Farmland Values: Where Do We Go From Here?
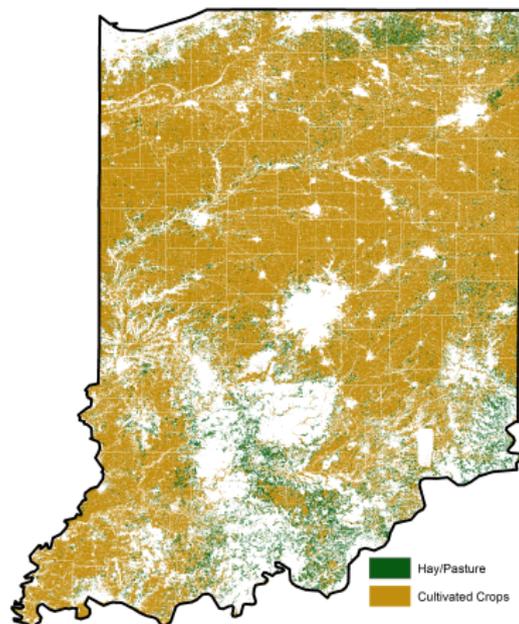
Todd H. Kuethe
Schrader Chair in Farmland Economics
Department of Agricultural Economics

Purdue Top Farmer Conference
January 10, 2020

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Farmland in Indiana

Source: Indiana MAP (2011 Land Cover)

- 56,649 farms
- 14,969,996 acres
- $1.7 million land and buildings per farm
- $11.1 billion of agricultural products sold

Source: 2017 Census of Agriculture

Indiana farm balance sheet ($ billions)

	2005	2010	2015	2016	2017
Farm Assets	**35.8**	**59.9**	**69.6**	**68.7**	**75.3**
Real estate	26.9	43.6	54.7	53.1	59.1
Non real estate	8.9	16.3	14.9	15.6	16.2
Farm Debt	**4.3**	**6.5**	**9.1**	**8.9**	**10.2**
Real estate	2.3	3.8	4.7	5.0	5.5
Non real estate	2.0	2.7	4.3	4.0	4.7
Equity	**31.5**	**53.4**	**60.5**	**59.8**	**65.1**
Select measures					
Debt/Equity	13.7	12.1	15.0	15.0	15.7
Debt/Asset	12.0	10.8	13.0	13.0	13.6
Real estate/Assets	75.2	72.8	78.6	77.2	78.4
Real estate debt/Total debt	52.9	58.9	52.2	55.8	53.8

Source: USDA Economic Research Service

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Source: USDA Economic Research Service

Long-run Indiana farmland prices
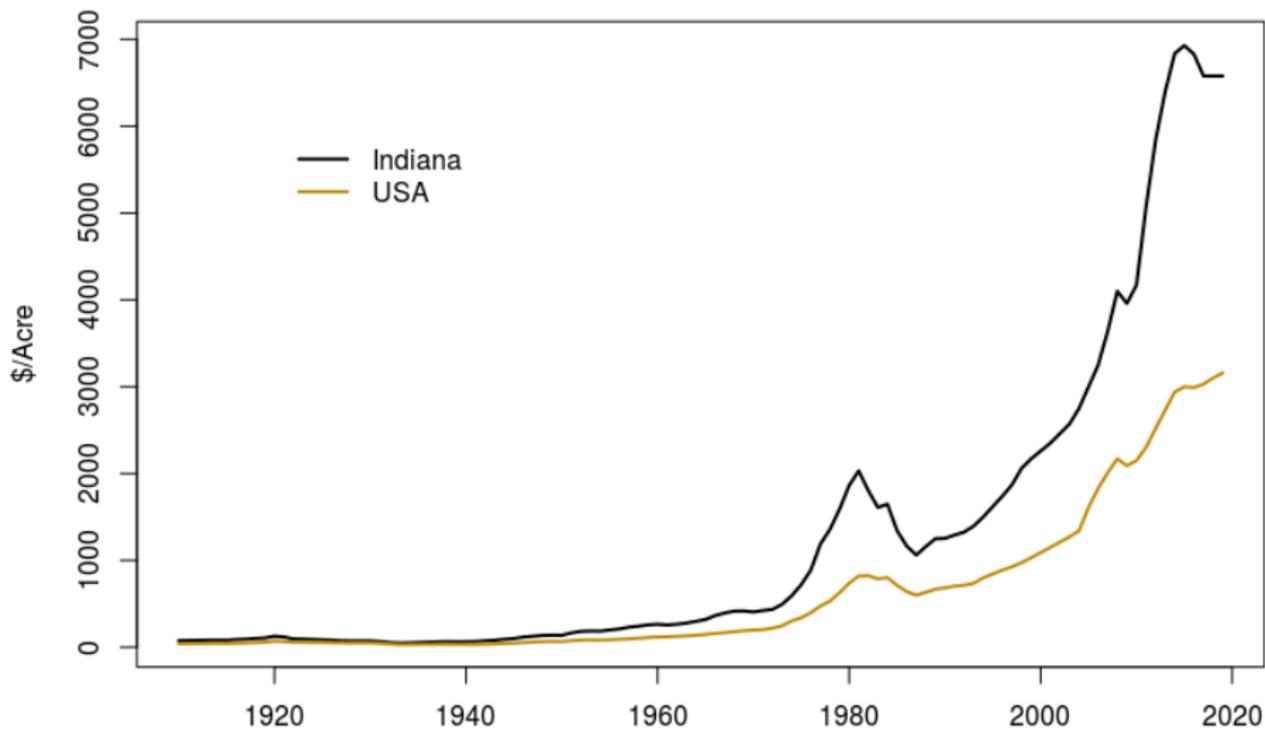
Source: USDA National Agricultural Statistics Service

