2017



Source: Prăvălie et al., 2017.

7. Cyprus, which was not in the scope of the above-mentioned study, is especially badly affected: studies have identified that 99 % of the country is vulnerable to desertification[16]. ***Annex I*** contains maps showing susceptibility to desertification in the five Member States we visited (see ***paragraph 26***).

---

[15] Both maps use the same methodology, although for the 2017 map an additional Climate Quality Index was considered.

[16] I.A.CO Environmental & Water Consultants, Cyprus, 2008.

Climate change scenarios confirm the EU's increased vulnerability to desertification

8. Projections on climate change in Europe indicate that the risk of desertification is increasing[17]. Hot semi-deserts exist in southern Europe, where studies have identified the climate transforming from temperate to dry[18]. This phenomenon is already extending northwards. Scientific evidence suggests that man-made emissions have substantially increased the probability of drought years in the Mediterranean region[19].

9. With climate change, water is becoming scarcer in parts of Europe, and studies have identified that droughts occur more frequently[20]. This increases vulnerability to desertification. According to the climate change models used by the Commission, temperatures are projected to increase by more than 2°C in certain regions (such as Spain) by the end of the century. Over the same time period, summer precipitation is projected to decrease by 50 % or more in southern Europe[21]. In their 2018 report[22], the Intergovernmental Panel on Climate Change (IPCC) confirmed with high confidence that temperatures on extreme hot days in mid-latitudes will increase by up to about 3°C at global

---

[17] IPCC Fifth Assessment Report, Working Group III Report "Climate Change 2014: Mitigation of Climate Change"; EEA, Climate Change Impacts and Vulnerability, 2016; the Court's Landscape review: EU action on energy and climate change, paragraph 117.

[18] See e.g. Spinoni, J., Vogt, J., Barbosa, P., McVormick, N., Dosio, A., "Is Europe at risk of desertification due to climate change?", *Geophysical Research Abstracts Vol. 20*, 2018,. EGU2018-9557, 2018 EGU General Assembly

[19] IPCC, "Global Warming of 1.5°C", 2018, Approval Session, pp. 3-36; Gudmundsson, L. and Seneviratne, S. I., "Anthropogenic climate change affects meteorological drought risk in Europe", Environmental Research Letters, 11(4), 2016, 044005, doi:10.1088/1748-46 9326/11/4/044005; Gudmundsson, L., Seneviratne, S. I., and Zhang, X., 2017, "Anthropogenic climate change detected in European renewable freshwater resources", Nature Climate Change, 7, p. 813.

[20] See e.g. Poljansek, K., Marin Ferrer, M., De Groeve, T., Clark, I., (Eds.), "Science for disaster risk management 2017: knowing better and losing less", Publications Office of the European Union, Luxembourg, 2017 and http://ec.europa.eu/environment/water/quantity/scarcity_en.htm.

[21] Climate Impacts in Europe. The JRC PESETA II project, 2014. JRC Scientific and Policy Reports. Data from Dosio and Parulo 2011 and Dosio et al. 2012.

[22] IPCC, "Global Warming of 1.5°C", 2018, Summary of Policy Makers, p. 9.

warming of 1.5°C and by about 4°C at 2°C, and that the number of hot days is projected to increase in most land regions.

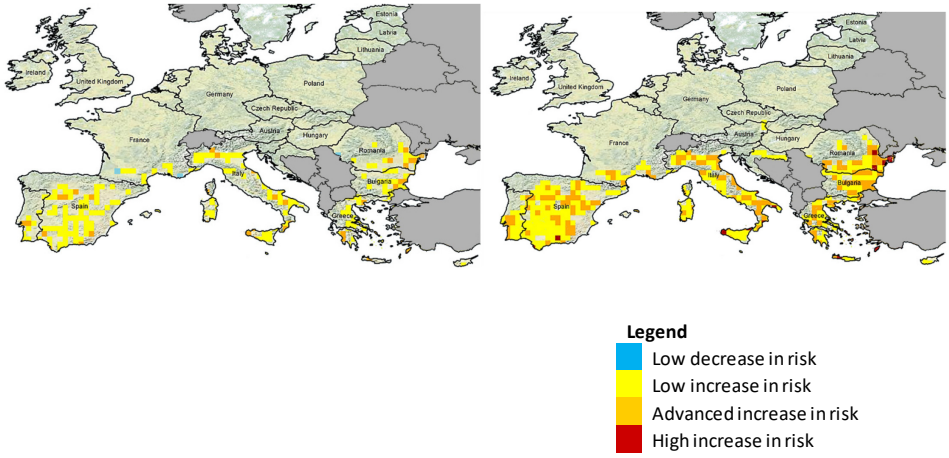
10. The models used by the Commission also provide projections on the risk of desertification, which is expected to be significant in particular in Spain, southern Italy, Portugal, and areas of south-eastern Europe including Bulgaria, Greece, Cyprus and the Danube Delta in Romania (see ***Figure 3***). Other studies report particularly strong increases in dryness and decreases in water availability in southern Europe and the Mediterranean when shifting from a 1.5°C to a 2°C global warming[23].

---

[23] IPCC, "Global Warming of 1.5 °C", 2018, Approval Session, pp. 3-41 and pp. 3-142; Schleussner, C.-F. et al., "Differential climate impacts for policy-relevant limits to global warming: The case of 1.5°C and 2°C", *Earth System Dynamics, 7(2)*, 2016b, pp. 327-351, doi:10.5194/esd-7-327-2016; Lehner, F. et al., "Projected drought risk in 1.5°C and 2°C warmer climates", *Geophysical Research Letters, 44(14)*, 2017, pp. 7419-7428, doi:10.1002/2017GL074117; Wartenburger, R. et al., "Changes in regional climate extremes as a function of global mean temperature: an interactive plotting framework", *Geoscientific Model Development, 10*, 2017, pp. 3609-3634, doi:10.5194/gmd-2017-33; Greve, P., Gudmundsson, L., and Seneviratne, S. I., "Regional scaling of annual mean precipitation and water availability with global temperature change", *Earth System Dynamics, 9(1)*, 2018, pp. 227-240, doi:10.5194/esd-9-227-2018; Samaniego, L. et al., "Anthropogenic warming exacerbates European soil moisture droughts", *Nature Climate Change, 8(5)*, 2018, pp. 421-426, doi:10.1038/s41558-018-0138-5.

Figure 3 – Predicted change in desertification risk and aridity index in 2071-2100 compared to 1981-2010

– Predicted change in desertification risk[24] under 2.4°C scenario (RCP 4.5 – left) and 4.3°C scenario (RCP 8.5 – right) in 2071-2100 compared to 1981-2010[25].



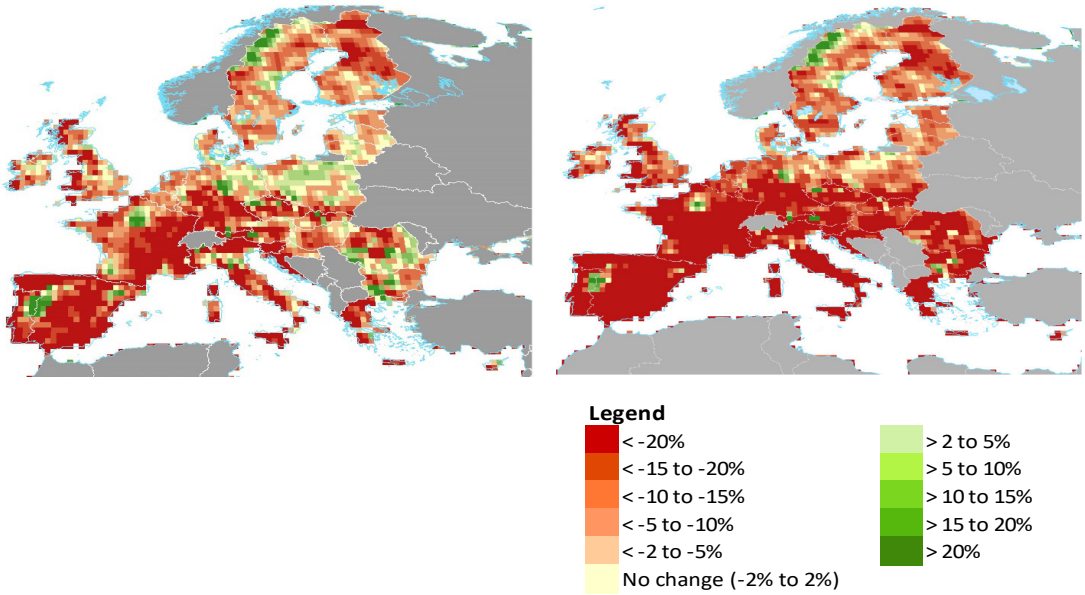
Source: Spinoni, J., Barbosa, P., Dosio, A., McCormick, N., Vogt, J., "Is Europe at risk of desertification due to climate change?", *Geophysical Research Abstracts Vol. 20*, 2018, EGU2018-9557, 2018 EGU General Assembly.

---

[24] Based on various indicators such as FAO-UNEP Aridity Index, Köppen-Geiger Climate Classification, and Holdridge Life Zones.

[25] Representative Concentration Pathways (RCPs) are greenhouse gas concentration trajectories used by the IPCC. By 2081-2100, RCP 4.5 is projected to result in a surface air temperature increase, compared to the 1850-1900 (pre-industrial) average, within a likely range of 1.7°C to 3.2°C (mean of 2.4°C). RCP 8.5 is projected to result in a temperature increase within a likely range of 3.2°C to 5.4°C (mean of 4.3°C).

– Predicted change in the aridity index under 2.4°C scenario (RCP 4.5 – left) and 4.3°C scenario (RCP 8.5 – right) in 2071-2100 compared to 1981-2010.



Source: Processed by Jian-Sheng Ye, Lanzhou University, China, in preparation of World Atlas of Desertification, 2018, DOI:10.2760/06292. Source data: Global Precipitation Climatology Centre and Climate Research Unit of the University of East Anglia.

Source: Cherlet, M., Hutchinson, C., Reynolds, J., Hill, J., Sommer, S., von Maltitz, G. (Eds.), World Atlas of Desertification, Publication Office of the European Union, Luxembourg, 2018, p. 78.

The UN framework for combating desertification

11. The United Nations Convention to Combat Desertification (UNCCD) is an international agreement setting out a global framework for combating desertification. It was established in 1994, following the Earth Summit in Rio de Janeiro in 1992[26]. It is a legally binding agreement on land issues that addresses land degradation and desertification, providing a platform for adaptation, mitigation and resilience. The UNCCD has 197 parties, including the EU[27] and its 28 Member States. The parties aim to work together to improve living

[26] The UNCCD is one of the three Rio Conventions, together with the United Nations Convention for Biodiversity and the United Nations Framework Convention on Climate Change.

[27] A Council Decision of 9 March 1998 provides that the Council will adopt the European Community's position at the UNCCD following a proposal from the Commission, and that the Commission represents the European Community at the UNCCD. It is the Commission's responsibility to ensure that the EU legal framework is compatible with the UNCCD, and to

conditions for people in drylands, to maintain and restore land productivity, and to mitigate the effects of desertification and drought.

12. Parties to the UNCCD can voluntarily declare themselves to be "affected by desertification". These countries must design and implement national action programmes (NAPs) to combat desertification.

13. In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development[28], including a commitment to achieve all of the United Nations' Sustainable Development Goals (SDGs). Of those, SDG 15 aims to "protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss"; it includes a target of combating desertification, restoring degraded land and soil, including land affected by desertification, drought and floods, and striving to achieve a land degradation-neutral world by 2030 (target 15.3).

14. In 2017, the UNCCD adopted its 2018-2030 strategic framework, which focuses on achieving SDG target 15.3. As a party to the UNCCD, the EU has confirmed its commitment to achieving land degradation neutrality by 2030.

Combating desertification in the EU

15. The EU does not have a dedicated strategy or a specific legal framework for desertification. However, certain factors associated with desertification are addressed under various other strategies or spending programmes, as shown below.

16. In September 2006, the Commission adopted a **Thematic Strategy for Soil Protection**[29], underlining that soil degradation processes can ultimately lead to desertification. The objectives of the strategy were to ensure a sustainable use of soil by preventing further soil

---

monitor that, in implementing the EU law, the Member States meet their obligations resting on them by virtue of the EU being party to the UNCCD.

[28] The 2030 Agenda for Sustainable Development, adopted in 25 September 2015 by Heads of State and Government at a special United Nations summit.

[29] COM(2006) 231 final.

degradation and preserving its functions, as well as by restoring degraded soil to a level of functionality consistent at least with its current and intended use. The 2006 Soil Thematic Strategy was structured on four pillars: awareness-raising; integration with other policies; research; and legislation: a proposal for a **Soil Framework Directive** (SFD)[30].

17. The SFD proposal required Member States to identify areas at risk of degradation, define targets for soil protection, and carry out programmes to achieve these targets. The proposed directive also intended to contribute to halting desertification resulting from degradation and soil biodiversity loss. However, for almost eight years, there was no qualified majority[31] in the Council in favour of adopting it. In April 2014, the Commission withdrew it.

18. In April 2013, the Commission adopted the **2013 EU Adaptation Strategy for climate change**, to encourage Member States to take adaptation action. It stresses the need for the EU to take measures to adapt to unavoidable climate impacts and their economic, environmental and social costs.

