

# Sustainable Development Goals (SDGs) & Indicators: Managing Drylands under Climate Change Conditions

Potamianou N., Papadopoulou C.-A.\* , Papadopoulou M.P., Charchousi D.

ILaboratory of Physical Geography & Environmental Impacts, School of Rural & Surveying Engineering, National Technical University of Athens, Athens, Greece

\*corresponding author: Chrysaida-Aliki Papadopoulou : e-mail: xpap@survey.ntua.gr

## Abstract

The future sustainable development constitutes a critical issue at a global scale. It builds upon the concepts of combating poverty & inequality, mitigating climate change impacts as well as protecting natural & cultural resources through innovation & adoption of eco-friendly solutions. It is a human-centric approach that places people at the core of its priorities. Seventeen Sustainable Development Goals (SDGs) have now been set by the United Nations (UN) for the year 2030, each accompanied by a set of indicators measuring their performance. This paper focuses on the contribution of each sustainability indicator to the accomplishment of the respective goals, especially in case of drylands. A general overview of the SDGs & the relative indicators are analyzed. Then, indicators related to climate change impacts are explored following by an assessment of the contribution of these specific indicators to the management of drylands under climate change conditions.

**Keywords:** SDGs, Sustainability indicators, Climate change, Drylands

## 1. Introduction

Climate change constitutes an atmospheric phenomenon affecting the global climate system. Extreme weather conditions like storms, heat waves & droughts are constantly becoming more frequent in various parts of the world creating new patterns of land development, agricultural production, water management & local climatic conditions. Under this framework, the global community faces the great challenge of combating climate change through the implementation of policies & practices emphasising to mitigate its effects & render both the physical & man-made environment more resilient. IPCC (2018) highlights the serious risks that the planet is going to face if the global warming will increase only by 1.5°C above pre-industrial levels. Robust differences will occur such as: increase of mean temperature in most land & ocean regions; multiplication of hot extremes in inhabited regions; increase of heavy precipitation & drought probability (IPCC, 2018).

SDGs are strongly related to climate change as the latter has serious impacts on human health, standards of living, availability of water & energy resources, biodiversity, etc. In this paper, the SDGs are briefly delineated along with

some indicative indicators measuring their performance. Emphasis is placed on SDGs & indicators related to drylands & their management under the pressures put by climate change.

## 2. SDGs & Drylands

SDGs succeeded in 2015 the Millennium Development Goals (concluded by the end of 2016). The adopted 2030 Agenda for Sustainable Development & its 17 SDGs set by the UN deals with issues concerning poverty, human health, water, climate, justice, etc. Each SDG has been specialised into more detailed & specific objectives the performance of which is measured by the use of respective indicators (Table 1).

**Table 1.** SDGs & Indicators

a/a	SDG	Indicative Indicator
1	No poverty	Proportion of population below the international poverty line by sex, age, employment status & geographical location
2	Zero hunger	Prevalence of undernourishment
3	Good health & well-being	Under-5 mortality rate
4	Quality education	Proportion of children & young people (a) in grades 2/3; (b) at the end of primary; & (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading & (ii) mathematics, by sex
5	Gender equality	Whether or not legal frameworks are in place to promote, enforce & monitor equality & non-discrimination on the basis of sex
6	Clean water & sanitation	Proportion of population using safely managed drinking water services
7	Affordable & clean energy	Proportion of population with access to electricity
8	Decent work & economic	Annual growth rate of real GDP per capita

growth		
9	Industry, innovation & infrastructure	Proportion of the rural population who live within 2 km of an all-season road
10	Reduced inequalities	Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population & the total population
11	Sustainable cities & communities	Proportion of urban population living in slums, informal settlements or inadequate housing
12	Responsible production & consumption	Number of countries with sustainable consumption & production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies
13	Climate action	Number of deaths, missing persons & directly affected persons attributed to disasters per 100,000 population
14	Life below water	Index of coastal eutrophication & floating plastic debris density
15	Life on land	Forest area as a proportion of total land area
16	Peace, justice & strong institutions	Number of victims of intentional homicide per 100,000 population, by sex & age
17	Partnerships for the goals	Total government revenue as a proportion of GDP, by source

Source: UN – General Assembly, 2017

The United Nations Environmental Programme (UNEP) identifies drylands based on an aridity index (AI) which is defined as the ratio of the annual precipitation & potential evapotranspiration (PET) totals (Sahin, 2012). Drylands cover about 40% of the earth's surface & are very sensitive to both climate change & human activities (Huang et al., 2016) while more than two billion people live in such areas (International Union for Conservation of Nature, 2019). The main characteristics of drylands are (FAO, 2019): a) Water scarcity, affecting ecosystems & posing limitations on agricultural & livestock production;

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b) Arid weather conditions (low precipitation, drought & heat waves); c) Vulnerability of soils due to wind & water erosion; d) Low fertility of soils & low content of organic matter. They are regions with high percentages of poverty, water & food scarcity. Therefore, the SDGs related to drylands are: a) No poverty; b) Zero hunger; c) Gender equality; d) Clean water & sanitation; e) Climate action & f) Life on land. Such SDGs will contribute to the limitation of further desertification & the improvement of living conditions in drylands.

Along with the aforementioned SDGs, specific indicators measuring their performance are focusing on (the): a) percentage of population living below international & national poverty lines, b) proportion of population covered by social protection systems, c) percentage of population with access to basic services, d) food insecurity, e) proportion of agricultural area under productive & sustainable agriculture, f) gender equality & discrimination, g) proportion of total agricultural population with ownership or secure rights over agricultural land, by sex, h) availability of drinking water & sanitation services, i) changes in water eco-systems, j) deaths caused by physical disasters, k) strategic plans for climate change adaptation, l) proportion of degraded land, m) conservation of biodiversity, n) red list index referring to degradation of habitats, biodiversity & extinction of threatened species.

### 3. Conclusions

Desertification of land is worldwide recognised as a serious threat affecting natural resources, biodiversity & human societies. Climate change is an amplifying factor as it puts pressures on the natural resources, especially water & land. Water scarcity, land degradation & limited soil fertility are key characteristics of drylands affecting quality of life, agricultural production & food security. In this paper, the relationship between drylands & SDGs was explored. It was clarified that accomplishment of some SDGs can effectively contribute to the future limitation of drylands & improve the quality of life in such harsh environments. Thus, by connecting drylands with SDGs it is possible to monitor their future progress through the monitoring of relevant indicators that will measure the performance of SDGs in dryland areas.

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