

Post-WWII landscape dynamics resulting from forced displacements: a GIS-supported study from the Polish Carpathians

ANDRZEJ N. AFFEK^{1,2}, JACEK WOLSKI¹, MARIA ZACHWATOWICZ³, KRZYSZTOF OSTAFIN⁴, VOLKER C. RADELOFF²

¹ Polish Academy of Sciences, Institute of Geography and Spatial Organization, Twarda 51/55, 00-818 Warsaw, Poland (a.affek@twarda.pan.pl)

² SILVIS Lab, Department of Forest and Wildlife Ecology, University of Wisconsin-Madison, 1630 Linden Drive, Madison WI 53706, USA

³ University of Warsaw, Faculty of Geography and Regional Studies, Krakowskie Przedmieście 30, 00-927 Warsaw, Poland

⁴ Jagiellonian University, Institute of Geography and Spatial Management, Gronostajowa 7, 30-387 Cracow, Poland

Introduction and Aims

Little is known about environmental effects of forced displacement, given how common worldwide forced displacements are. Our goal was to determine the long-term landscape effects of post-WWII forced displacements of Ukrainians (Carpatho-Ruthenian communities) from the Polish Carpathians.

Study area and Methods

We focused on the SE part of Polish Carpathians which before WWII constituted a multi-cultural borderland (Fig. 1A), and after war experienced one of the largest planned displacement actions in the modern history of Europe.

We conducted a regional-level analysis (1865 villages) of overall forest cover change across the Polish Carpathians, as well as a local-level analysis of landscape diversity and land-cover patterns in two highly depopulated test sites. We made use of demographic census, and combined it with GIS-based long-term spatial-temporal land cover data derived from historical and contemporary maps (pre-war: 1850s-1860s and 1930s, and post-war: 1970s and 2010s).

Results

We found a massive forest-cover increase (Fig. 1BC). We showed that over 60% of post-war forest cover increase in the Polish Carpathians was a result of displacement action (Fig. 2), and far exceeds the widely reported forest cover increase due to the collapse of socialism in early 1990s. We noted a substantial decrease in landscape diversity (Fig. 3). A densely populated rural region turned to a ‘wilderness’ area, one of the largest in Central Europe.

Conclusions

A permanent and widespread land cover changes that took place over 30 and 70 years after forced displacement following WWII continue to cause substantial declines in landscape diversity. Looking at past examples may help understand what is likely to happen in consequence of warfare or ethnic conflicts. This sheds new light on the possible land use effects of today’s involuntary migrations worldwide.

