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

(Need to add background on land-use change in general and explain the knowledge gap and why it is particularly useful to look at Latvia)

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 (Mander and Kuuba, n.d.). After joining the EU, the share of large farms in land use increased while the share in small farms decreased (FAO, 2009). Utilized agricultural area increased by 116% between 2003 and 2007. With the joining of the EU comes the adoption of EU’s agricultural and land use policies.

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 ground 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/urbanisation. Results can also be used potentially to project into future land coverage.

**Research questions**

**Three sub-questions:**

How successful is this model at classifying specific land-use types in Latvia?

- address this but not a specific question – more in the accuracy of the methods

1. Can key socio-political events in Latvia be detected through land-use change?
2. Specific predictions about where the signal will be the strongest – is there a signal with different land uses
   1. link to agriculture – should be visible here
3. Is there a time lag between the socio-political event and when the land-use effects are observed?
   1. Does this differ between land use type?
   2. Break it down by land use type
   3. Explore in categories that have a signal

To do:

* Draw out figures
* Write out predictions
* All Earth Engine basic tutorials – especially classification (do Random Forest, could try SVM, Max ent) one – December
* Need to not spend too long doing classifications – can always be made better but go back to this after you go through whole workflow
* Dissertation is ~6,000 words!

Google Earth Engine tutorials in December

JavaScript tutorials;

Set up GitHub repo for dissertation

**Predictions – need to add these in**

**Methods**

**Pre-classification**

* Decide different land use types in Latvia – extensive, intensive and abandoned
  + E.g. Water, Wetland, Forest, Agricultural, Bare field, Urban/suburban (Fonji and Taff, 2014)
* Pick which land-use datasets i.e. **Landsat or MODIS** (there’s a MODIS one that already has the classifications – MODIS Land Cover dataset – Gergana has code about this) or GlobCover or mixture – need to check how long these are available for (some start at 1992 – there is data before this but may be of lower quality – should be able to start in early 1980s)

**Classification**

* Create a classification i.e. per-pixel supervised classifications (group satellite image pixels with same or similar features into same categories) (Fonji and Taff, 2014) and time series analysis (Sidhu *et al.*, 2018)
  + classifications for each year, then you plot the overall trend in land use, see if something happens after 1991 and after 2003
  + consider time lags
  + consider differences between the two events
* Test and train classifier with training datasets
* Assess the accuracy of the classifier through estimating a classification error with validation data
* Tutorial: <https://geohackweek.github.io/GoogleEarthEngine/05-classify-imagery/>
* <https://developers.google.com/earth-engine/classification>

**Detecting and assessing change**

* Overlay years and go through each pixel to see which pixels remained unchanged through a study period and compute gain, loss and change (Zewdie and Csaplovics, 2016)
* Image overlay, change vector analysis and image rationing (Pimple *et al.*, 2018)
  + Can indicate the nature and magnitude of LULC changes that have taken place over time

**Deadlines and plan**

December/ early January:

* Set up repository
* Write 1 page outline
* Google Earth Engine
* Pre-register

Preregister topic and write one-page outline. This should give a clear plan of what needs to be accomplished write dissertation plan

**17 January**: One-page outline, project safety form and dissertation safety declaration due

**31 January**: Dissertation plan due

**24 April**: Final dissertation due

**9 May**: Dissertation conference