19. In November 2013, the EU adopted the **General Union Environment Action Programme**, to "ensure that by 2020 land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway".

20. The 2013 **EU Forest Strategy** highlighted that forests are not only important for rural development, but also for the environment and the fight against climate change. Forests play an important role in combating land degradation and desertification.

---

[30] COM(2006) 232 final.

[31] In 2007, a minority block of five Member States – Germany, France, the Netherlands, Austria and the United Kingdom – voted against the bill at the Environment Council. The other 22 Member States had all voted in favour of the proposal. See http://europa.eu/rapid/press-release_IP-08-924_en.htm.

21. Various EU funds can be used to finance measures to address desertification:

- The implementation of the Common Agricultural Policy (CAP), with its rural development[32], greening and cross-compliance components[33], can have positive effects on agricultural soils. However, intensive or unsustainable agricultural practices can damage soil.

- The European Structural and Investment Funds[34] aim to reduce regional imbalances across the EU. They include 'Climate change adaptation and risk prevention' as a thematic objective. Projects to combat desertification can be co-financed – if Member States identify a corresponding need – by the European Regional Development Fund (ERDF) or Cohesion Fund, for example.

---

[32] Governed mainly by Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) (OJ L 347, 20.12.2013, p. 487) – a fund helping rural areas in the EU to face a wide range of economic, environmental and social challenges.

[33] Governed mainly by Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy (OJ L 347, 20.12.2013, p. 608).

Cross-compliance includes rules preventing soil erosion, maintaining soil organic matter and soil structure, ensuring a minimum level of maintenance and avoiding the deterioration of habitats, and protecting and managing water. Greening is linked to a number of sustainable agricultural practices such as maintaining permanent grassland and crop diversification, with positive impact on land.

[34] The European Structural and Investment Funds is a group of five separate funds: the European Regional Development Fund (ERDF); the European Social Fund; the Cohesion Fund; the European Agricultural Fund for Rural Development (EAFRD); and the European Maritime and Fisheries Fund.

- Other EU funding instruments which address desertification are the Framework Programme 7 and Horizon 2020 research programmes[35], the LIFE[36] instrument for the environment, or the European Union Solidarity Fund (EUSF)[37].

22. Although the EU spending programmes make funding available for projects addressing desertification, the amount of EU funds planned and used to address desertification is not available.

23. Within the EU, the Council has set up a working party on desertification[38]. This working party prepares the EU position for international negotiations related to desertification and land degradation, and is the only regular forum for discussing UNCCD and desertification-related issues at EU level.

24. Together with the Council and other Commission services, DG ENV coordinates the EU's position for UNCCD events such as the Conferences of Parties, which take place every two years. The role of the Joint Research Centre (JRC) is instrumental in providing scientific background information and participants in the UNCCD roster of experts. Other Commission's services may also have a role in the context of combating desertification in the EU, as shown in ***Figure 4***. In addition, European Commission's Directorate-General for Statistics (DG ESTAT) issues an annual report on progress towards the SDGs in an EU context, including an assessment of indicators on land degradation under SDG 15 (see ***paragraph 13***).

---

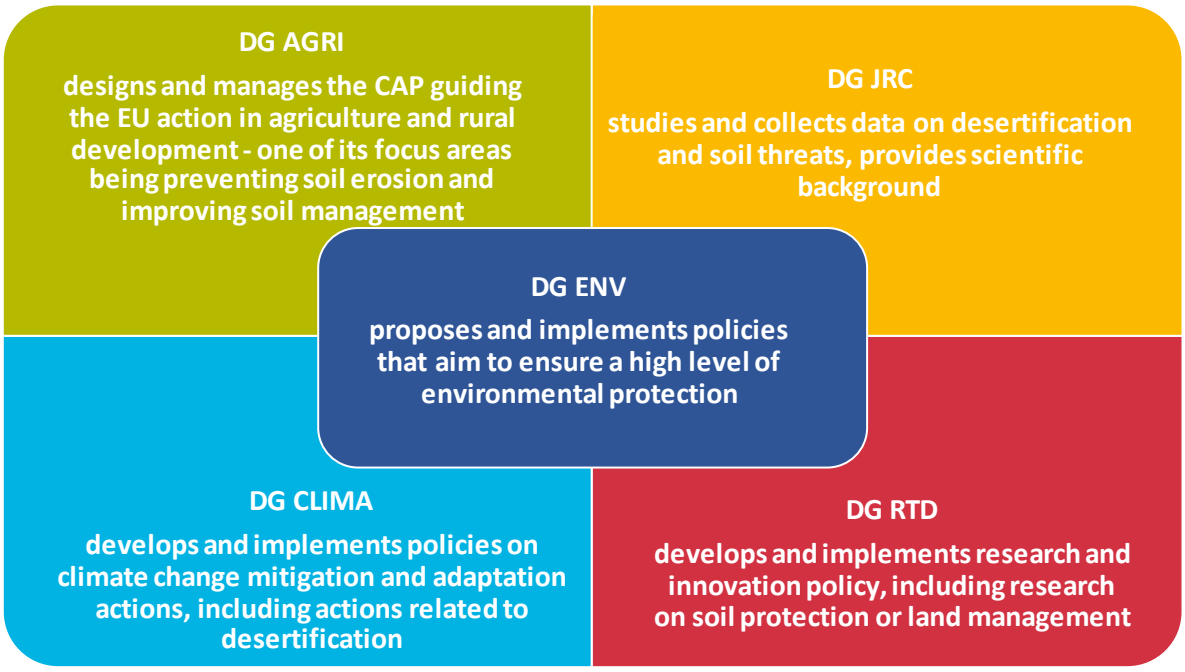
[35] EU's research and innovation programmes for 2014-2020 (Horizon 2020) and for 2007-2013 (Framework Programme 7).

[36] FR: *L'Instrument Financier pour l'Environnement.* The EU's financial instrument supporting environmental, nature conservation and climate action projects throughout the EU.

[37] Set up to respond to major natural disasters and express European solidarity to disaster-stricken regions within Europe. EUSF can only be used to restore land after a natural disaster has occurred, not to prevent or mitigate a process that could happen in the future.

[38] Working Party on International Environmental Issues – Desertification.

Figure 4 – Commission services dealing with desertification in the EU



Source: ECA.

AUDIT SCOPE AND APPROACH

25. As Europe is increasingly affected by desertification, our audit examined whether the risk of desertification in the EU was being effectively and efficiently addressed. In particular, we assessed whether:

- the Commission and the Member States had made adequate use of the available data;
- the EU had taken steps to combat desertification in a coherent way;
- projects addressing desertification in the EU had had a positive impact;
- the EU commitment to land degradation neutrality by 2030 was likely to be achieved.

26. We carried out our audit between September 2017 and May 2018, collecting audit evidence from the following sources:

- documentary reviews and interviews with staff from five Commission Directorates-General[39];

- audit visits to five Member States declared as being affected by desertification: Spain, Italy, Cyprus, Portugal and Romania, selected because of their vulnerability to desertification, and to cover a range of climatic conditions, vegetation, man-made activities, and identified risks. We carried out interviews, analysed strategic documents (including rural development programmes), procedures and data;

- visits to a sample of 25 projects identified by these five Member States as relevant for desertification and financed or co-financed by the EU. These projects included irrigation investments, forestry projects, crop rotation, or restoration of dry-stone walls or dykes to prevent soil erosion. The aim of the project visits was to assess whether the projects had made a sustainable impact on addressing desertification, not to issue an opinion on their legality or regularity. We also audited projects involving research into techniques for addressing desertification (see ***Annex III***);

- meetings with various stakeholders, including the UNCCD, the EEA and academic experts, to discuss strategic approaches or techniques for addressing and monitoring desertification and land degradation in the EU.

27. The scope of the audit did not include land taken as a result of urban and other artificial development. According to the EEA[40], between 2006 and 2012, the annual land take in EU 28 countries was approximately 850 km^2 – less than 0.1 % of the EU's total land area. In addressing the audit questions set out in ***paragraph 25***, we did not assess the framework established by the UNCCD to combat desertification.

---

[39] DG Agriculture and Rural Development (AGRI), DG Climate Action (CLIMA), DG Environment (ENV), DG Joint Research Centre (JRC) and DG Research and Innovation (RTD).

[40] European Environment Agency, Land take indicators, May 2018.

OBSERVATIONS

The Commission and Member States collect data relevant to desertification and land degradation, but the Commission does not make adequate use of it

28. We examined the Commission's use of the available data on desertification and land degradation. The Commission needs to collect and analyse data on desertification and the risks associated with it, to decide on the action needed to address it, and then to act. This data must be sufficient, coherent, reliable, and regularly updated and reviewed.

The Commission and the Member States collect data related to desertification

29. A key system used for monitoring indicators relevant to desertification and land degradation in the EU is the Copernicus Earth Observation Programme, which is coordinated and managed by the Commission[41]. This system uses a variety of technologies, from satellites in space to measurement systems on the ground, in the sea and in the air. Copernicus delivers data openly and freely across a wide range of areas: atmosphere, marine, land, climate, emergency and security. One of its components, the Copernicus Land Monitoring Service, provides geographical information about land cover and related variables; for example, about vegetation cover and the water cycle. In 2015, an additional satellite was launched. One of its stated objectives is to monitor desertification[42], but clear information about this is not yet available (see also ***paragraph 39***).

30. The Commission regularly collects useful, relevant information about various elements related to the state of soil in the EU, including information on the three UNCCD sub-indicators (see ***paragraph 38***).

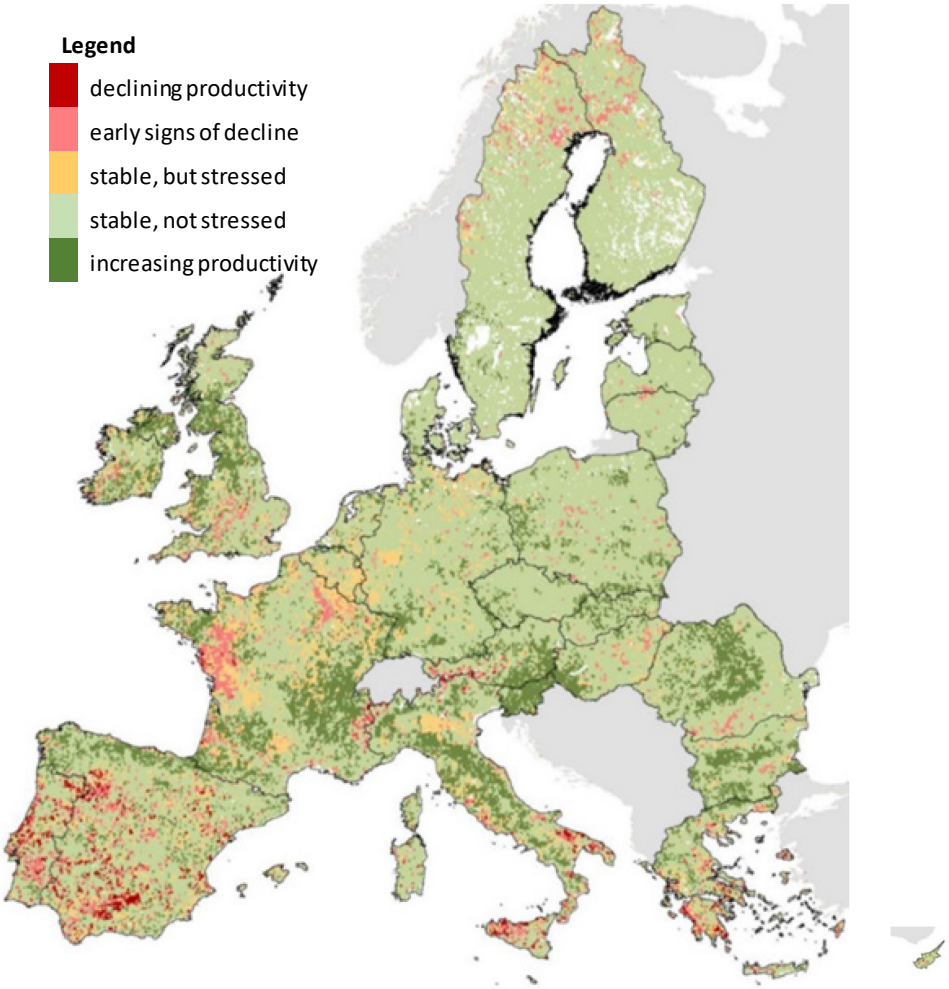
---

[41] Implemented in partnership with the Member States, the European Space Agency, the European Organisation for the Exploitation of Meteorological Satellites, the European Centre for Medium-Range Weather Forecasts, EU Agencies and Mercator Océan.

[42] Sentinel-2A satellite, see http://www.copernicus.eu/main/sentinel-2a-orbit

31. **Land productivity** was analysed by the JRC in a report based on satellite observations between 1982 and 2010 using Copernicus data[43]. ***Figure 5***, which is based on the most recent comprehensive data published by the Commission on land productivity dynamics in the EU[44], shows that the hot, dry Mediterranean countries are more susceptible to a decline in land productivity.

Figure 5 – Land productivity dynamics in Europe (1982-2010)



Source: JRC, 2012.

