

# **The relationship between desertification and climate change**

**Theme: Climate change and natural resources**

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## **Abstract**

At the Rio-Conference in 1992 climate change and desertification – along with loss of biological diversity – were identified as the major global environmental challenges, and all three subsequently became subjects of international environmental conventions. Since then it has been debated whether climate change or human mis-/overuse of resources should be considered the main cause of desertification (and loss of biological diversity as well). The work reported here deals with the question of the main causes of desertification, as defined in ‘United Nations Convention to Combat Desertification’ (UNCCD). In this definition desertification is understood as ‘land degradation in drylands’, and one of the main indicators of land degradation is change in the productivity of the vegetation cover. We assess the trends, at global and decadal scale, in vegetation productivity on the basis of the NOAA AVHRR GIMMS data-set, presently the most consistent long-term satellite-based data-set applicable for the purpose. Subsequently, we relate vegetation productivity to rainfall and temperature data derived from global data-bases, integrating satellite- and land-based measurements with model outputs, in order to identify statistical relations between vegetation productivity and climatic variables for the period 1982-2010. The results show that positive trends in vegetation productivity dominate globally, and particularly in Africa, which is in conflict with generally held views. We further show that much of the variation in vegetation productivity may be explained by variations in annual rainfall. In temperate regions, changes in temperature may sometimes be important as well, presumably in cases where higher temperatures cause an increase in the length of the growing season. These findings stand out in contrast to claims that desertification is mostly caused by local human influence. Finally, the implications for international environmental policies concerning desertification and climate change are discussed.