
Systematic Mapping of Biodiversity and Ecosystem Services Scenarios Research Applied to Landscape Restoration.

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Abstract

The conversion of natural habitats into agricultural systems, together with habitat fragmentation, biological invasions and global climate change are threatening biodiversity and our own well-being. Restoration of natural habitats is a strategy to reverse or, at least, decelerate the trend of species loss and ecosystem services decline. Indeed, many countries are committed to restore large amounts of natural land cover (e.g. COP21). However, effective restoration policies should take into account multiple factors and scenarios, related with land use expansion, climate change, landscape conditions, socio-economical factors, among others. Consequently, the use of scenarios could be a powerful tool to increase chances of restoration success and citizen engagement. We performed an extensive literature survey using ISI Web of Science and Scopus databases searching for studies that used scenarios approaches for biodiversity and ecosystems services with restoration purposes (hereafter "*restoration scenarios*"). We used the search keywords combination [(restor* OR revege* OR reforest* OR rehabilit* OR remediat*) AND (ecosystem* OR land* OR habitat OR site OR regional OR global) AND (biodiversity OR "Ecosystem servic*" OR *populat* OR species) AND scenario*]. As a result we obtained a total of 1298 publications. Based on their abstract content we filtered the publications, leading to select 444 works strictly related to restoration scenarios. We categorized publications according to the scenario typology proposed by IPBES assessment, type of environment, scale, organization level, climate zone of study site and actors involved. We found a predominance of articles using exploratory scenario approaches (71%) dealing mainly with habitat (55%) and plants (36.8%) at broad scale (> 100 ha; 65%), on forests (47%) and in temperate environments (78%). In addition, the main actors were researchers (65%), doing non-participatory research (top-down; 76%) at the landscape organization level (49%). There was a small number of participatory research (bottom-up; 18%) and none with non-governmental actors. We identified a lack in species-level research (< 2%) and studies at global and regional scale (both < 2%). We did not find publications related to invertebrates or about marine environments. There was an extremely low representation of publications developed for polar or boreal climatic zones (~4%), urban environments (~1%) and applying ex-post assessment scenarios (~3%). Our results pointed out important research gaps in the application of scenarios for restoration purposes and also detected a demand for governmental participation on restoration initiatives as an active actor, beyond providing financial support for researches.

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