---

[43] Cherlet, M., Ivits, E., Sommer, S., Tóth, G., Jones, A., Montanarella, L., Belward, A., "Land Productivity Dynamics in Europe, Towards a Valuation of Land Degradation in the EU", Joint Research Centre, Institute for Environment and Sustainability, Land Resource Management Unit, 2013.

[44] The report estimates that 85.1 % of the total area of the EU is currently unaffected by land productivity decline, 5.6 % shows early signs of land productivity decline, and 1.5 % is in decline.

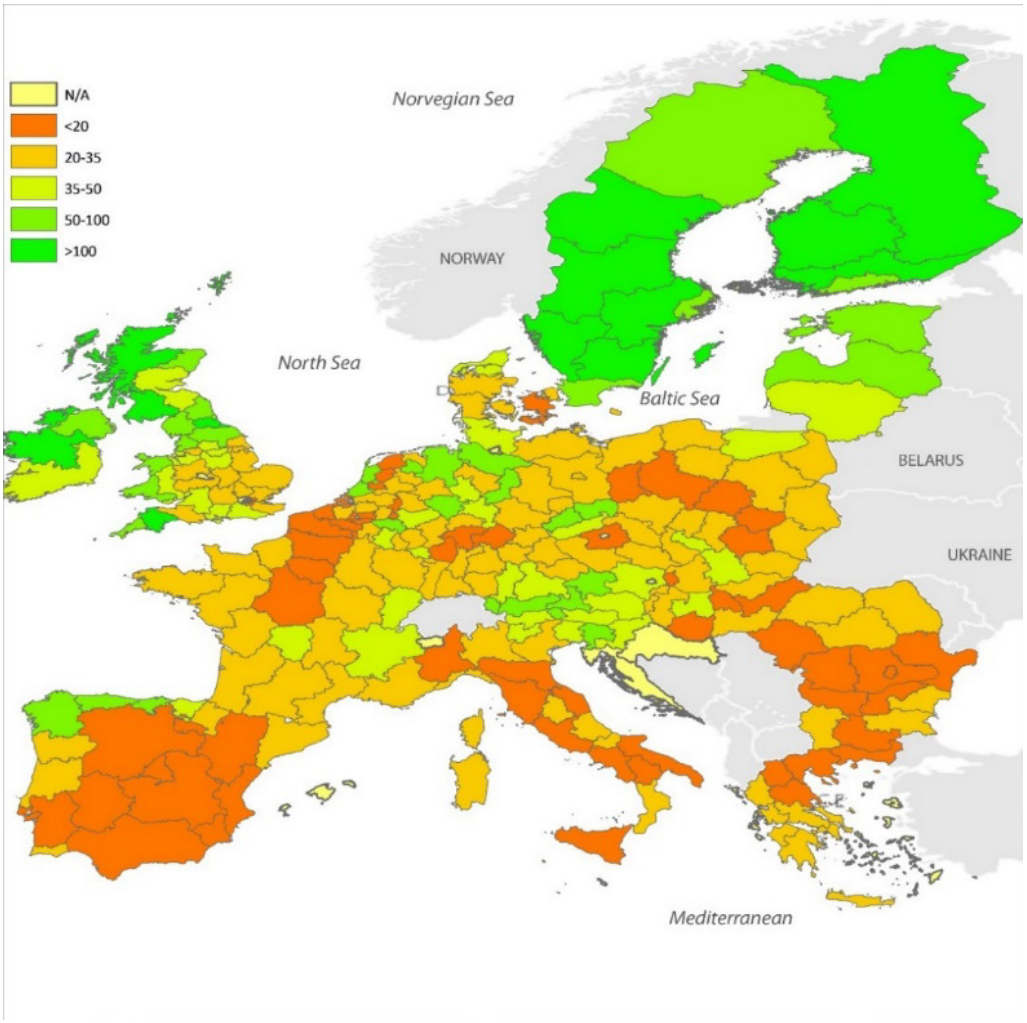
32. **Organic carbon in soil** is monitored by the Commission using the multipurpose platform of the Land Use/Cover Area frame statistical Survey (LUCAS)[45], a standardised three-yearly analysis of the properties of topsoil across the EU, operated by the JRC. According to the EEA, "On average, soils in Europe are most likely to be accumulating carbon. Soils under grassland and forests are a carbon sink … whereas soils under arable land are a smaller carbon source"[46]. ***Figure 6*** shows that the areas at risk of desertification, in Greece, Spain, Italy, Portugal and Romania, are correlated with a low level of organic carbon in the soil.

---

[45] LUCAS 2015 provided observations for more than 270 000 points in the 28 EU Member States. LUCAS 2018 survey started in March 2018 (it includes more than 240 000 points and about 99 000 photo interpretations), and its results will be available in 2019.

[46] https://www.eea.europa.eu/data-and-maps/indicators/soil-organic-carbon-1/assessment. The largest emissions of CO_2 from soils are due to conversion (drainage) of organic soils.

Figure 6 – LUCAS – Soil organic carbon in the EU – 2015 (g/kg)



Source: JRC, 2018.

33. **Land cover and land-cover changes** in the EU are regularly monitored through the Coordination of information on the environment programme (CORINE)[47], a component of Copernicus, which is managed by the EEA. Relevant CORINE datasets have been produced every six years since 2000, most recently in 2012. Taken together, agricultural land and forests cover 85 % of land in the EU[48].

---

[47] CORINE is based on analysis of satellite images and maps 44 classes of land use, grouped into five main categories: artificial surfaces, agricultural areas, forest and semi-natural areas, wetlands, and water bodies.

[48] See the CAP context indicators 2014-2020 report, 2017 update.

34. The Commission regularly collects and compiles additional data on various factors related to desertification in the EU, such as soil erosion, droughts, water, forest fires, as described in ***Annex II***. However, the Commission does not use it to assess the extent of desertification and land degradation.

35. A World Atlas of Desertification was first published in 1992 by the United Nations[49], and then updated in 1997. The Commission took over the publication of the Atlas and published a third version in 2018. It contains maps of factors which can lead to desertification, such as soil erosion, salinisation, urbanisation, and migration. The new Atlas provides maps and data on a range of human-environment interactions relevant for land degradation, but does not contain any maps specifically on desertification. The Commission considers that desertification cannot easily be mapped, because it is a very complex process, which studies found to be triggered by many different factors[50].

36. The Member States visited have produced maps on the risk of desertification (see ***Annex I***). However, these maps were not updated regularly, and cannot be compared as they used different indicators and colour coding. Thus, they cannot provide a comprehensive view of desertification at EU level.

37. The Member States we visited also monitored factors associated with desertification and land degradation, such as water, droughts or precipitation monitoring. Regarding the soil-data collection mechanisms, we found that:

- Spain, Italy and Romania had their own systems, which provided more specific soil data but overlapped to some extent with the EU's own collection mechanisms.

---

[49] United Nations Environment Programme.

[50] See e.g. Cherlet, M., Zdruli, P., Zucca, C., "Desertification: Mapping Constraints and Challenges; Encyclopedia of Soil Science", Third Edition, Taylor & Francis, 2017.

National data concerning soil was incomplete, was not collected and interpreted regularly, and was not always reliable[51].

– Cyprus and Portugal relied exclusively on the Commission's LUCAS platform to collect soil data.

There is no agreed methodology for assessing desertification and land degradation within the EU

38. Desertification and land degradation are complex phenomena affected by many interdependent factors, and there is no scientific consensus as to how to assess these factors. However, proxy indicators can be used to detect deterioration in the state of the land. There are several such proxy indicators, but the UNCCD recommends the use of three sub-indicators to assess land degradation: land productivity, organic carbon in soil, and land cover and land-cover change[52].

39. The Commission and the Member States have not agreed on a methodology for compiling the available indicators to come up with a consistent assessment of desertification and land degradation across the EU. This makes it difficult to compare the extent of desertification in the different Member States of the EU.

40. In the 2018 monitoring report on progress towards the SDGs in an EU context, the Commission uses two indicators for land degradation which are partially aligned with the UNCCD indicators: artificial land cover per capita, and estimated soil erosion by water (see ***Table 2***). There are many other characteristics of land degradation which are not covered by these indicators, such as organic carbon in soil, land productivity, salinisation, or contamination. Additional information on other such relevant indicators is available at

---

[51] In its 2012 report on the state of soil in Europe, the JRC observed that soil-mapping in the Member States is insufficient for current needs and that differences between various national datasets make cross-border analyses difficult.

[52] Other examples are salinisation and contamination.

Commission level (see ***paragraphs 30 and 34***) but is not used for the purposes of assessing land degradation in the EU.

Table 2 – Comparison of the Commission's and the UNCCD's indicators for land degradation

Commission	UNCCD
Artificial land cover per capita	Land cover and land cover change
Estimated soil erosion by water	Organic carbon in soil
	Land productivity

Source: ECA, based on UNCCD and DG ESTAT.

The EU is taking steps to combat desertification, but with limited coherence

41. We examined whether the EU is taking action to combat desertification in a coherent way. Such action needs a coherent governance structure and a good long-term plan to mitigate the risk of poor value-for-money decisions, and to avoid fragmented, uncoordinated actions.

42. The UNCCD framework and its implementation in the EU is described in ***Box 2***.

Box 2 – The UNCCD framework in the EU

Under the UNCCD, all parties which declared themselves to be affected by desertification must draw up national action programmes (NAPs). The EU has not declared itself to be affected by desertification, and there is no action programme in place at EU level to combat desertification. Thirteen EU Member States have declared under the UNCCD that they are affected by

desertification, based on their own self-assessments: Bulgaria, Greece, Spain, Croatia, Italy, Cyprus, Latvia, Hungary, Malta, Portugal, Romania, Slovenia and Slovakia. These include seven of the eight Member States with a Mediterranean coastline.

Member States' NAPs cover many sectors such as agriculture, forestry and water management. Examples of measures included in the NAPs are: promoting research activities, drought contingency plans, afforestation, building terraces to prevent landslides, and improved early warning systems.

Regarding the thirteen Member States which have declared themselves to be affected by desertification, and based on information publicly available:

- Five Member States' NAPs are published on the UNCCD website[53]. Of the eight other Member States, we are aware of two with a NAP[54]. The published NAPs are now over 10 years old. For Portugal, the NAP updated in 2014 has not yet been published.

- Cyprus has a NAP, drawn up in 2008, which was never officially adopted by the national Council of Ministers, and has not been submitted to the UNCCD.

Based on the limited information available, the Commission considers that Member States' NAPs to combat desertification lacked effectiveness, as they were not fully integrated into national planning processes, and not enough capacity, technical and financial resources were available to implement them[55]. Our review confirmed this assessment.

No specific legislation on desertification and soil exists at EU level

43. As described in ***paragraph 16***, the 2006 **EU Thematic Strategy for Soil Protection** included a proposal for a **Soil Framework Directive** (SFD). One of the objectives of the proposed directive was to contribute to halting desertification resulting from degradation and soil biodiversity loss. The legislative proposal did not find a majority in the Council and was withdrawn by the Commission in 2014. Therefore, while other vital environmental

---

[53] Greece (NAP 2001), Spain (NAP 2008), Italy (NAP 2000), Portugal (NAP 1999) and Romania (NAP 2000).

[54] Bulgaria and Slovakia.

[55] April 2018, re-iterating their 2008 findings on desertification to the United Nations.

resources such as air and water are governed under various EU directives and regulations, there is no similar integrated EU legislation on soil.

44. A recent study concluded that the withdrawal of the SFD proposal was a lost opportunity to create a common understanding and vision around soil protection in the EU[56]. The same study confirmed that, while no overarching soil protection legislation exists at EU level, national soil protection legislation – if it exists – failed to prevent desertification and soil degradation across the EU.

EU strategies, policies and spending programmes contribute to combating desertification, but do not specifically focus on it

45. There is no specific EU strategy aimed at addressing desertification and land degradation. References to desertification are scattered in various EU strategies, policies and spending programmes, the most relevant of these for desertification being the CAP, and the EU strategy on adaptation to climate change.

46. While the **CAP** has the potential to play an important role in addressing desertification, we noted the following limitations:

- According to the EEA, **direct payments** can cause the intensification of agriculture leading in turn to soil organic matter loss, reduction in soil water retention, and land-use changes[57].

- **Cross-compliance** provisions include three Good Agricultural and Environmental Conditions that are aimed at preventing soil degradation, namely, those concerning minimum soil cover, land management to limit erosion, and maintenance of soil organic matter. According to the EEA, cross-compliance can contribute to the

---

[56] Wunder, S., Kaphengst, T., Frelih-Larsen, Dr. A., McFarland, K., Albrecht, S., "Implementing SDG target 15.3 on "Land Degradation Neutrality" – Development of an indicator based on land use changes and soil values", Ecologic Institute, Berlin on behalf of the German Environment Agency, 2018.

[57] See EEA report No 8/2016 – "The direct and indirect impacts of EU policies on land", p. 11 and p. 66.

maintenance of soil organic matter levels and the protection of soil from erosion[58]. However, while not concluding specifically on the effect of cross-compliance on soil degradation, the ECA's Special Report No 26/2016 found that the information available did not allow the Commission to adequately assess the overall effectiveness of cross-compliance[59]. Another report noted that its environmental effects cannot be quantified[60].

