

Socioeconomic drivers of agricultural land change and associated fire risk in Greece

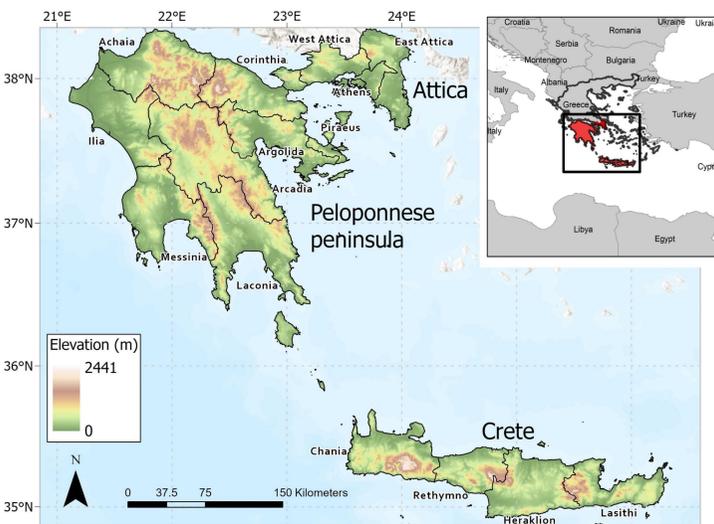
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Research Motivation

- Background:**
- Greece is a fire-prone, heterogenous landscape, with agriculture and settlements interspersed within shrubland and forest
 - Many agriculture policy reforms and socioeconomic turbulence events (e.g., 2008 economic crisis) have occurred in last 50 years
 - Resulting ag. land change extent and drivers largely unknown
- Importance:**
- Understanding drivers of ag. land change and how change affects fire risk can inform policy and land management
 - Knowing preferences and values of landowners and residents can inform what policies are publicly acceptable and likely to succeed

Study Area, Objectives & Mapping



- Objectives**
1. Map agricultural land change from 1986-2020
 2. Quantify changes in fire risk as a function of agricultural land change
 3. Identify drivers of agricultural land change using socioeconomic, sociocultural, and geophysical input variables
 4. Identify policies and incentives most likely to encourage land management practices that reduce fire risk

- Mapping Approach**
- LUCAS ground data and Landsat spectral-temporal metrics were used to train a Random Forests classifier
 - Arable (cereals, legumes, hay) and permanent agriculture (olive & fruit orchards, vineyards) classified at annual timesteps
 - Hidden Markov Model used to reduce spurious landcover transitions in the time series
 - Validation used a stratified random sampling approach and was used to evaluate map accuracies and derive a sample-based area estimation

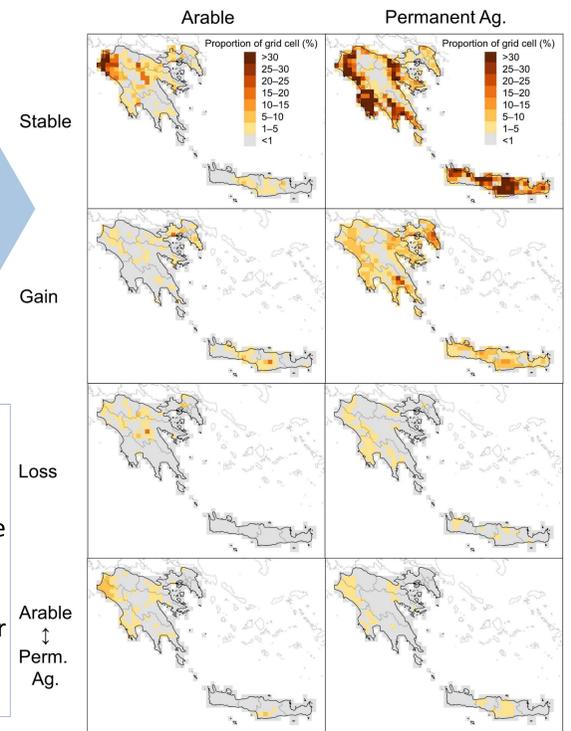
Over the last 3 decades,
agricultural land expansion
 was **~8x greater than loss**
 in Southern Greece.
 ...what does this mean for
Fire Risk?

Find out more about mapping in this paper:
 Sparks, A.M., et al. 2022. Mapping Arable Land and Permanent Agriculture Extent and Change in Southern Greece Using the European Union LUCAS Survey and a 35-Year Landsat Time Series Analysis. *Remote Sensing*, 14(14), p.3369.

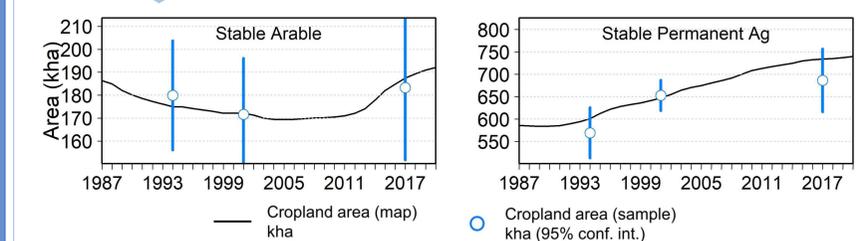


Results

Right: Differing spatial trends in arable land and permanent agriculture extent from 1986-2020.



Below: Differing temporal trends in arable land and permanent agriculture extent from 1986-2020. Years on x-axis represent the last year in each bi-annual period.



What's next?

1. Identification of socioeconomic drivers and fire risk solutions using interview and discrete choice survey data



Left: Interview with olive producer in Agios Vasileios, Crete.
Right: Informational meeting with community members in Melampes, Crete.

2. Modeling changes in fire risk using field-collected fuels data



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