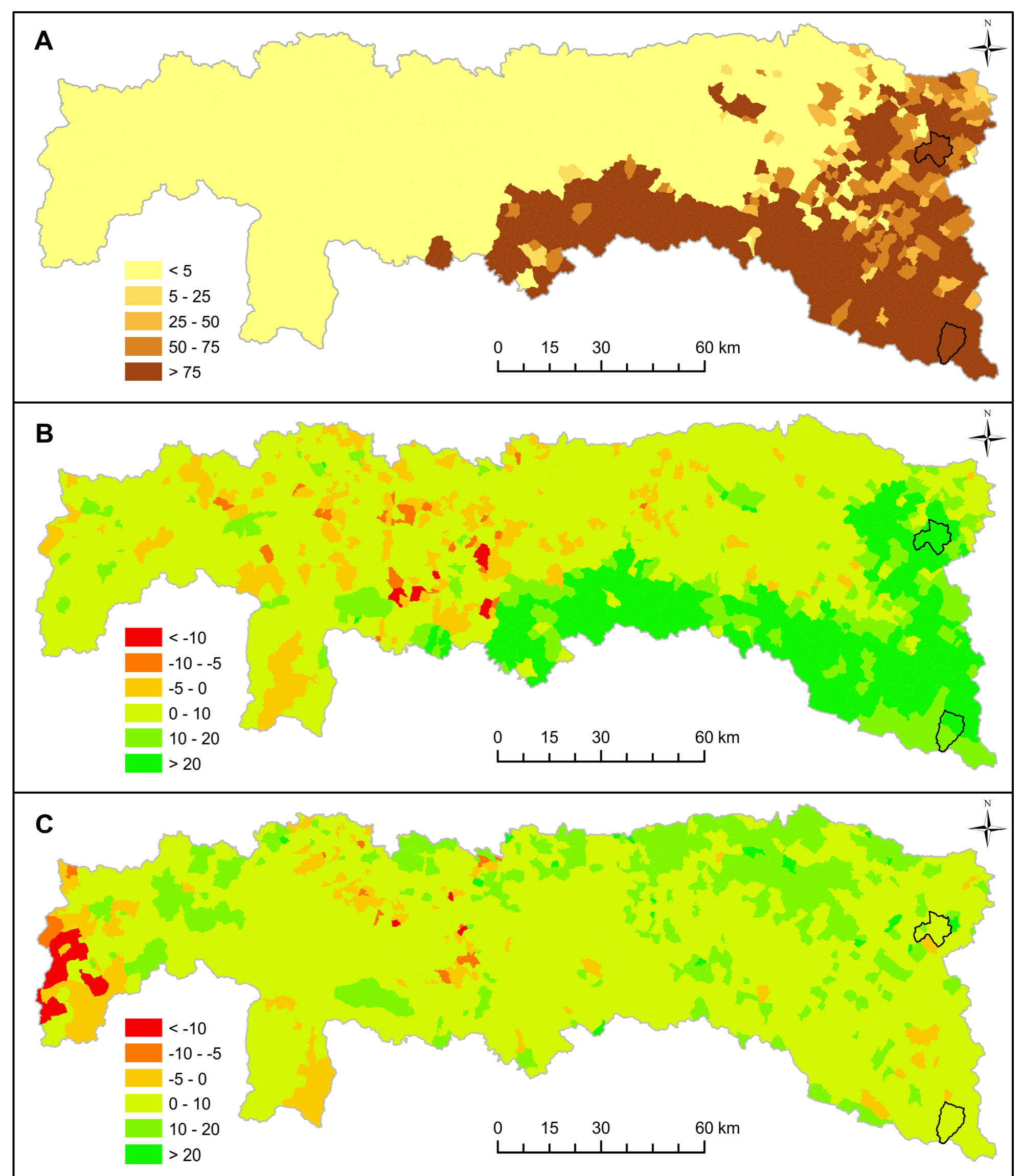


Figure 1. A – Village-level percentage of Ukrainian population in 1939, B – Village-level forest cover change (in percentage points) between the 1930s and 1970s, C – Village-level forest cover change (in percentage points) between the 1970s and 2010s