– **Greening** lacks a fully developed intervention logic with clearly defined, ambitious targets. Its budget is not directly linked to the policy's delivery of environmental and climate-related objectives. Moreover, depending on the individual situation of farmers and their agricultural land, several exemptions to the greening rules exist[61]. We concluded, in our 2017 report, that greening, as currently implemented, is unlikely to provide significant benefits for the environment and climate[62]. Statistics published by the Commission in 2018[63] indicate that the share of utilised agricultural area subject to at least one greening obligation in Member States affected by the risk of desertification such as Greece, Croatia, Italy, Malta, Portugal or Romania was only around or below 50 %[64].

– According to the Commission, the **rural development programmes** (RDPs) of the Member States affected by desertification recognise desertification or land

---

58 See EEA report No 8/2016 "The direct and indirect impacts of EU policies on land", p. 66.

59 See Special Report No 26/2016 "Making cross-compliance more effective and achieving simplification remains challenging".

60 Swedish Board of Agriculture, Environmental Effects of Cross-Compliance, 2011.

61 For example: small farmers, organic farmers, farmers with large proportions of grassland. See https://ec.europa.eu/agriculture/direct-support/greening_en.

62 See Special Report No 21/2017 "Greening: a more complex income support scheme, not yet environmentally effective", paragraphs 26 to 57.

63 Commission's Green Direct Payments report, 2018, based on 2015 data.

64 The land covered by greening obligations might even be lower because, even if such obligations would only apply to a single parcel, irrespective of its size, the area of the whole farm would still be included in the indicator.

degradation as a risk. We looked at five national RDPs, and two regional RDPs[65]. Out of these:

- all RDPs included measures[66] which can contribute to combating desertification and land degradation, such as agri-environment and climate measures, aid for areas with natural constraints, forestry measures, or irrigation investments;
- only one RDP included a specific package against desertification, but it was poorly designed (see ***Box 3***).

Box 3 – Example of ineffective measure to address desertification

The 2014-2020 Romanian Rural Development Programme contains an agri-environment package aimed specifically at addressing desertification issues in Romania. The package is open to farmers in selected areas with a high risk of desertification. The amount of the aid is €125 per hectare. To receive it, farmers must commit to planting drought-resistant crops, to practise crop rotation, and to keep tillage to a minimum. Only farmers with less than 10 hectares of arable land are eligible.

The package contains a number of features which might be beneficial for land. However, it has been poorly designed. The amount of aid available does not provide a sufficient financial justification for such farmers with less than 10 hectares to comply with the demanding requirements of the measure. As a result, no eligible beneficiaries applied for the desertification package, and no payments were made.

47. Soil protection is a feature of the Commission's proposal for the next CAP[67], which proposes various standards related to soil protection and quality. The proposal also sets out

---

[65] We examined the national RDPs of all five Member States we visited, and the regional RDPs of Andalucia (Spain) and Sicily (Italy).

[66] These measures were in general designed under the "Restoring, preserving and enhancing ecosystems related to agriculture and forestry" priority of the RDPs.

[67] COM(2018) 392 final of 1 June 2018, Proposal for a Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy.

possible result indicators[68] and impact indicators for soil protection, for Member States' reporting. These proposed features of the new CAP have the potential to provide improved incentives for farmers to take appropriate care of soil in the EU. These proposals are still under discussion. It is therefore too early to assess how the proposed arrangements might work in practice.

48. The 2013 **EU strategy on adaptation to climate change** recognises the importance of combating desertification as one of the climate change adaptation actions to be supported. Member States are encouraged to develop their own national strategies. Using documentation available at the Commission, we found that, of the thirteen Member States who declared themselves to be affected by desertification (see ***Box 2***), as of November 2018:

- eight had included specific actions against desertification in their climate change adaptation strategies, including the five Member States we visited[69];
- two, Hungary and Slovenia, did not mention desertification in their adaptation strategies;
- three, Bulgaria, Croatia, and Latvia, had not yet established climate adaptation strategies.

49. Member States implement these strategies. No comprehensive EU-wide information is currently available to the Commission about the results of their implementation. In 2016, the Commission launched an evaluation of the EU adaptation strategy to examine its implementation and performance. It is planned to be completed by the end of 2018.

50. Other EU policies and spending programmes are relevant to desertification, but their impact was not documented (as explained below).

---

[68] Proposed results indicators include: carbon storage in soils and biomass (R14), improving soils (R18), sustainable nutrient management (R21).

[69] Some Member States incorporated desertification into their climate change strategy by referring to their NAPs.

51. **Regional funds:** The ERDF and the Cohesion Fund can finance infrastructure investments for climate change adaptation. Investments for dams and irrigation systems are the most relevant for desertification and land degradation. Their impacts on land are mixed (see ***paragraphs 62 to 63***). According to the EEA, ERDF projects "can have a broad range of impacts on land; some investments, such as those for road transport, can aggravate sprawl and land take trends"[70]. In addition, the EU Solidarity Fund has been used to rehabilitate land after emergencies which increase the risk of desertification, such as droughts and forest fires.

52. **EU Research:** A number of research projects dealing directly or indirectly with desertification[71] have been financed under the EU research framework programmes. These focused mainly on understanding the phenomenon of desertification, developing indicators to monitor desertification, or supporting coordinated action to raise awareness. However, neither Member States nor the Commission have effectively capitalised on the research results to assess the extent of desertification, to build up an effective monitoring system, or to develop any related strategy.

53. **Water:** The Water Framework Directive considers water scarcity as one aspect of integrated water management and has the overall objective of achieving good status for Europe's waters by 2015. In May 2018, the Commission proposed a draft Regulation on water reuse, focusing on the reuse of treated waste-water for agricultural irrigation. Ensuring the availability of enough, good-quality water is a major challenge in combating desertification.

54. **Forestry:** The 2013 EU Forest Strategy is not legally binding. All of the five Member States we visited had national forestry legislation. The national forest programmes and national sustainable forestry practices have positive effects on soil. The EU supports certain forestry actions under the rural development policy which can also have a positive impact on desertification.

---

[70] See EEA report No 8/2016 "The direct and indirect impacts of EU policies on land".

[71] E.g. LEDDRA, PRACTICE, RECARE, BIODESERT.

55. Various Commission services (see ***paragraph 24***) interact on an ad-hoc basis on desertification issues. In 2015, the Commission established an expert group for soil protection, "to reflect with Member States on how soil quality issues could be addressed using a targeted and proportionate risk-based approach within a binding legal framework"[72].

56. There is, therefore, a range of strategies, action plans and spending programmes at EU and national level, which are relevant for combating desertification, but which do not focus on it.

EU-financed projects related to desertification can have a positive impact, but there is no relevant performance information on desertification

57. We assessed whether projects addressing desertification in the EU had a positive impact. For such projects to have a positive impact on addressing this phenomenon, they must address relevant needs, and be environmentally and financially sustainable. Performance information on the effectiveness and efficiency of spending is helpful in evaluating what has been achieved with the EU budget.

58. Studies have shown that restoring degraded land is, in general, more costly than preventing desertification and land degradation[73]. Projects relevant for desertification should also be timely, as delayed actions can potentially be more costly or unable to prevent irreversible negative consequences on land.

59. No comprehensive data is available on planned or actual expenditure on projects relevant for desertification at regional, national, or EU level. There is no data on how many such projects exist in the EU. We selected an illustrative sample of 25 projects (see

---

[72] http://ec.europa.eu/environment/soil/process_en.htm

[73] Nkonya, E., Mirzabaev, A., and von Braun, J., "Economics of Land Degradation and Improvement: An Introduction and Overview,"Economics of Land Degradation and Improvement – A Global Assessment for Sustainable Development", 2016, pp. 24-26; Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, "Thematic assessment of land degradation and restoration", March 2018.

paragraph 26) from lists submitted to us by the five visited Member States, which they identified as being relevant to desertification[74].

EU projects can have a positive impact on combating desertification

60. Within our sample, we identified two particularly successful projects which we considered to be examples of good practice. These projects had allowed previously non-productive soil to be enriched and protected against land degradation. While addressing desertification, reducing erosion and improving the condition of the land, these projects also benefited beneficiaries economically or contributed to biodiversity (see ***Box 4***).

Box 4 – Good practices – projects relevant for desertification

An ERDF co-funded project in Sicily, Italy, was aimed at combating desertification by stabilising slopes, enriching the soil, and ensuring better drainage. It also contributed to the growth of vegetation adapted to local climatic conditions. The project contributed to mitigating surface erosion, increasing biodiversity and improving the condition of land.

Improvement of soil condition in Italy (Sicily)

Source: ECA.

An EAFRD co-funded project in Portugal allowed economic benefits to be obtained from previously non-productive soil. A pine forest was planted in an area with sandy soil. The soil was enriched with organic matter, and irrigation and vegetation control methods that did not involve ploughing

[74] The visited Member States found it challenging to produce a list of desertification-related projects for our audit, as there was no specific policy linking them. In general, the projects were not identified as related to desertification, but addressed it rather indirectly.

were used. The project improved the productivity of the land while protecting the soil from wind erosion.

Afforestation in Portugal

Source: ECA.

But there are concerns about their long-term sustainability

61. Investment in irrigation was the most common type of project in our sample (10 of 25, 9 of which were co-financed by EAFRD). Studies show that such projects can have mixed impacts on desertification and land degradation[75].

62. On the one hand, irrigation can increase the land's profitability: it can increase crop yields – especially in the short term, make more land available for farming, and can also increase drought resistance. We observed all these positive effects in the projects in our sample.

63. On the other hand, irrigation can lead to sustainability problems: depleted water resources, contaminated groundwater, increased soil erosion or risk of salinisation[76] and

---

[75] Podimata, M. V. and Yannopoulos, P. C., "Evolution of Game Theory Application in Irrigation Systems", *Agriculture and Agricultural Science Procedia 4*, 2015, pp. 271-281; Muñoz, P., Antón, A., Nuñez, M., Paranjpe, A., Ariño, J., Castells, X., Montero, J.I., Rieradevall, J., "International Symposium on High Technology for Greenhouse System Management", *ISHS Acta Horticulturae 801,* Greensys, 2007; Kattakulov, F., Špoljar, M., Razakov, R., "Advantages and disadvantages of irrigation: focus on semi-arid regions. The Holistic Approach to Environment", 2017, pp. 29-38.

[76] EEA estimates that 25 % of irrigated agricultural land in the Mediterranean region is affected by salinisation (2015 State of the Environment Report).

reduced soil fertility. To address these issues, the EAFRD Regulations require irrigation projects to meet specific environmental sustainability conditions if they are to be co-financed[77]. ***Box 5*** describes long-term sustainability issues that we identified for two irrigation projects we visited.

Box 5 – Sustainability concerns of irrigation projects addressing desertification

In **Sicily**, **Italy**, we visited an irrigation project co-financed by EAFRD during the 2007-2013 programming period. This project did not use water metering. Water was billed for on the basis of the number of irrigated hectares, not actual consumption. This practice does not encourage the efficient use of water resources. This issue has been addressed in the current programming period (2014-2020), when it is required that water metering systems be in place in all new irrigation investments.

In **Portugal**, a 2014-2020 EAFRD irrigation project covered an area that was mostly cultivated with rice – a very water-intensive crop. Because of the salinity levels of the local soil, the competent authorities considered that rice was the only suitable crop. However, the project was in an area where water was scarce. There was no assurance that the irrigation infrastructure would provide enough water to sustainably support the production of rice. The authorities had not carried out a cost-benefit analysis on alternative options such as desalination, or the use of a more distant existing irrigation system.

64. Forestry projects (all co-financed by the EAFRD in our sample) have a positive impact on preventing desertification and land degradation: the forest cover protects the soil against erosion, and the capacity to absorb carbon increases. Forest landscape restoration can conserve biodiversity and reduce land degradation. Agroforestry initiatives can also help address land degradation through community-based efforts in more marginal areas[78]. We considered one of the four forestry projects in our sample to be an example of good

[77] See Article 46 of Regulation (EU) No 1305/2013. For example, the environmental analysis must show that the investment will have no negative environmental impact.

[78] IPCC, "Global Warming of 1.5°C", 2018, Approval Session, Table 5.2, pp. 5-64 and pp. 5-68.

practices (see ***Box 4***). However, forestry projects are less successful if vegetation cover is less adapted to the local climatic conditions (see ***Box 6***).

Box 6 – Sustainability concerns of a forestry project in addressing desertification

For an EAFRD co-financed afforestation project in Cyprus, we saw that about 20 % of the trees which had been planted had not survived for at least five years after the project ended, as some species were not well adapted to the climatic conditions.

Source: ECA.

Limited use and scope of cost-benefit analysis

65. Cost-benefit analyses and assessments of environmental sustainability are essential for desertification-related projects. The most common EU co-financing source in our sample was the EAFRD (17 of 25 projects). The EAFRD Regulation does not require a cost-benefit analysis to be performed. Some Member States made it mandatory for specific irrigation projects, including Cyprus and Romania. For six of the nine EAFRD irrigation projects in our sample, a cost-benefit analysis had been performed. In these cases, the analysis sought to demonstrate that the project had financial benefits compared to a 'do-nothing' scenario. However, it did not consider the cost of measures for correcting the potentially negative environmental impact (although various permits from environmental authorities were required) as part of the project's investment costs.

