**Can land intensification and abandonment in Latvia be linked to key socio-political events?**

Land-use change is a global concern, with changes having vital consequences through changing climate conditions through temperature change and through the release of carbon dioxide (Ramankutty and Foley, 1999). Such conversion has primarily occurred through changes in agricultural practices (ibid). However, the extent to which policy and socio-political events influence trends in land-use change has seldom been quantified.

Due to Latvia’s quick-changing political status, it proves as an appropriate study site to examine if such land-use change can be linked to key socio-political events. The two events I will be examining are (1) the Soviet Union collapse in 1991 and (2) the addition of Latvia to the EU in 2004 (vote in 2003). After the Soviet Union, there was an increase in abandoned land, tree cutting and percent coverage of protected areas. After joining the EU, the share of large farms (intensive) increased, while the share in small farms (extensive) decreased (Csaki and Jambor, 2009). Agricultural abandonment has the potential to cause biodiversity loss, a global driver of climate change (MacDonald *et al.*, 2000).

Analysing if socio-political shifts can be detected through land-use change would shed light into if and how long political influence has an effect on land-use at community level. Ultimately, this type of analysis could be replicated for other countries to outline the impacts of shifting political power on land cover and thus, have implications for wider aspects such as ecosystem services, the economy and human movement/urbanization across Europe and other regions around the world.

**Research questions**

1. Are key socio-political events in Latvia visible through land-use change detected using satellite imagery?
2. Is the strength and direction of land-use change different with differing land management?
3. Is there a time lag between socio-political events and when the land-use effects are observed? Does this differ between land-use type?

**Methods**

To examine the effects of the two aforementioned events, I will be using Google Earth Engine, which is an online global spatial analysis platform. Specifically, I will be creating a classification of land use types in Latvia over time to test whether key socio-political events can be detected. Using satellite data, I will first define land-use types into several categories: extensive, intensive and abandoned land. I will then create a classification for each year, allowing me to plot the overall trend in land use change. The timeframe studied will be determined after researching which satellite data would be most beneficial to the study. Having a yearly time-step classification will allow me to test time lags and differences between the two key socio-political events in 1991 and 2004. I will test and train the classification with training datasets and assess the accuracy through estimating error with validation data. To detect and assess change, I will overlay each year and compute gain, loss and change on a pixel scale. Statistical analyses including mixed-effects models will be conducted in the programing language R.

**References**

Csaki C, Jambor A (2009) The Diversity of Effects of EU Membership on Agriculture in New Member States 48.

MacDonald, D., Crabtree, J., Wiesinger, G., Dax, T., Stamou, N., Fleury, P., Gutierrez Lazpita, J. and Gibon, A. (2000). Agricultural abandonment in mountain areas of Europe: Environmental consequences and policy response. *Journal of Environmental Management*, 59(1), pp.47-69.

Ramankutty, N. and Foley, J. (1999). Estimating historical changes in global land cover: Croplands from 1700 to 1992. *Global Biogeochemical Cycles*, 13(4), pp.997-1027.