

Ecological Footprint Analysis (EFA) for the Chicago Metropolitan Area: Initial Estimation

Because of its computational simplicity, Ecological Footprint Analysis (EFA) has been extensively deployed for assessing the sustainability of various environmental systems. In general, EFA aims at capturing the impacts of human activity on the environment by computing the amount of bioproductive land that can support population consumption and the concomitant generation of waste in any given area. Herein, we deploy EFA for assessing the sustainability of an urban system, specifically, the Chicago Metropolitan Area (CMA). We estimate the trend in EF for the CMA between 1990 and 2015 to determine if the metropolitan area is moving towards or away from sustainable development. At the outset of the estimation, we consider six categories of bioproductive land for the analysis, namely, energy, arable, forest, pasture, and built-up lands as well as lake area. In addition, we allocate the various items consumed and/or produced by the area's population to one of these categories. Subsequently, we computed the CMA's ecological demand, or footprint, by quantifying the amount per capita of each land/space category required to sustain the consumption of the area's population. Moreover, we determined the CMA's ecological supply by accounting for the amount per capita of each land/space category that the area is providing to the environment. Finally, the ecological balance is computed by subtracting the area's footprint from the corresponding ecological supply. We expect that the results of this analysis will serve as a basis for the establishment of a refined computational framework for the city's Ecological Footprint that might guide policy-making regarding the sustainability of the CMA in the future.