



Photovoltaic Parks' Impact On Soil CO₂ Releasing

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The sun provides a tremendous source for generating green and sustainable energy without any greenhouse gases (GHG) emissions. Even though photovoltaic energy is a promising alternative to fossil fuel-based energy, its development poses new environmental questions and potential threats. Due to its no GHG emissions property, photovoltaic energy grew at an unprecedented rate at global level, expanding by 50 % per year over the last decade. Unfortunately, there is still a knowledge gap on the long-term effects of photovoltaic parks on habitat loss, on soil quality, and hence on soil carbon dynamics. This subject should draw scientists' attention due to the occurred land use changes, possible soil compaction, potential alteration of drainage channels, increased runoff and erosion, use of herbicides which may leach to groundwater, but mainly due to the soil probability to lose the storing capacity of organic C, leading to CO₂ emissions. Soil capacity of storing organic C emission may be affected by photovoltaic parks construction as follows: soil temperature increase due to poor ventilation, changes in precipitation and evapotranspiration processes, the balance of direct and diffuse radiation, climate induced changes in plant and soil microbial community composition and activity, but not only. Anyhow, studies reported by other authors showed that CO₂ emission led by removal of vegetation followed by photovoltaic parks construction is high, total organic C remained 30 % lower than on undisturbed areas.

The aim of this study was to perform an in-depth analysis of photovoltaic parks development in Romania and to assess their potential impact on below-ground organic C pools regarding the increasing of C release back into the atmosphere as CO₂.

The study showed that the photovoltaic parks constructed in Romania reached, until the January 2014, a total installed power of 1022 MW, some of them being installed on arable land, thus changing land use and posing a risk to soil physico-chemical characteristics. This on-going study is aimed to be long-term conducted in order to proper assess the photovoltaic parks' potential impact on soil and, hence, on CO₂ emissions.