**Discussion**

Outline

Importance of understanding relationships between economics, socioeconomics, and forests at different scales. Important for developing sustainable forestry policies and for predicting forest loss to target interventions. Importance of using the most appropriate method for the question you are asking. We have revealed some important relationships between the expansion of ELCs and macroeconomics. We have also revealed some interesting relationships between forest cover and human predictors. We have also revealed issues with these kinds of data and the challenges of scale

Lack of effects seen for macroeconomics and forest loss. Why do we think this is? Wrong variables? Is Cambodia different to other countries due to recent history and very rapid development? We didn’t include government policies as variables – perhaps this was the issue (Culas 2007).

Macroeconomics and ELCs. Impact of ELCs across the country. These effects reveal some of the broader relationships and potential drivers. New ELCs not such an issue anymore but these are important lessons for other countries and for the future. Paper linking rubber market prices to defor and ELCs – Grogan et al 2015

Socioeconomics. Discuss the few effects that I did find at commune level and province level. Huge differences in socioeconomics across the country – different stages of development. Challenging to identify national-level effects.

Methodological issues. Social-ecological systems are infinitely complex and operate at different scales. When looking at an entire country, it is difficult to identify relationships at a fine scale – there is too much noise/variation. Our commune-level models perform badly and are not good enough to be able to make meaningful predictions across the country. This should serve as a warning for other researchers. If you are looking at the broad scale you are likely missing a lot of variation and nuance, but if you look at too fine a scale you may be swamped by variation and lose the signal. The province-level models are better, but don’t reveal any strong relationships between forest cover and socioeconomics.

Alternative approaches to this kind of analysis. Non-hypothesis testing – cellular automata, neural networks.

Cluster analysis. When the models above performed badly, we decided to try different approach. Specifically removing hypothesis testing – describe the data rather than trying to explain it. Not enough to just keep looking at increasingly complex data - simulations and machine learning can isolate our thinking and help to increase understanding. Talk about cluster results. What can be said about the country? How do the results relate to the modelling results? What are the similarities, what are the differences? Do we learn anything new?

Conclusions. What forest transition pathway is Cambodia on (lambin & Meyfroidt papers)? Linking forest cover and forest loss to economic and social factors is challenging. This is particularly true of a country like Cambodia which has changed and developed extremely rapidly over the last 30 years – does not conform to development trends of the region. The governance of the country also means that natural resource exploitation is difficult to pin down through official metrics – opaque legal mechanisms and processes (e.g. ELC allocation). Nevertheless, there are analytical tools to use. Which ones you choose will depend on the data you have and the questions you are trying to ask. Final point of optimism - something about the Environmental Kuznet curve and hoping that Cambodia can reduce forest loss before its too late.