Projects' performance on desertification and land degradation was not assessed by Member State authorities

66. Member States are not required to collect data on, or evaluate, the impact of EU projects on desertification and land degradation[79]. None of the authorities of the Member States we visited had assessed how effective such projects had been in addressing desertification.

The Commission has not assessed progress towards meeting the commitment to land degradation neutrality by 2030

67. We examined whether the EU commitment to land degradation neutrality by 2030 is likely to be met. To achieve this goal at EU level, there needs to be a regular assessment of land degradation; cooperation and coordination across national boundaries and implementation of relevant actions; and relevant guidance to Member States on steps to achieve land degradation neutrality. Such guidance should include dissemination of good practices, and techniques for evaluating the impact of irrigation investments on land and for assessing biodiversity loss.

68. The EU and Member States endorsed the United Nations' commitment to achieving land degradation neutrality by 2030 (see ***paragraphs 13 and 14***). DG ESTAT publishes annually a report on progress towards the SDGs in an EU context, including indicators covering two aspects concerning land degradation: artificial cover and soil erosion by water (see ***paragraph 40*** and ***Table 2***). DG ESTAT – on behalf of the Commission – only analyses the changes in these indicators, and does not draw a conclusion on the status of land degradation neutrality in the EU[80].

---

[79] The existing evaluation frameworks, in particular for EAFRD, do not have specific monitoring indicators on desertification or land degradation, although there are context indicators linked to some extent to land degradation: land cover, soil organic matter in arable land, soil erosion by water.

[80] In its 2018 EU SDG Monitoring report, DG ESTAT confirms that its analysis for target 15.3 "focuses only on two aspects: artificial land cover and soil erosion. Because other degradation processes such as contamination, loss of soil biodiversity, erosion by wind, decline in organic matter, compaction, salinisation and desertification are not covered by the indicator set, the results of the analysis are limited."

69. Land degradation has a transboundary impact: soil is not static and the drivers of its degradation are often global. Land degradation is often considered a local phenomenon but soil particles move. Studies show that water and wind erosion processes, dust storms[81] or human activities such as pesticide pollution, are relevant in terms of a transboundary impact of soil degradation and have economic, social and environmental consequences[82], such as climate change, health problems and food shortage. Despite the transboundary nature of the problem, Member States and the Commission do not coordinate efforts to achieve the EU's goal of achieving land degradation neutrality.

70. The Commission has not assessed progress towards meeting the commitment to achieving land degradation neutrality by 2030. This is supported by studies such as one made on behalf of Germany's Environment Agency, which states that "the discussion on the implementation of the SDGs in general and land degradation neutrality in particular are still at an early stage" and that "the EU was a major player in the process of developing the SDGs, however implementation of the SDGs in the EU has been slow."[83] There is still no clear, shared vision in the EU about how land degradation neutrality will be achieved by 2030.

71. The UNCCD has established a voluntary programme to support countries with their land degradation neutrality commitments, for example in defining national baselines, targets or associated measures. As of November 2018, 119 countries were participating in this programme. Italy is the only participating EU Member State. The Commission does not provide guidance to the Member States on practical aspects on achieving land degradation neutrality.

---

[81] For example, in 2016, the Cypriot government issued 21 dust announcements.

[82] See e.g. Hagemann, N., SOILS4EU, "Transboundary effects of soil degradation in the EU", Helmholtz Centre for Environmental Research, 2018 and http://ec.europa.eu/environment/soil/index_en.htm.

[83] Wunder, S., Kaphengst, T., Frelih-Larsen, Dr. A., McFarland, K., Albrecht, S., "Implementing SDG target 15.3 on "Land Degradation Neutrality" – Development of an indicator based on land use changes and soil values", Ecologic Institute, Berlin on behalf of the German Environment Agency; 2018, pp. 12 and 38.

CONCLUSIONS AND RECOMMENDATIONS

72. Desertification is a form of land degradation in drylands. It is a growing threat in the EU with significant effects on land. Future climate change scenarios indicate an increasing vulnerability to desertification in the EU throughout this century, with an increase in temperature and droughts and less precipitation in the southern parts of Europe. Its effects will be particularly acute in southern Portugal, a large part of Spain, southern Italy, south-eastern Greece, Cyprus, and the Bulgarian and Romanian coasts (see ***paragraphs 1 to 24***).

73. We found that the risk of desertification in the EU was not being effectively and efficiently addressed. While desertification and land degradation are current and growing threats in the EU, the Commission does not have a clear picture of these challenges, and the steps taken to combat desertification lack coherence.

74. We found that there is no agreed methodology for assessing desertification and land degradation within the EU. Although the Commission and the Member States collect data about various factors with an impact on desertification and land degradation, the Commission does not analyse it to come up with a conclusive assessment on desertification and land degradation in the EU (see ***paragraphs 28 to 40***).

Recommendation 1 – Understanding land degradation and desertification in the EU

The Commission, in cooperation with the Member States, should:

(a) establish a methodology and relevant indicators – starting with the UNCCD's three indicators – to assess the extent of desertification and land degradation in the EU;

Target implementation date: 31 December 2020.

(b) based on agreed methodology, collate and analyse relevant data on desertification and land degradation, much of which is already being collected, and regularly present it in a clear, user-friendly way for public use, preferably in the form of interactive maps for use in the EU.

Target implementation date: 31 December 2021.

75. EU actions to tackle desertification lack coherence. The EU does not have legislation in place to deal specifically with desertification. While other vital environmental resources such as air or water are governed under various EU directives and regulations, there is no similar integrated EU legislation on soil.

76. There is no EU-level strategy on desertification and land degradation. Rather, there is a range of strategies, action plans and spending programmes at EU level, such as the Common Agricultural Policy or the EU strategy on adaptation to climate change, which are relevant for combating desertification, but which do not focus on it. Addressing desertification and land degradation is not well coordinated in practice (see ***paragraphs 41 to 56***).

Recommendation 2 – Assessing the need to enhance the EU legal framework for soil

The Commission should assess the appropriateness of the current legal framework for the sustainable use of soil across the EU, including addressing desertification and land degradation.

Target implementation date: 30 June 2021.

77. We found that EU projects can have a positive impact on desertification. Desertification-related projects are spread across different EU policy areas – mainly rural development, but also environment and climate, research or regional policy. However, there are some concerns about their long-term sustainability. Member States made limited use use of cost-benefit analyses, and did not assess the impact of EU-funded projects related to desertification, since desertification was not their primary objective (see ***paragraphs 57 to 66***).

78. The Commission has not assessed progress towards meeting the commitment to strive to achieve land degradation neutrality by 2030. There has not been an assessment of land degradation at the level of the EU. The Commission did not provide practical guidance to Member States on how to achieve land degradation neutrality. There is not yet a clear, shared vision in the EU about how land degradation neutrality will be achieved by 2030 (see ***paragraphs 67 to 71***).

Recommendation 3 – Achieving land degradation neutrality in the EU by 2030

The Commission should:

(a) further detail how the EU's commitment to land degradation neutrality will be achieved by 2030, and report periodically on progress;

Target implementation date: 31 December 2020.

(b) provide guidance to Member States on practical aspects of preserving soil and achieving land degradation neutrality in the EU, including dissemination of good practices;

Target implementation date: 31 December 2020.

(c) on their request, provide technical support to Member States to establish national action plans to achieve land degradation neutrality by 2030, including identifying targeted measures, clear milestones, and a plan for intermediate reporting at Member State level.

Target implementation date: 31 December 2022.

This Report was adopted by Chamber I, headed by Mr Nikolaos A. Milionis, Member of the Court of Auditors, in Luxembourg at its meeting of 14 November 2018.

For the Court of Auditors

Klaus-Heiner LEHNE

President

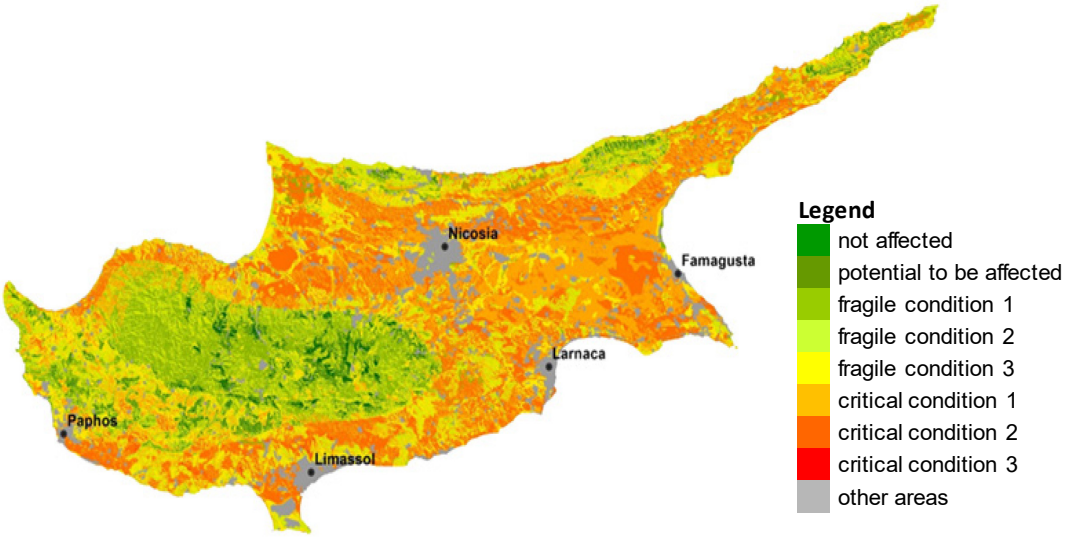
ANNEX I

Mapping of areas at risk of desertification in selected Member States

The Member States we visited have produced maps on the risk of desertification. However, these maps have not been updated regularly, and cannot be compared with each other as they used different indicators and colour coding. As a result, they cannot provide a comprehensive view of desertification at EU level.

Cyprus

Sensitivity to desertification in Cyprus was assessed based on the MEDALUS project definition of Environmentally Sensitive Areas[84]. This assessment concluded that the expected decrease in the rainfall and increase in air temperature accompanied by an increase in the aridity index will result in an increase in the vulnerability to desertification on the whole island of Cyprus.

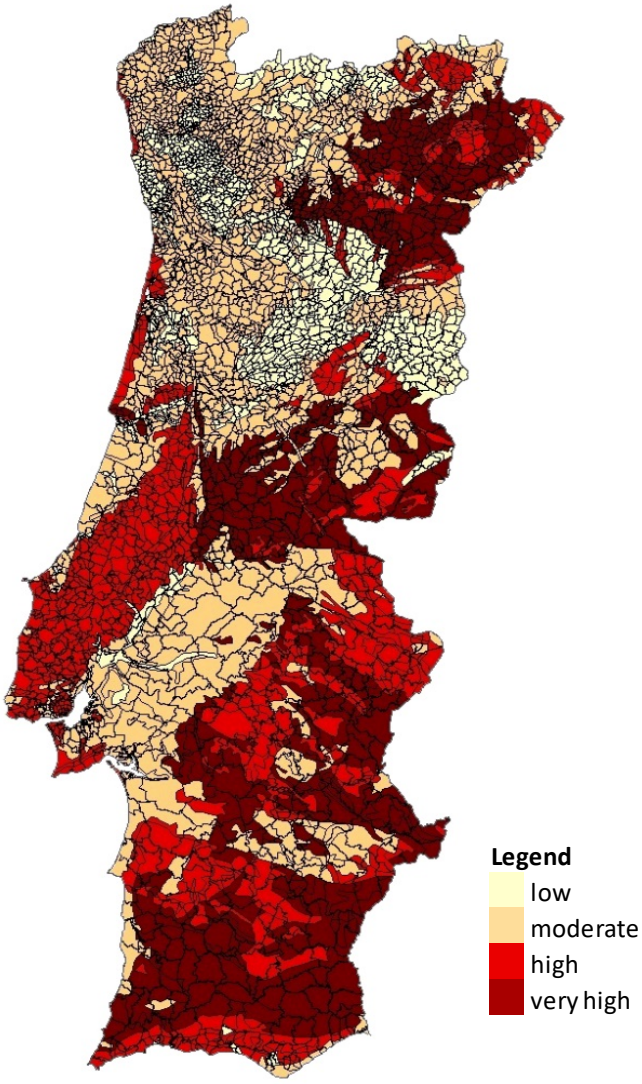


Source: Ministry of Agriculture, Rural Development and Environment, "Climate Change Risk Assessment, Land Desertification", 2016, p. 24.

[84] The MEDALUS model (Mediterranean Desertification and Land Use) has been largely tested in the Mediterranean basin countries and is widely used as a tool for the detection of most endangered areas in terms of land degradation.

Portugal

Over 5.5 million hectares of the continental part of Portugal (more than 50 % of the total area of the Portuguese mainland) is at risk of desertification[85]. The vulnerability to desertification map in the 2014 Portuguese NAP confirms that Portugal is largely affected by desertification, with over 30 % of its territory having a "very high" or "high" vulnerability to desertification.

