Synthesis of studies on institutional change and LCLUC effects on carbon, biodiversity, and agriculture after the collapse of the Soviet Union

Abstract

Major institutional changes occurred throughout Eastern Europe and European Russia after the collapse of the Soviet Union in 1991, and the expansion of the EU in 2004 and '07, resulting resulted in substantial land cover and land use change. NASA-funded case studies led by members of our proposal team have highlighted the magnitude of these land changes. However, these case studies have not been synthesized, and we lack comprehensive datasets of land change, analysis of its economic and institutional drivers, and assessments of its environmental effects. Our first goal is to utilize recent advances in remote sensing science to a) map wall-to-wall decadal land change from Landsat data across Eastern Europe and European Russia, and b) conduct in-depth analyses of higher temporal resolution land change for dense time stacks of selected footprints.

Our prior case studies highlighted that land changes were highly heterogeneous in space suggesting that economies and institutions were important drivers of land change. However, how economic, policy, and institutional changes - and their legacies - affected land change is not clear. Our second goal is to understand the economic, policy and institutional drivers of land change across Eastern Europe and European Russia.

Similarly, case studies by our team and others provide strong evidence for substantial effects of land change on agriculture, forestry, carbon pools and fluxes, and biodiversity. The additional remote sensing analyses outlined above would allow us to take the research on these effects to a new level, and make comprehensive assessments across Eastern Europe. Our third goal is to assess the effects of land change on agriculture, forestry, carbon, and biodiversity across Eastern Europe and European Russia.

The main outcome will be a synthesis of prior research on land change in Eastern Europe. Our prior research puts us in a unique position to provide three important outcomes: a) consistent maps of land change across Eastern Europe; b) analyses of the policy, economic and institutional drivers of the land changes that occurred; and c) assessments of land change effects on agriculture, forestry, carbon, and biodiversity.

Land use is the principal driver of global environmental change. Twenty years after the Soviet Union, and ten years after the start of NEESPI and of numerous research projects in the region, we now have a unique opportunity to synthesize findings and extract more general patterns. We propose to conduct such a synthesis and make a major contribution to our understanding of human-natural systems, and land use science.