Using remote-sensing data: pixels or objects?

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Dataset
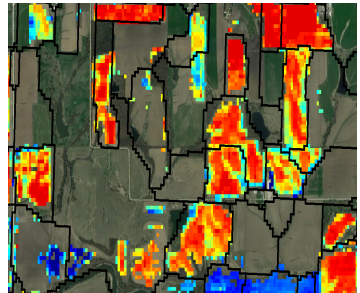
Dataset:

- Crop data layer (CDL), USDA. 30m Landsat: pixels
- Corn and soybeans yields, US Midwest: pixels
- Field bondaries: vector

(a) CDL

(b) Corn yields

Research questions

Main paper:

1. (How) do yields respond to prices? $\implies$ debate on increasing supply through crop intensification or land expansion.

Second paper:

1. Are "lower-yields zones" in a field also most environmentally fragile? $\implies$ debate on soil conservation policies.

Question for today

Should I use pixels "as-is", or group them into fields?

Scope of study 1: I assume farmer takes decision at field-level (face 1 single price)

Computational issues: ~2.6 mio fields versus ~800 mio pixels

Statistical issues:

- pixels within a field highly correlated
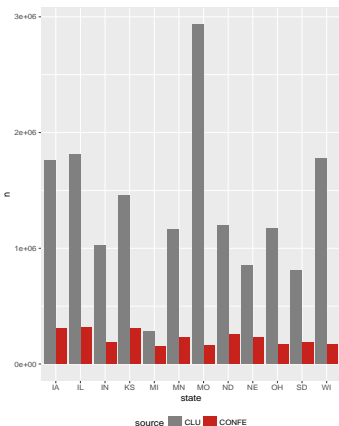- measurement error: can detect it looking at fields?

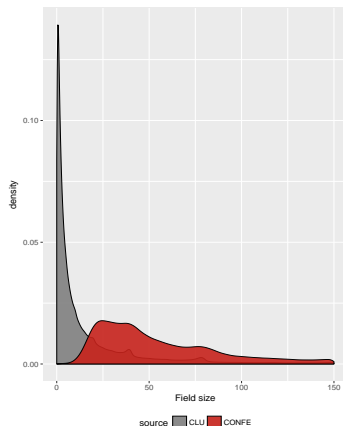# Field boundaries data

Two sources:

- Common Land Unit (CLU): manually digitized, whole US, 2007
- Yan, Roy (2016): fields from Landsat 30m data using object-segmentation algorithms, 2010

Comparison
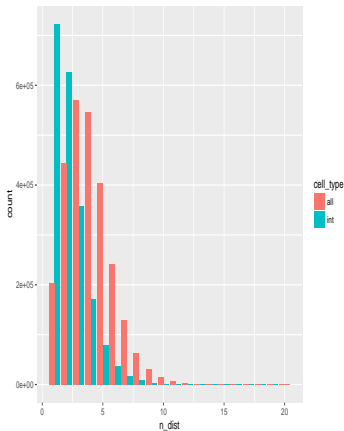

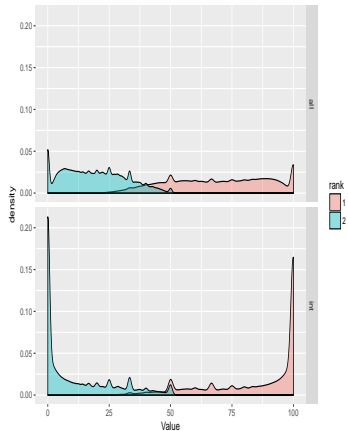(c) Number of fields per state

(d) Field area

Validity of crop classification?

(e) Number of distinct crops per field

(f) Distribution of the first mode

Conclusion

- Object-oriented analysis informative about bias
- A chicken and egg problem: is bad measurement about field boundaries, or classification?