



Projected Impact of Urban Growth on Climate Change

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Human activities on land use such as intensive agricultural techniques and urbanization are generating a number of social and economic benefit for contemporary society. Besides, these phenomena are one of the most significant causes of Land Degradation. Firstly, intensive agriculture is on the one hand creating an advantage in the short-period in terms of food production, while on the other is producing serious long-period problems in terms of loss of ecosystem services, including some important for agriculture itself. Secondly, the rapid growth of urban areas in recent decades is generating deep environmental issues. The World Urbanization Prospect by the United Nations (UN) shows that more than half of the world's population today (54%) lives in urban areas. This figure was only 30% in 1950, and estimates are that it will rise to 66% by 2050. Urban growth is responsible for the increase of air pollution, waste production, energy consumption, and land take. Moreover, the expansion of urban areas is making the problem of urban heat islands more relevant, and studies are proving how land cover changes are among the main factors that affect local microclimates. Consequently, territorial planning will play an important role in the fight to mitigate the effects of climate change, as land cover has a significant impact on the energy exchanges between the earth and the atmosphere.

This study couples urban growth simulation models based on cellular automata to multiple linear regression techniques that are used to formulate equations for predicting the effects of simulated urban development on soil surface temperature. The proposed methodology is applied to the case study of the Italian national territory, considering various alternative scenarios of land use changes and of their impact on local surface temperatures.

The results show that the areas with the greatest urban pressure might be subject to significant climatic changes due to the increased impact of urban heat island phenomena. This highlights the need to take meaningful action to reverse the trends currently in place concerning the territorial government, with the purpose of creating a renewed political and social context that can reduce Land Degradation phenomena. These assumptions are considered essential to meet the new climate sustainability parameters introduced by the Paris Agreement signed in December 2015.