

Africa is increasingly drier: Economic research estimates reduction in income due to desertification

March 16 2023, by Marco Percoco e Maurizio Malpede



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Approximately 52 million square kilometers of the earth surface is made by arid zones, defined as areas where the total amount of rainfall is

balanced by evaporation from the surface and natural transpiration of plants. The "right balance" between atmospheric precipitation and water evaporation is essential for soil productivity, a balance that climate change is constantly modifying, with dramatic consequences on habitability and food availability in many areas of the globe.

According to the 2019 report of the Intergovernmental Panel on Climate Change (IPCC), as of 2015, approximately 500 million people were living in areas that had experienced desertification between the 1980s and 2000s. This situation is expected to worsen in the coming decades, as the population made vulnerable by [global warming](#) and [habitat degradation](#), including desertification, is estimated to increase by an additional 250 million people by 2050, with Africa expected to pay the highest price.

In spite of these climate predictions, there is little knowledge of the economic effects of desertification, defined as [land degradation](#) in arid, semi-arid and sub-humid areas resulting from many factors, including [climate change](#) and anthropization.

With the help of the Invernizzi Foundation, it was possible to study the economic and social implications deriving from worrying phenomena of increased soil aridity. Desertification, in fact, worsens the living conditions of habitants through a chronic shortage of water and food which, for the part of the population that has no possibility of migrating elsewhere, translates into deterioration of a series of human welfare indicators.

By building a database composed of georeferenced data relating to the entire globe and analyzing it with econometric techniques, our estimates indicate a reduction in income due to desertification equal to 12% for Africa as a whole over the 1990-2015 period, with costs projected to be equal to 16% of GDP in 2079, with much higher effects not only in the

Sub-Saharan region, but also in the Maghreb.

The Asian region, on the other hand, would seem to suffer much less from the same phenomenon, with the sole exceptions being the central and inner areas of Russia, China and Mongolia.

Furthermore, the deterioration of soil productivity would seem to have a significant negative impact on the health of children at birth, in terms of life expectancy and [body mass](#), so as to cast a dark shadow on long-term development prospects. These effects would derive directly from the reduction of the quantity of harvest extracted from [agricultural areas](#), and this not only in the years when extreme meteorological events occur (heavy rains or, conversely, prolonged droughts), but, more slowly and progressively, in subsequent years.

More specifically, our results show that between 1995 and 2005, soil aridification led to a global loss of approximately 1.7 million tons of corn, 81,000 tons of rice, 786,000 tons of soybeans and 430,000 tons of wheat, a contraction mainly concentrated in Africa and Asia.

By using long-term forecast models of evapotranspiration potential of soils, i.e. the soil's ability to hold the right amount of water (a measure often used to measure aridity), we predict that aridification would cost up to 0.8 tons per hectare of crop grown in Sub-Saharan Africa for every year until 2040.

Therefore, if immediate action is not taken to counter the effect of the advance of aridity on agricultural productivity and, therefore, on the availability of food, the African continent could lose, in less than a century, more than a third of its product, something which, together with the [population increase](#), would cause a clear reduction in individual welfare

Provided by Bocconi University

Citation: Africa is increasingly drier: Economic research estimates reduction in income due to desertification (2023, March 16) retrieved 21 June 2024 from

<https://phys.org/news/2023-03-africa-drier-economic-reduction-income.html>

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