



## **African land degradation in a world of global atmospheric change: fertilization conceals degradation?**

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Land degradation is one of the most widespread environmental problems worldwide. The sub-Saharan Africa (SSA) is one of the most seriously affected regions with huge implications on food security and economic development. To plan plausible management measures, understanding the magnitude of the problem and identification of hotspot areas are necessary. Analysis of remote sensing and climate data observed from space for the period 1982 – 2003 showed significant improvement in vegetation productivity across 30% of SSA with decline on 5% of the subcontinent. Global change in atmospheric chemistry is likely responsible for the observed increasing trend in vegetation productivity. Such widespread greening observed from space could mask anthropogenic land degradation processes such as land conversion, selective logging, and soil nutrient mining. To assess this possible masking effect, a re-analysis of the vegetation productivity dynamics, taking into account atmospheric fertilization, was conducted. This was performed by analyzing the long-term trend in vegetation productivity of pristine lands (areas with minimum human- and climate- related impacts) identified across different biomes in SSA. The baseline slope values of biomass accrual calculated for those pristine lands were estimated and used to re-calculate the long-term trend of green biomass with and without the impact of atmospheric fertilization. This ultimately enabled to delineate the areas that would have experienced significant loss in vegetation productivity had the atmospheric chemistry not changed. The result suggests that seven times more than the area of actual productivity decline in SSA is affected by land degradation processes that are concealed by atmospheric fertilization. With this rate of surreptitious loss of vital land attributes and with the current rate of population growth (3%), the SSA subcontinent may soon lack the land resources necessary to foster economic development. Spatially distributed field data are, however, required to ascertain the validity of the results presented.