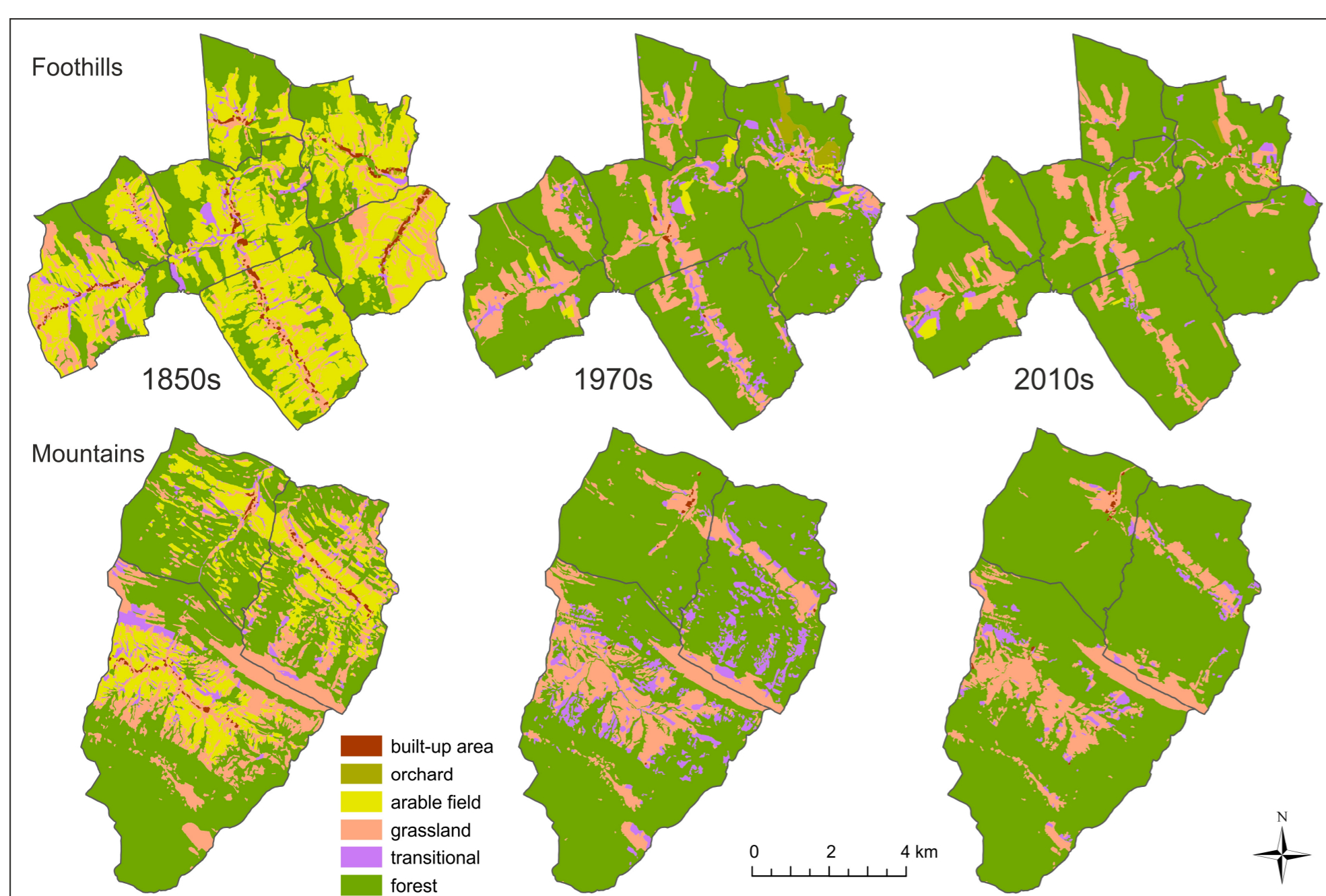


Figure 3. Landscape change in two test sites representing Carpathian foothills and middle mountains after the forced displacements of the 1940s

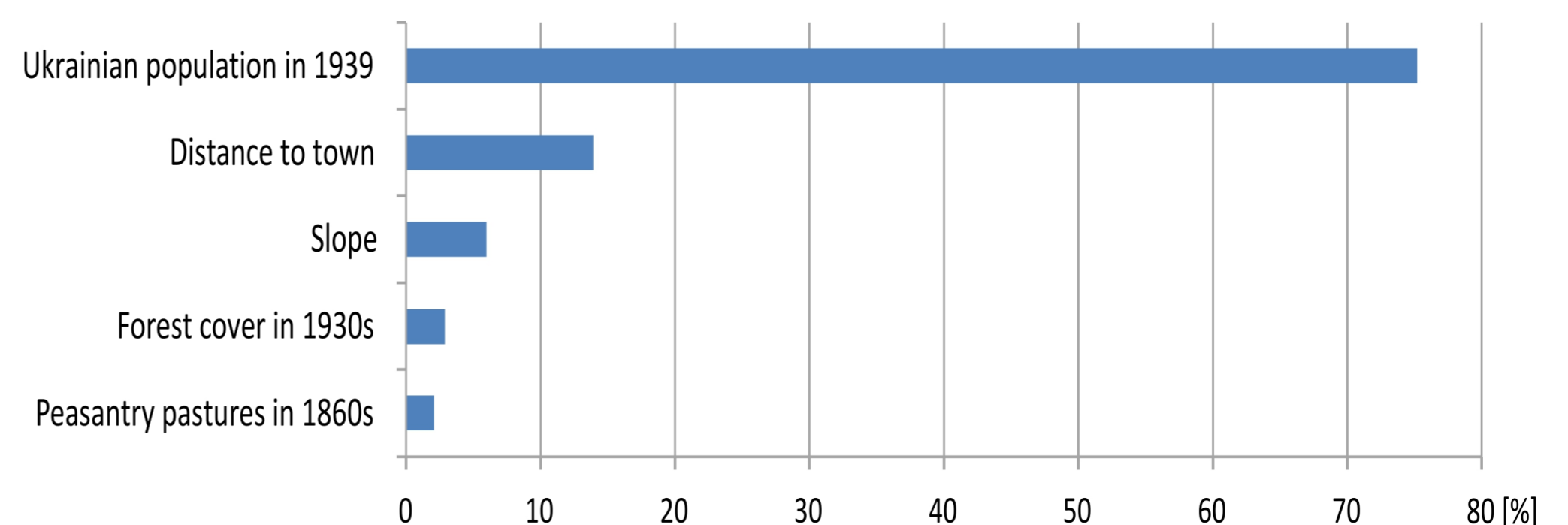


Figure 2. Independent effects of the strongest determinants on forest-cover change 1930s-1970s

This research was supported by the Polish National Agency for Academic Exchange (Grant No. PPN/BEK/2018/1/00501) and NASA’s Land Cover and Land Use Change Program.

This study is a part of research presented in a scientific paper: Affek A.N., Wolski J., Zachwatowicz M., Ostafin K., Radeloff V.C. (submitted), *Effects of post-WWII forced displacements on long-term landscape dynamics in the Polish Carpathians*. Landscape and Urban Planning