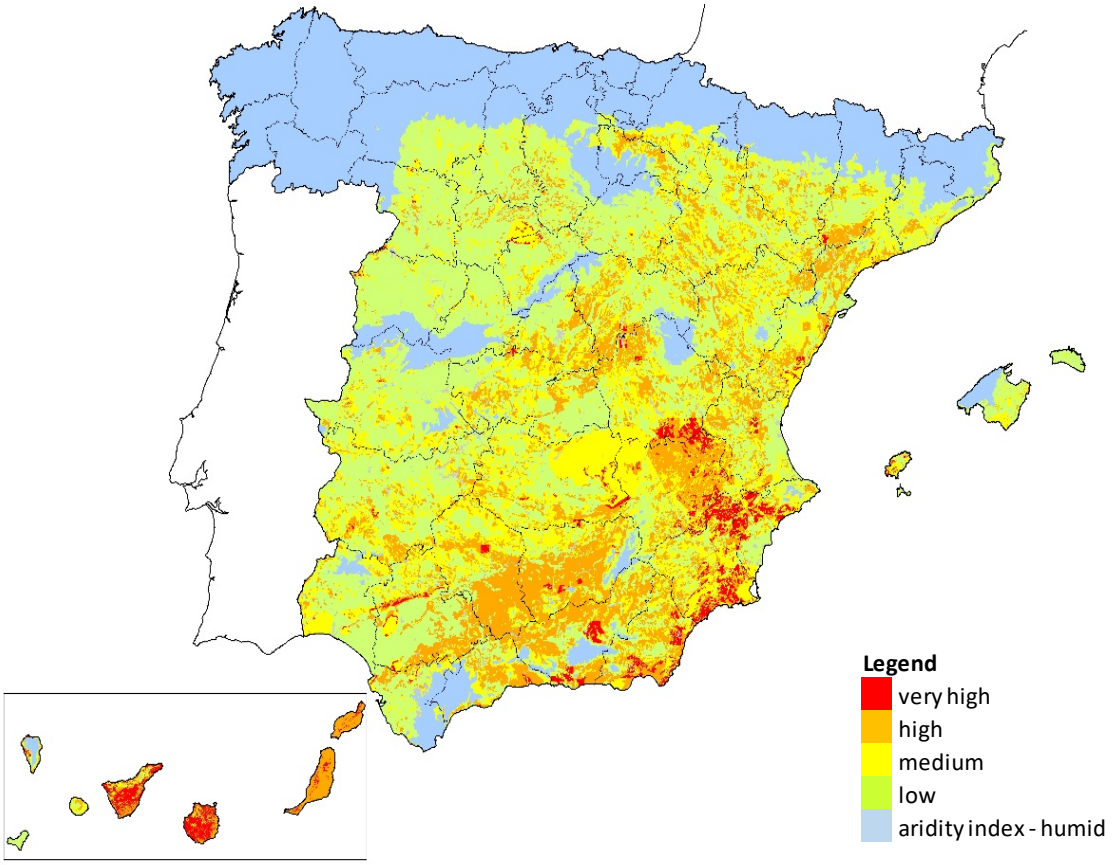


Source: Rural Development and Hydraulics Institute, National Agronomic Station, the DISMED project, 2003 for Lúcio do Rosário, "Desertification Indicators for the Continental Portugal", 2004; and, Territorial Directorate General, Official Administrative Map of Portugal, 2016.

[85] Sanjuan, M. E., del Barrio, G., Ruiz, A., Puigdefabregas, J., DesertWatch project, 2011.

Spain

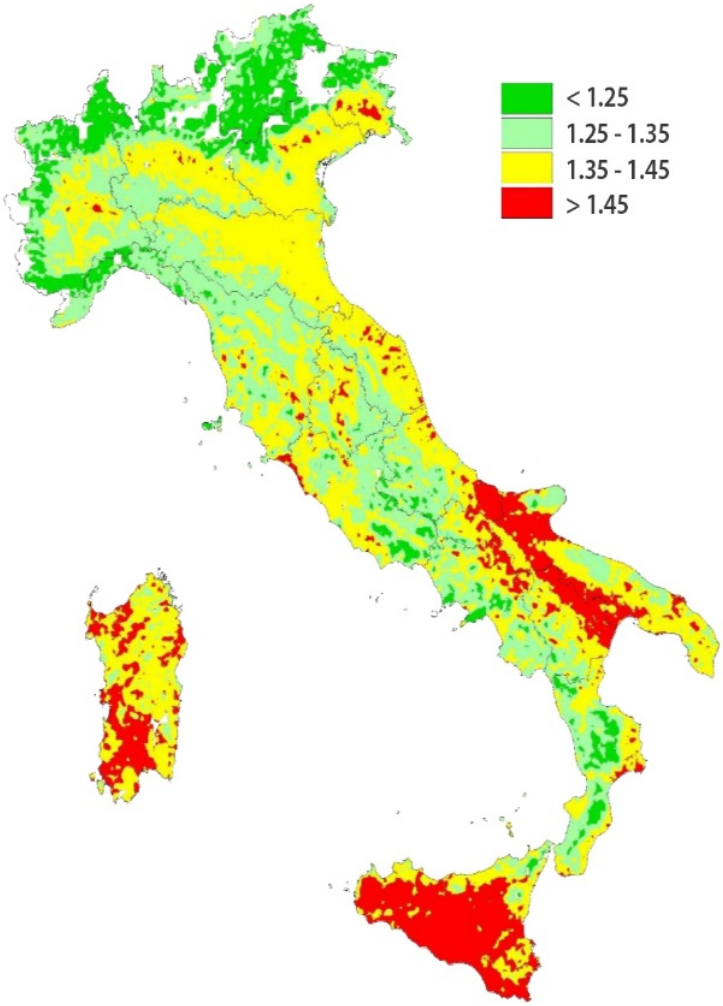
According to Spain's 2008 NAP for the UNCCD, about 74 % of Spain is at risk of desertification, with 18 % being at "high" or "very high", and 19 % at "medium" risk. The situation is particularly concerning in the Region of Murcia, the Valencian Community and the Canary Islands, where the risk of desertification is either "high" or "very high" across over 90 % of the territory.



Source: Ministry of Agriculture, Fisheries and Food, National Action Programme to Combat Desertification, 2008, p. 137.

Italy

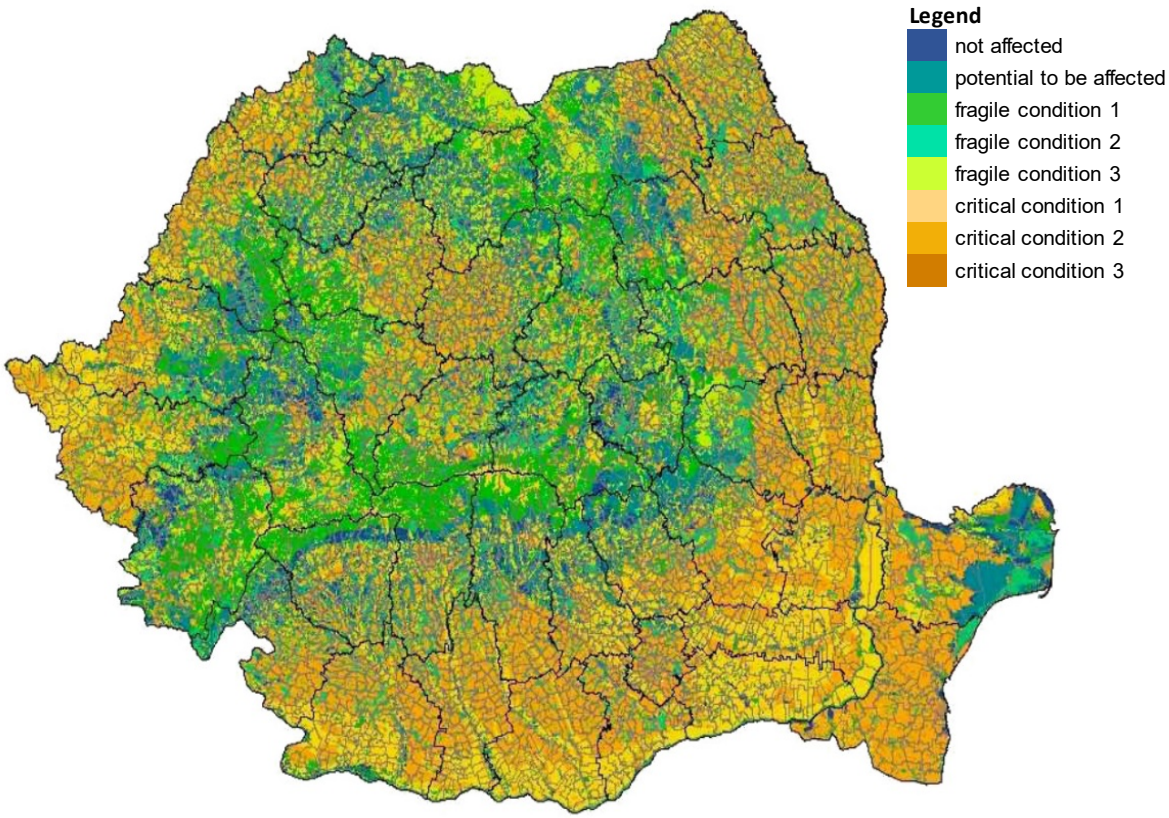
Sensitivity to desertification in Italy was assessed based on the MEDALUS project definition of Environmentally Sensitive Areas. This assessment concluded in 2008 that 10 % of Italy's territory had a high sensitivity to desertification, and that 49 % had a medium sensitivity. In particular, 70 % of the area of Sicily has a medium or a high degree of environmental vulnerability. But other areas, especially in south-eastern Italy and in Sardinia, are also significantly affected.



Source: Perini, L. et al., "Desertification in Italy", 2008, based on 2000 data.

Romania

The Romanian authorities estimated in their Sixth National Communication on Climate Change and First Biennial Report (December 2013) that the area subject to desertification, characterised by an arid, semi-arid or subhumid-dry climate, is approximately 30 % of the total area of Romania, being largely situated in Dobrogea, Moldavia, the south of the Romanian Plain and the Western Plain.



Source: National Research and Development Institute for Soil, Agro-chemistry and Environmental Protection, Sectorial Programme of the Ministry of Agriculture and Rural Development, 2007.

ANNEX II

Additional data related to desertification monitored by the Commission

- Soil erosion: the Implementation of the Soil Thematic Strategy report from 2012[86] estimates that 22 % of Europe's land surface is subject to erosion. The risk of soil erosion remains high in Mediterranean regions. These regions, which make up 11 % of the EU's total land area, experience almost 70 % of the total soil loss which occurs in the EU[87]. The soil loss rate has been reduced in Europe over the past decade by 9.5 % on average, and by 20 % on arable land[88]. The data on soil erosion is based on information provided by Copernicus, CORINE, LUCAS and other EU sources.

- Droughts: the European Drought Observatory publishes drought-relevant information such as maps of indicators derived from different data sources (e.g. precipitation measurements, satellite measurements, and modelled soil moisture content). Data shows that the trend of drought frequency and drought duration in dry areas in the EU has increased in recent decades.

- Water monitoring: surface water monitoring, carried out by the JRC, shows trends in the area covered by surface water (e.g. new dams), but reveals no information on the quantity of water available or water needs. The results of this monitoring indicate that there has been an increase in the area of surface water in dry areas in the EU (e.g. Spain, Cyprus, Portugal) in recent years. Groundwater monitoring has also been obligatory in the EU since 2006.

- Forest fires: forest fires are monitored by the European Forest Fire Information System, which covers 40 countries in Europe, North Africa and the Middle East. Although there is no clear correlation between desertification and fires, the Commission considers that climate change has increased the intensity of forest fires, and the length of the fire season in the EU. As a result, it has increased the risk of desertification.

---

[86] COM(2012) 46 final, 13 February 2012, The implementation of the Soil Thematic Strategy and ongoing activities,.

[87] JRC presentation (Panagos, P.) to DG AGRI workshop "Identification of challenges related to soil erosion and agriculture", 2018.

[88] https://esdac.jrc.ec.europa.eu/content/soil-erosion-water-rusle2015

ANNEX III

Summary of projects relevant to desertification visited during the audit

Type of project	Co-financing EU source	No of projects sampled	No of completed projects	Member States	ECA assessment of potential impact on combating desertification
Irrigation investments	EAFRD	9	6	All visited Member States	Mixed
	ERDF	1	1		
Forestry measures	EAFRD	4	4	Italy, Cyprus, Portugal	Positive, given that the vegetation cover is adapted to the climatic conditions
Restoration of dry-stone walls or dykes	EAFRD	3	3	Spain, Italy	Positive – prevents soil erosion
Use of better adapted plants	LIFE/ LIFE Climate Action	2	0	Spain, Portugal	Projects not completed
Research on techniques to address desertification	FP7	2	1	Cyprus, Portugal	Positive, given that the research results are disseminated
	ERDF	1	1	Spain	
Crop rotation	EAFRD	1	0	Cyprus	Project not completed
Land rehabilitation after forest fires	EUSF	1	0	Cyprus	Project not completed
Stabilisation of slopes, increased plant and soil cover	ERDF	1	1	Italy	Positive – prevents desertification and soil erosion
	Total	**25**	**17**		

REPLIES OF THE COMMISSION TO THE SPECIAL REPORT OF THE EUROPEAN COURT OF AUDITORS

"COMBATING DESERTIFICATION IN THE EU: A GROWING THREAT IN NEED OF MORE ACTION"

EXECUTIVE SUMMARY

I. Desertification and land degradation are indeed growing threats at global and European level, as highlighted in the UNCCD (UN Convention to Combat Desertification) Global Land Outlook[1], the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) Land Degradation and Restoration Assessment report[2] and the 3rd World Atlas of Desertification[3]. While the definition of desertification is enshrined in the UNCCD scope, there is not yet a single and commonly agreed definition of land degradation and land degradation neutrality at European level. This has to be kept in mind when referring to the Land Degradation Neutrality (LDN) concept and related implementing actions.

