The biodiversity footprint of urban consumption in China declined by one quarter between 2012 and 2017

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Author: XIAOJUAN LIU
Co-Authors: Bingqi Xie, Wei TU, Xia Li

China needs to play a vital role in bending the curve of global biodiversity loss. Big gains could be made by understanding and reducing the biodiversity footprint of consumption in cities, the ultimate source of much environmental harm. Yet there is very little information on how the biodiversity footprint of consumption varies among cities, how this changes over time, and which sectors are responsible, hampering the design of sustainability measures in cities to reduce the footprint.
To fill this gap, we estimated the biodiversity footprint associated with urban consumption in 309 Chinese cities for the years 2012 and 2017 using the environmentally-extended multi-regional input-output (EE-MRIO) model. The data on province-level occurrence of 2873 Chinese species (1520 plant species and 1353 animal species), and the threats to which they are exposed were collected from the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. The city-level MRIO tables for 2012 and 2017 were derived from Carbon Emission Accounts & Datasets, which constructed input-output records with a high level of consistent sectoral economy for a complete product classification of goods and services between cities. We also analyse the driving forces of footprint variation using structural decomposition analysis (SDA). Specially, the final demand was decomposed into sector threat intensity, production structure, consumption level, and urbanized population.
We discover that the city-level biodiversity footprint in China decreased by an average of 24.35% between 2012 and 2017, with declines occurring in 266 out of the 309 cities. This striking reduction is strongly correlated with the degree of technological advancement in urban areas, which appears to have more than compensated for the negative impacts of population growth. Our results show a notable decrease in the contribution of food-related consumption to the overall biodiversity footprint, both in proportional and absolute terms. This suggests that there has been a shift in the primary drivers of biodiversity impact from traditional sectors such as agriculture to other industrial and service sectors. Additionally, we observe that the share of species threats exported to regions beyond a city's home province increased from 34.24% in 2012 to 39.40% in 2017, reflecting an increasingly teleconnected footprint within China.
This study is a systematic assessment of urban consumption-based impacts on biodiversity at the city level. Our findings indicate that sustainability strategies in China, ranging from enhanced industrial practices such as sustainable production to proactive social actions including sustainable consumption, have begun to take effect during the observed five-year period. However, our findings underscore the need for greater efforts in responsibility allocation and technological innovation. Addressing these challenges is critical for urban areas to meet increasing consumption demands while simultaneously limiting biodiversity loss within the planetâ€™s ecological boundaries. Such efforts are essential to move closer to achieving the â€˜No Net Lossâ€™ target for biodiversity conservation in China. These findings provide valuable insights into footprint reduction in Chinese cities and offer a methodological framework that can be adapted to other regions with rapid urban growth (e.g., South Africa) in the quest for sustainable development.