Socio-economic transformations and land use change
Patterns and processes of land use change in Central and Eastern Europe

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Photo: A. Prishchepov
Land use transitions

Foley et al. 2005, *Science*
New paradigms for land use change

- Change is not always gradual
  - non-linearity
  - periods of stability & catastrophic shifts

Mather 1992, *Area*
Collapse of socialism

- Rapid and drastic changes in Eastern Europe’s institutional, societal, and economic conditions after 1989
Restructuring of agricultural sectors

- Disappearance of former markets
- Price liberalization (of inputs and outputs)
Population changes and migration

Rural population (1,000)
- change between 1992/1994 and 2004/2006 -

Source: World Development Indicators 2008
Change in Nighttime Lights 1992 to 2000

High
Low

Russia: GDP

www.ngdc.noaa.gov/dmsp/
Privatization of land - different land reform strategies

- Restitution (e.g., Baltic States, Slovakia)
- Distribution (e.g., Russia, Ukraine)
- Auctioning (e.g., Poland)
Individualization of land use

Share of agricultural land in individual use, 2000

Source: Rozelle & Swinnen 2004
How has all of that affected land use/cover patterns in Central and Eastern Europe?

1. Farmland abandonment
2. Logging
- Peterson & Aunap 1998
- Nikodemus 2005
- Prishchepov et al, in prep.
- Hostert et al. 2010, sub.
- Vaclavik & Rogan 2009
- Baumann et al. 2010, sub.
- Kuemmerle et al. 2008
- Kuemmerle et al. 2009
- Müller & Munroe 2008

= 50% abandonment

Farmland abandonment rates from RS mapping

Moscow
Southern Romania: Most abandonment during the early transition years

Modeling spatial determinants of LUCC suggests more abandonment on
  - steep and high terrain
  - isolated fields

Population variables not important...

Kuemmerle et al., 2009a, Reg. Env. Change
Mueller et al., 2009, J. Land Use Science
Importance of accessibility & remoteness

Fine scale patterns
(here: Eastern Carpathians)

Broad-scale patterns
(here: European Russia)

Kuemmerle et al. 2008, Ecosystems

Ioffe et al. 2004, Annals of the AAG
Multi-scale econometric modeling showed:

- More abandonment in less productive regions
- Population decline important
- But spatial determinants of abandonment differ regionally (e.g., socio-economic factors sometimes outweigh environmental factors)
But: strong differences among countries in border regions
Ownership and land reforms

- Differences among tenure regimes
- More abandonment where farmland was restituted

Kuemmerle et al. 2008, *Ecosystems*
Western Ukraine

Baumann et al. 2010, submitted – and see poster!
Explanatory models of abandonment patterns:

- Soil quality, topography, market access, and migration important

- But: direction often opposite to expectations

Baumann et al. 2010, submitted – and see poster!
Summary - abandonment

- Marginality of farming very important
- Yet, large variability in farmland abandonment patterns - within and among countries & among spatial scales
- Marginality factors are often mediated by institutional factors (subsidies, land reforms)
How has the post-socialist transition affected land use patterns in Central and Eastern Europe?

1. Farmland abandonment
2. Logging
... and forest regeneration
In other regions increase in logging in the 1990s (here: Eastern Carpathians)

Similar overall pattern, yet marked differences among countries

Kuemmerle et al. 2007, Ecological Applications
Illegal logging and institutional strength (here: Western Ukraine)

Kuemmerle et al. 2009b, Remote Sensing of Environment
Different logging rates in different ownership regimes (here: Eastern Carpathians)
Pollution legacies
(here: Polish Carpathians)

Large variability in logging trends among countries and regions

Strength of institutions and ownership changes emerge as important factors
Conclusions

- Eastern Europe provides unique opportunities for studying the effect of ‘socio-economic’ disturbances on land use change.
- Such disturbances may be frequent at a global scale (e.g., wars, revolutions, economic shocks).
- In Eastern Europe, institutional factors, especially at the national scale, were important in mediating socio-economic disturbances.
Post-socialist LUCC one of the most dramatic land change episodes in the 20th century

Yet, much remains to be learned about the patterns and drivers of land change in Eastern Europe

ISI-referenced papers on land use/cover change in Amazonia and CEEC
Thank you for listening!

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