III. The Commission agrees that desertification and land degradation are current and growing threats in the EU. While land degradation is affecting all EU countries, the risk of desertification is increasing in particular in Southern Europe and in areas bordering the Black sea in Bulgaria and Romania.

A Directive establishing a framework for the protection of soil and amending Directive 2004/35/EC was proposed by the Commission on 22 September 2006 (COM(2006) 232 final) and had to be withdrawn in 2014 in absence of qualified majority in the Council. Consequently, there is not any other piece of legislation at EU level with a comprehensive approach on this matter.

Nevertheless, the Commission has been working at different levels on this matter (see §44) and in 2015 the Commission set up an EU Expert Group to implement the soil protection provisions of the 7th EU Environment Action programme (Decision No 1386/2013/EU). Additionally, different EU funding programmes address this aspect too.

IV. The Commission collected data for assessing desertification in the EU in the preparation of its proposal for a Soil Framework Directive (COM(2006)232). In absence of a dedicated legal framework there is no legal obligation to continue to collect information on desertification at EU level.

Nevertheless, Commission policies are established and are supporting Member States actions in different aspects (mainly Common Agricultural Policy) to tackle this problem individually and not under the umbrella of an integrated EU policy.

V. The Commission aimed to establish an overall strategy to tackle desertification as part of the EU Thematic Strategy and the proposal for a Soil Framework Directive.

Following the withdrawal of the Soil Framework Directive proposal, the Commission did its best to address this matter under the legal framework in place, through the implementation of the EU Soil Thematic Strategy (COM(2006)232) and the integration of soil protection into other EU policies and programmes (e.g. Common Agricultural Policy, Cohesion and Regional policy, the EU strategy on adaptation to climate change, the Water Framework Directive, Programme for the Environment and Climate Action and Research programmes).

---

[1] https://knowledge.unccd.int/glo

[2] https://www.ipbes.net/assessment-reports/ldr

[3] https://wad.jrc.ec.europa.eu/

The EU funding programmes envisaged in the next programming period 2021-2027 have broadly the same purposes that the ones currently in place and they will therefore continue to contribute to addressing desertification and land and soil degradation.

Various Member States initiatives supported by different EU funding programmes aim to tackle desertification in the best possible way within the current legal framework.

VI. The rural development fund sets eligibility conditions which must be met by projects and investments (e.g. irrigation, afforestation) and these include conditions aiming to ensure projects' sustainable character.

VII. The Commission proposed to the Member States (in the Council Working Party on International Environment Issues on desertification and in the EU Soil Expert Group) to facilitate exchanges and coordination at EU on land degradation neutrality objective. A study being launched by the Commission will further support these efforts by the Commission.

VIII. The Commission accepts the recommendations.

Regarding the recommendation on better understanding land degradation and desertification in the EU, the agreement on a common methodology will be subject to Member States' decision. The collection and presentation of data in an interactive tool will also be subject to the allocation of adequate resources to the Commission.

Regarding the recommendation to assess the need to enhance the EU legal framework the Commission, supported by the EU Soil Expert Group, will further reflect on how soil quality issues could be addressed at EU and national level. The reflection will not be limited only to the enhancement of the EU legal framework on soil but also aim at finding the most appropriate actions to combat desertification and land degradation in the EU.

The Commission also accepts the recommendation on achieving land degradation neutrality target by 2030.

INTRODUCTION

Box 1 – Key terms

For drought several definitions exist.

3.

First indent: The latest examples from the Iberian peninsula confirms that one of the main cause of the big fires is the land abandonment, the lack of proper management of the land and after fires the erosion and land degradation can trigger the desertification process.

The lack of proper land and vegetation management may also cause desertification when due to the accumulated and unmanaged biomass it burns down and open the way to erosion, land degradation and desertification[4]**.** On the other side, human activities, such as proper afforestation and land management can limit and even reverse desertification.

Second indent: The report of the European Environment Agency on water resources problems in Southern Europe[5] describes well the vicious circle of desertification: '*desertification can cause a reduction of infiltration into the soil and thus, a greater surface flow, with a corresponding increase in the maximum flood discharges. Desertification also causes modifications to the vegetation cover,*

---

[4] Álvarez-Martínez, J., Gómez-Villar, A., Lasanta, T., 2016. The use of goats grazing to restore pastures invaded by shrubs and avoid desertification: a preliminary case study in the Spanish Cantabrian Mountains. Land Degrad. Dev. 27, 3–13.

[5] https://www.eea.europa.eu/publications/92-9167-056-1/page012.html

which is currently undergoing rapid changes as a result of deforestation, either for providing fuel or for obtaining more arable land. The new vegetation cover, when it does exist, consists of either crops or poor vegetation. The soil is unprotected and the erosion caused by an increasing surface flow on the ground becomes even more serious, thus starting a spiraling process."

4.

Second indent: Soil restoration is often done by establishing a proper green /trees cover (not the reverse).

9. In addition, according to the Intergovernmental Panel on Climate Change report the risks from droughts and precipitation deficits are also projected to increase, albeit with a lower confidence.

21.

First and second indent: One of the objectives of the CAP is to ensure the sustainable development of agriculture. Some instruments under the CAP have the potential to address (reverse or prevent) the possible negative impact of certain farming practices and methods on the state of natural resources including soil. There are mandatory measures (cross-compliance and greening), which includes practices aiming at preventing damages to the soil and ensuring its protection. This can be combined with voluntary measures of rural development measures, supporting farming practices applied to improve the state of natural resources, including soil. As there is a large flexibility left to Member States on the choice of measures, the level of ambition of such measures can vary. This has been analysed in detail in the 'Inventory and assessment of soil protection policy instruments in the EU Member States[6].

Furthermore, rural development provisions (under the European Agricultural Fund for Rural Development (EAFRD) – part of the EU Structural and Investment Funds) include safeguards for supported investments (including those on irrigation) which aim at avoiding possible pressures by such investments on natural resources.

In the programming period 2014-2020, Member States have allocated more than 20% of the EAFRD (above €20 billion) to this thematic objective which is just one of the few objectives under which desertification and land degradation could be addressed.

22. While exact data on the level of the CAP support used for desertification is not available, the structure of the policy provides a certain indication in this regard. This is done by linking direct payments to the respect of good agricultural and environmental conditions (GAEC) including soil protection requirements and by a significant allocation by Member States of rural development funds to priority 4 addressing water, soil and biodiversity management (44% of the funds is allocated to this priority as a whole).The European Regional Development Fund (ERDF) and Cohesion Fund data is reported for all risks together. To improve the information collected, the Commission has proposed a more detailed breakdown of the allocations to climate change adaptation for the next Multiannual Financial Framework 2021-2027, including data on ERDF and Cohesion Fund allocations to floods, fires and other climate-related risks (e.g. storms and drought).

AUDIT SCOPE AND APPROACH

27. At EU level between 2000 and 2012, the average area of land taken for development was estimated to be 926 km^2 per year which is above the no "net land take" target of the Resource efficiency roadmap and the 7th Environment Action Programme (EAP) (source: European Environment Agency Environmental Indicator Report, 2017).

---

[6] http://ec.europa.eu/environment/soil/pdf/Soil_inventory_report.pdf

OBSERVATIONS

28. The Commission collected data for assessing desertification in the EU in the preparation of its proposal for a Soil Framework Directive (COM(2006)232).

In this context it can be considered that the Commission has already made adequate use of the available data on desertification and land degradation.

However, in absence of EU soil legislation there is no obligation for collecting or updating data and monitoring desertification and land degradation at EU level.

32. At EU level LUCAS (Land Use and Coverage Area frame Survey) data provide detailed information on land use and land cover collected on the ground every 3 years on 270,000 points across Europe, which are useful to calibrate or validate satellite images.

The Commission is currently analysing the LUCAS Soil Organic Carbon data comparing LUCAS 2015 data with previous data sets (LUCAS 2009+2012). This analysis will provide more information on the soil organic carbon trends in arable land and grassland in particular.

33. Conclusions drawn from CORINE (coordination of information on the environment) data are corroborated by LUCAS. LUCAS also provides important information on land cover and land use changes over Europe published every three years by the European Commission Directorate-General for Statistics (DG ESTAT). The reference table in footnote 53 (CAP context indicators 2014-2020 report, 2017 update), concerns data from 2012; in 2015, according to LUCAS, taken together agricultural land and woodland cover 88% of land in the EU[7].

34. Some data collected at EU level (on land cover changes and soil, in particular) for other purposes (e.g. agri-environmental indicators, EU State of soil report, EEA State of Environment Report) are also useful for assessing the extent of desertification and land degradation, but there is no legal obligation to do it at EU level.

The Commission processes LUCAS soil data collected on the ground to provide indicators of risk of soil erosion, loss of soil organic carbon etc. The EU Sustainable Development Goal indicator set currently includes an indicator on estimated soil erosion by water; other soil indicators will be considered during the Commission's annual reviews of the set.

With reference to Annex II, the respect for the environment is an intrinsic part of organic agriculture. Organic farming is a method of food production that combines best environmental practices, a high level of biodiversity and the preservation of natural resources, including soil[8].The total organic area in the EU-28 (i.e. the fully converted area and the area under conversion) was almost 12 million ha in 2016 and accounted for 6.7% of the total utilised agricultural area (UAA). The share of UAA devoted to organic production is increasing rapidly. For the period 2010-2016, the organic area increased by 30% in the EU-28, with an average annual growth rate of 4.4% and this increase is particularly significant in Bulgaria, Croatia, France and Cyprus[9]."

35. In the third version of the World Atlas of Desertification the approach was to describe the drivers of land degradation and desertification and their impacts, instead of providing a static map of desertification, which is a dynamic and complex process.

37.

---

[7] Table 1 in Land cover in the EU.

[8] Source: https://ec.europa.eu/agriculture/organic/consumer-trust/environment_en

[9] Source: CAP context indicator 19 – Area under organic farming: https://ec.europa.eu/agriculture/cap-indicators/context/2017/c19_en.pdf

First indent: The collection of harmonised data at EU level (LUCAS, CORINE and Copernicus data) was triggered by the lack of comparable data across Member States. Some Member States have very good and detailed soil monitoring system but some others do not have regularly collected soil data.

38. Due to the withdrawal of the Directive, the technical aspects of its further implementation were not addressed. However the Commission supported research projects which contributed to improve methodology to assess desertification and land degradation.

The Commission now envisages to propose a coordination and support action for the next Framework Programme for research Horizon Europe. The aim would be to assess and consolidate the existing evidence base (tools, measures, monitoring systems, mapping), bringing all stakeholders in the field together, to discuss and propose cost-effective restoration actions, prevention strategies, and streamline these actions and recommendation measures into the works of the UNCCD Conventions, hence the finalisation of National Actions Plans to combat Desertification, foster EU actions towards Land Degradation neutrality and promote an EU level Strategy on desertification and land degradation.

39. In order to come up with a fully consistent assessment of desertification and land degradation across the EU the Commission needs the agreement of the Member States on a common methodology for compiling the available indicators.

40. The Commission collects relevant data both for monitoring desertification being land cover/land use, soil moisture, vegetation /biomass indicators derived from satellite data (Copernicus) and soil data collected through LUCAS and national programmes. Those data are already incorporated in indicators at EU level (agri-environmental indicators, SDGs indicators etc.). The Commission published the World Atlas of Desertification in 2018 based on collected data at EU and global level.

43. Even in absence of an integrated EU soil legislation, Member States may use the available EU funding instruments (referred to by ECA in this report) to reach their own objectives in this matter.

44. When withdrawing its Soil Framework Directive proposal the European Commission stated that it "remains committed to the objective of the protection of soil and will examine options on how to best achieve this. Any further initiative in this respect will however have to be considered by the next college"[10].

45. The objective of the EU Soil Thematic Strategy is to address soil protection including desertification and other forms of degradation. However, in absence of an EU soil legislation soil protection and land degradation are scattered in various instruments, such as CAP, the EU strategy on adaptation to climate but also in other environmental policies (water, waste, air quality, biodiversity, industrial emission directive, environmental liability directive etc.).

46. The Commission considers that direct payments as such are not limiting factor to tackle desertification (see Commission reply, §46, first indent).

First indent: With reference to the EEA conclusions, 90% of direct payments are decoupled, that is to say they entail no incentive for production (and thus no incentive for intensification of production) and can be paid against the sole maintenance of the agricultural land in a state suitable for grazing and cultivation. Member States are to set minimum activities to be carried out for the maintenance of the land. For environmental reasons, in certain areas, such activities can be bi-annual.

