

Abstract

The main aim of this thesis is to analyse the impact of land use and land use changes on the provision of ecosystem services in Czechia. While land use analysis is well known approach already, the concept of ecosystem services has gained intensive scientific attention relatively recently. Consistently with the research field of geography, the concept of ecosystem services enables analysis of interactions between environment and human society from the anthropocentric point of view. The ecosystem services are in short the benefits which people obtain from natural environment and which directly or indirectly influence human well-being. Their provision is influenced by several factors, but this thesis specifically focuses on the impacts of land use change.

The thesis is delineated by six research questions, which divided its content into Theoretical Part and Analytical Part. The Theoretical Part provides background information regarding applied concepts. Except that, one chapter is dedicated to an explanation how to combine land use and ecosystem services analysis into one methodological framework. The Analytical Part of the thesis contains three case studies. All of them are situated in Czechia, however spatial scale and time scale were altered.

The first case study performs integrated assessment of ecosystem services in Czechia at national level. To estimate the total value of Czech ecosystems geographically-specific database of ecosystem service values (EKOSERV) was developed. The structure of the assessment is given by six ecosystem types and 17 ecosystem services delivered from these ecosystems. Specific literature review strategy was conducted to fill the database with biophysical and economic values of ecosystem services. Developed database consists of more than 190 values of ecosystem services, approximately half of them has been used for a benefit transfer to calculate total ecosystem values. The resulting average value of ecosystem services in Czechia represents approximately 1.5 the current national GDP (gross domestic product).

The aim of the second study was to provide spatially explicit information at a national level on land use change impacts in order to assess changes in the provision of selected ecosystem services (carbon sequestration, food production and soil erosion) in the agricultural sector of Czechia. This assessment shows that, historical land use trends (since 1948) lead to a significant decrease of arable land in the border fringes of Czechia, which is to some extent replaced by grasslands, in turn affecting the provision of ecosystem services.

The third case study studied availability of ecosystem services in the region of Cezava, Czechia since 1845 to 2000. The methodology again combines the ecosystem services analysis with an analysis of long-term land use changes. A comparison of service-provision over the centuries reveals that regulation and cultural services were significantly reduced, while provisioning services increased, due to the proliferation of arable land, land consolidation and agricultural intensification.

Despite that several uncertainties have been acknowledged during the research, the assessments provided innovative insights into the impact of long-term land use on ecosystem services in Czechia. The methodology may be used as a guideline for a long-term assessment of delivery of ecosystem services when the data for this kind of analysis are limited. As it has been shown, such an assessment clarifies the effects of land use on the environment, identifies the significance of particular services, indicates their importance for natural processes, and can potentially help in the assessments of the costs related to the loss of such services. This research also demonstrates that it is possible to analyse long-term land use trends to generate more meaningful, spatially explicit information. The LUCC Czechia UK Prague database has been a valuable resource for this analysis. Results of the spatial (and temporal) analysis of the changes can be used as a support tool for local land use management, or considered on the national scale for informing evidence-led policy decisions.

Key words: landscape, ecosystems, land use changes, ecosystem services, Cezava, Czechia