

Science for Environment Policy

Declining city populations could boost provision of urban ecosystem services

The decline of urban populations and abandonment of buildings and land could provide an opportunity to promote ecosystem services, a new study suggests. The researchers examined the relationships between the use of abandoned land and ecosystem services, providing insight into the pros and cons of different urban planning policies.

In Europe, 40% of all large cities — those with over 200 000 people — have declining populations. If [city](#) populations fall substantially, urban spaces may be abandoned, presenting a challenge to urban planners who must decide how best to use the vacated space. However, such a challenge could also be viewed as an opportunity to enhance the provision of urban ecosystem services, which help improve [air quality](#), mitigate climate change and protect [biodiversity](#) — these are all benefits for the shrinking population.

This study identifies links between urban shrinkage and the provision of ecosystem services. Using data from case studies of cities that have suffered urban shrinkage, particularly the German city of Leipzig that has initiated effective programmes to develop [green infrastructure](#), the researchers identified four factors that need to be considered when regenerating land. These were:

- The different ecosystem services that can be provided by land cover associated with urban shrinkage, such as bare soil or sealed land.
- The economic benefits and improvements in quality of life provided by ecosystem services.
- The positive and negative effects of land use policies and interventions.
- The trade-offs and synergies between ecosystem services, economic gains and human wellbeing for each of these policies.

These factors formed the basis of a four-step model. In the first step, the researchers identified possible ecosystem services that could be enhanced through the space made available by urban shrinkage. For example, vacant land that is sealed by asphalt or concrete provides no ecosystem services, but unsealed land with trees can help improve air quality, absorb excess rainwater, store carbon, provide shade in hot temperatures and protect biodiversity.

In the second step, they linked the ecosystem services to economic benefits and improvements to quality of life. They show, for instance, that better air quality improves health, while flood regulation improves public safety and some urban green spaces, such as allotments, can bring food production.

The third step evaluated potential planning and policy instruments that could be used in shrinking cities. These instruments were identified and assessed mainly with data from the EU project [SHRINK SMART](#)¹. This showed a large variation in the impact of instruments and that they often had both benefits and problems. For example, creating low-rise housing with plenty of space between buildings allows for green space to improve ecosystem services — but if these are individual villa-like buildings they may only be affordable to the wealthy. As such, it is important to create nearby cheaper, low-rise buildings whose inhabitants could also benefit from the improvement in the area.

In the final step, the researchers focused on these synergies and trade-offs of the various policies. Creating green spaces, such as parks, improves quality of life by improving air quality, carbon storage and cooling, for example, but provides little in terms of direct economic benefit from food production or commercial recreation. However, it may provide more indirect economic benefits from the reduced pressure on local health services, the creation of jobs to maintain green infrastructure and gains in house prices.

This approach provides an understanding of relationships between land use and ecosystem services and insight into the pros and cons of different policies. The four steps can help decision makers assess the possibility of turning urban shrinkage into a positive provision of ecosystems through green infrastructure, the researchers say.

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