Suggesting that direct payments as such can cause the intensification of agriculture and contribute to some factors related to desertification of land means ignoring any environmental benefit brought by

[10] OJ C 153 of 21 May 2014 and corrigendum in OJ C 163 of 28 May 2014.

decoupled direct payments (including of the safeguards introduced with cross-compliance requirements and "greening obligations. ").

Second indent: Cross-compliance makes a link between the CAP payments received by a farmer and the respect of certain environmental rules, in particular on soil protection. With regards to measuring its effectiveness the Commission has accepted the ECA's recommendation in the Special Report No26/2016 and has examined as part of the impact assessment for the CAP post 2020 how to better assess the performance of cross-compliance, in particular by further developing its set of indicators in the context of the proposal for the future CAP.

Third indent: The green direct payments ("greening") aims at remunerating the provision of public good by farmers, in particular with regards to soil protection. The large proportion of Utilised Agricultural Area (UAA) covered by the greening requirements (Ecological Focus Area, permanent grassland protection and crop diversification) highlights the potential of the greening to widely address issues.). While it is true that, for the sake of the simplification of the management of the scheme, certain farmers are exempted, the area concerned by greening requirements remains significant even in countries where exemptions are more frequent.

Fourth indent: Rural development programming can help ensuring coherence of actions concerning soil and land management. By establishing their own rural development strategies based on overall EU priorities and objectives and by identifying their specific needs and objectives, Member States can establish an integrated approach in dealing with a defined problem/need such as soil quality and management.

Box 3 – Example of ineffective measure to address desertification

Second alinea: The payments, as proposed by Romania, have to be calculated based on income loss and additional costs due to the commitments made, plus possible transactional costs. When an operation does not meet the expected uptake, the managing authorities can propose modification to the content of the requirements and related premium.

47. One of the proposed specific objectives of the of the Commission's proposal for the post 2020 CAP explicitly covers care for soil. The proposal allows for Member States to use a range of intervention types in the CAP's first and second pillars to address this objective. Moreover, the proposed system of "conditionality" includes various standards related to soil protection and quality. The proposal sets out not only result indicators but also possible impact indicators[11] for soil protection.

49. One of the priorities under the EU Adaptation strategy is to promote action by Member States and in particular to encourage and support the development of National adaptation strategies and plans.

Member States are the main actors in the development and implementation of their adaptation strategies and plans. They may use available EU funding instruments (e.g. LIFE, H2020, CAP, ERDF, etc.) to reach their own objectives in this matter. Member States further have to report *"[...] information on their national adaptation planning and strategies, outlining their implemented or planned actions to facilitate adaptation to climate change. [...]"* according to Article 15 of the

[11] Proposed impact indicators include: "reducing soil erosion" (I.13) and "enhancing carbon sequestration" (I.11). The latter indicator is formally allocated to the specific objective on climate change rather than the specific objective on management of natural resources but is nevertheless highly relevant to soil protection and quality.

Greenhouse gas Monitoring Mechanism Regulation[12], soon to be replaced by the Regulation on the Energy Union Governance[13].

51. While some irrigation projects have been co-financed during 2007-2013, irrigation (which is in the remit of the EAFRD) has not been a priority for the ERDF and Cohesion Fund in the 2014-2020 period. In contrast, cohesion policy funds a broad range of measures for climate change adaptation, including dams but also green infrastructure projects such as reforestation.

52. Research projects funded under the EU Framework Programmes were running during 2018 and therefore require a thorough analysis of their results before any further step (see Commission reply to §38).

Under Horizon 2020 the Commission is working together with Member States to create a European Joint Programme on agricultural soil management (EJP). This EJP will allow Member States and the European Commission to capitalise on the past projects and move from lab research to large scale testing and practice. The interest of Member States and associated countries is significant. This large financial investment (40 million Euro from the European Union's budget and 40 million Euro from the countries) is expected to respond to policy needs and to provide opportunities to work on topics that should be tackled at the national level, like desertification.

54. The Omnibus regulation (Reg. 2393/2017, Article 23 (Rural Development Programme Regulation)) introduced a change to agroforestry measure to be able to regenerate or renovate existing agroforestry systems. This is a concrete possibility towards decreasing desertification processes in theses Mediterranean Dehesa and Montados systems and improve their resilience.

55. In the context of the Expert Group on Soil Protection, a study was commissioned by the European Commission for mapping existing soil-related EU and national policies and analysis gaps, that was published in 2017 '*Updated Inventory and Assessment of Soil Protection Policy Instruments in EU Member States*'[14].

59. Please see Commission reply to §22.

63. As from the 2014-2020 programming period the EAFRD sets conditions which must be met by irrigation projects in order for them to receive funding. Such conditions are to ensure the sustainable character of the projects and related investments. Based on these conditions, only those irrigation projects can be supported which concern area for which river basin management plans are notified, which lead to water saving and for which an environmental analysis shows that there will be no significant negative impact on the environment.

64. It should be recalled that in case of afforestation projects and creation of woodland, Member States are obliged to ensure that in the selection of species, varieties and provenance of trees, they take account of the need for resilience to climate change as well as hydrological conditions.

65. Member States' rural development strategies, based on SWOT analysis, have to include the justification for the allocation of financial resources to the proposed measures. This approach to design a rural development programme implies the need to undertake a cost-benefit analysis, at programme and measures level, of the established needs, objectives and targets.

The investments projects, supported by EAFRD, which may have a negative impact on the environment, must be preceded by an environmental impact assessment. In addition, for irrigation

---

12 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R0525&from=EN

13 https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/governance-energy-union

14 http://ec.europa.eu/environment/soil/pdf/Soil_inventory_report.pdf

projects aimed at the increase of irrigated area, an environmental impact analysis demonstrating no significant negative effects is required. These should prevent the need for correcting measures.

66. The 2014-2020 Rural Development Policy provides for a specific focus area for improving agricultural and forestry soil management and/or preventing soil erosion (focus area 4C). Member States that have programmed projects in the 2014-2020 Rural Development Programmes (RDPs) to address this focus area assess these as foreseen in the Common Monitoring and Evaluation System.

69. In addition to the points made by the Court, soil degradation also has transboundary aspects as a result of indirect land use. The loss of local capacity means that the service (food production, climate mitigation) that was provided by the soil must instead be compensated by the use of soils elsewhere, often in other countries. A clear example is the import of food, feed and fibre from other countries which are based on the soil resources of the producing country.

70. The Commission annually reports on the progress of SDGs implementation at EU level including an assessment of land degradation (land take and soil erosion). The Member States also report individually the progress on SDGs implementation at national level.

While Member States have not formally tasked the Commission to coordinate the process of developing a common approach to land degradation neutrality and the development of common indicators, the Commission took the initiative to start at least some informal exchanges with Member States and is about to start a study to support it on that.

71. The elaboration of guidance and collection of best practices to address land degradation neutrality will be part of the aforementioned project to be launched in 2018 by the Commission.

CONCLUSIONS AND RECOMMENDATIONS

73. The Commission acknowledges that the risk of desertification and land degradation could be better addressed. It was part of the objective of the SFD proposal that the Commission decided to withdraw in absence of qualified majority in the Council for eight years. In the absence of EU legislation on soil protection and measures to prevent and restore degraded soil, Member States have the responsibility to implement appropriate measures at national level. The project on the implementation of land and soil-related SDGs in the EU will provide an updated overview of the measures and actions implemented at Member State level.

74. The Commission and Member States collect data relevant both for monitoring desertification and land degradation which are already incorporated in indicators at EU level (SDGs, agri-environmental indicators) and in EU monitoring systems on drought and crop conditions. In addition, those data were incorporated in the third version of the World Atlas of Desertification published in 2018, which provide an inclusive assessment on desertification and land degradation at global level.

Recommendation 1 – Understanding land degradation and desertification in the EU

The Commission accepts this recommendation.

The Commission intends to launch in 2018 and 2019 actions that will respond to the recommendation:

(a) the improvement of indicators is part of the Commission's work on agri-environmental indicators and SDGs indicators. In this context, discussions on and work for the establishment of a specific methodology to assess desertification and land degradation in the EU will start in the context of the Commission's study about to start on the implementation of soil and land-related SDGs at EU level. However, the adoption of this methodology will be subject to a decision by the Member States.

(b) Without prejudging any agreement by Member States on a proposed methodology, the Commission may consider, subject to the availability of adequate resources, to work on a specific assessment of desertification and land degradation at EU level and the presentation of data in a more

interactive and user friendly way, building on existing data and the approach developed for the 2018 World Atlas of Desertification.

76. The Commission recalls that the objective of the EU Soil Thematic Strategy is to address soil protection including desertification and other forms of degradation. However, in absence of an EU soil legislation (after the withdrawal of the SFD proposal by the Commission in absence of qualified majority in the Council), soil protection (of which desertification) and land degradation are only partially addressed at EU level through various instruments (CAP, the EU strategy on adaptation to climate, regional and other environmental policies, research).

Recommendation 2 – Assessing the need to enhance the EU legal framework for soil

The Commission accepts this recommendation.

In line with its continuous commitment on soil protection and examination of options on how to best achieve this, when withdrawing its proposal for a Soil Framework Directive the Commission set up the "Expert Group on Soil Protection to reflect on how soil quality issues could be addressed using a targeted and proportionate risk-based approach within a binding legal framework". The reflection will not be limited only to the need to enhance the EU legal framework on soil but also aim at finding the most appropriate actions to combat desertification and land degradation in the EU.

The work of the Soil Expert Group is in progress and the outcome of this work will be assessed by the Commission in due time.

77. The rural development fund sets eligibility conditions which must be met by projects and investments and these include conditions to ensure projects' sustainable character. While specific cost-benefit analyses might not be required at a project's level, by proposing financial allocations to concrete measures, needs and objectives, Member States undertake environmental and economic analyses. See also Commission reply to paragraph 63.

78. An assessment of progress towards meeting the commitment to land degradation neutrality by 2030 will be part of the project that the Commission is about to start a study on the progress of implementation of land and soil-related SDGs at EU level (with a particular focus on Land Degradation Neutrality target). This project will also analyse the approaches at national and possible convergences at EU level.

Recommendation 3 – Achieving land degradation neutrality in the EU by 2030

(a) The Commission accepts this recommendation

The Commission expects that the study about to start will partially contribute to defining actions at EU and Member State level that will bring about land degradation neutrality by 2030.

However additional work and further discussions with Member States, the other EU institutions and with stakeholders will be needed. This discussion will also take into account that Member States are responsible for the implementation of their own commitments on SDG targets.

It also has to be mentioned that addressing desertification as such is not a primary objective of many EU policies, like cohesion policy, subsequently for such policies there is no legal basis for such detailed reporting requirements.

(b) The Commission accepts this recommendation

The Commission intends to provide guidance to Member States and enable the dissemination of good practices. Actions to this effect will be supported by the aforementioned study about to be launched that is expected to end by mid-2020.

(c) The Commission accepts this recommendation

It should however be noted that only 13 EU Member States declared them affected by desertification under the UNCCD and are therefore bound to prepare national action plans on desertification.

Furthermore, also the Land Degradation Neutrality (LDN) target setting programme of UNCCD is voluntary and so far only one Member State (Italy) is engaged in this process. More Member States might decide to establish national action plans to achieve land degradation neutrality by 2030 and for this they may request support from the Commission and/or from the UNCCD LDN setting programme. It is therefore difficult to anticipate how many Member States will be willing to do so and when this process will start and end.

Event	Date
Adoption of Audit Planning Memorandum (APM) / Start of audit	15.11.2017
Official sending of draft report to Commission (or other auditee)	27.9.2018
Adoption of the final report after the adversarial procedure	14.11.2018
Commission's (or other auditee's) official replies received in all languages	13.12.2018

PDF ISBN 978-92-847-1509-1 1977-5679 doi:10.2865/801468 QJ-AB-18-031-EN-N

HTML ISBN 978-92-847-1518-3 1977-5679 doi:10.2865/425778 QJ-AB-18-031-EN-Q

Desertification is a form of land degradation in drylands. It is a growing threat in the EU. The long period of high temperatures and low rainfall in the summer of 2018 reminded us of the pressing importance of this problem. Climate change scenarios indicate an increasing vulnerability to desertification in the EU throughout this century, with increases in temperatures and droughts and less precipitation in southern Europe. Its effects will be particularly acute in Portugal, Spain, Italy, Greece, Cyprus, Bulgaria and Romania.

We found that the risk of desertification in the EU was not being effectively and efficiently addressed. While desertification and land degradation are growing threats, the steps taken to combat desertification lack coherence. There is no shared vision in the EU about how land degradation neutrality will be achieved by 2030. We recommend the Commission aims at a better understanding of land degradation and desertification in the EU; assesses the need to enhance the EU legal framework for soil; and steps up actions towards delivering the commitment made by the EU and the Member States to achieve land degradation neutrality in the EU by 2030.

EUROPEAN COURT OF AUDITORS

Publications Office

EUROPEAN COURT OF AUDITORS
12, rue Alcide De Gasperi
1615 Luxembourg
LUXEMBOURG

Tel. +352 4398-1

Enquiries: eca.europa.eu/en/Pages/ContactForm.aspx
Website: eca.europa.eu
Twitter: @EUAuditors

© European Union, 2018

For any use or reproduction of photos or other material that is not under the European Union copyright, permission must be sought directly from the copyright holders.