Farmland prices across the Corn Belt

Purdue Farmland Values and Cash Rent Survey
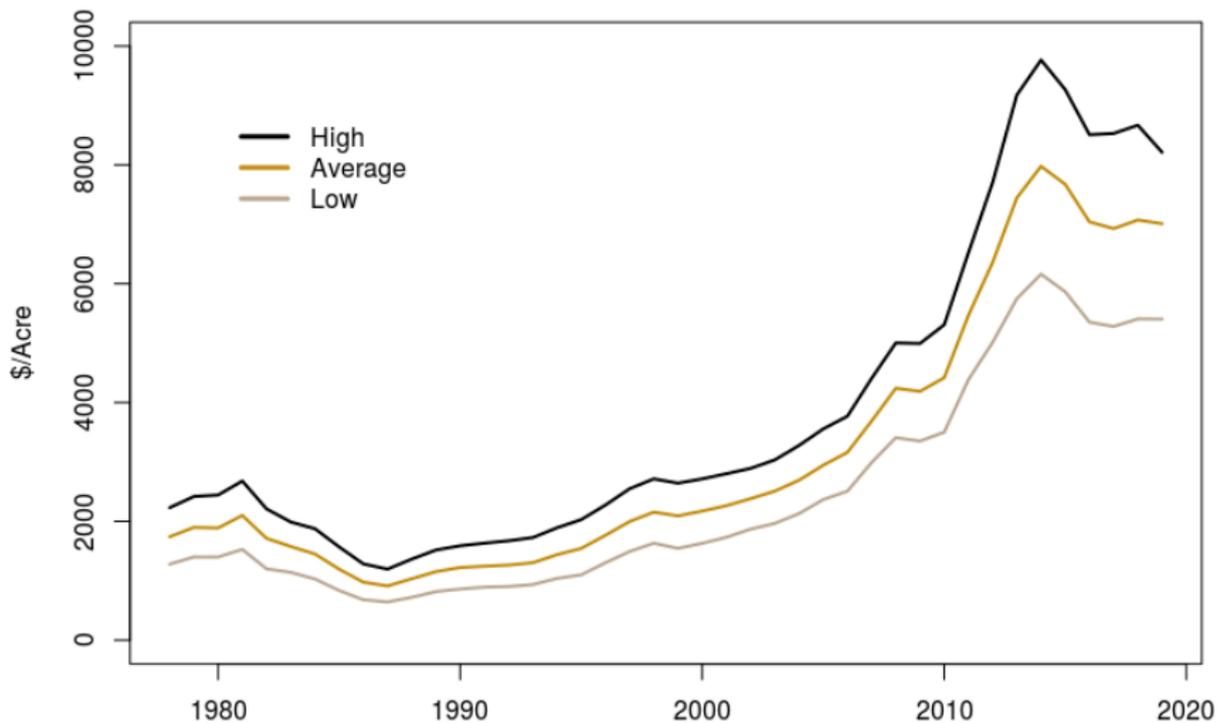
Source: Purdue Center for Commercial Agriculture

Purdue Farmland Values and Cash Rent Survey
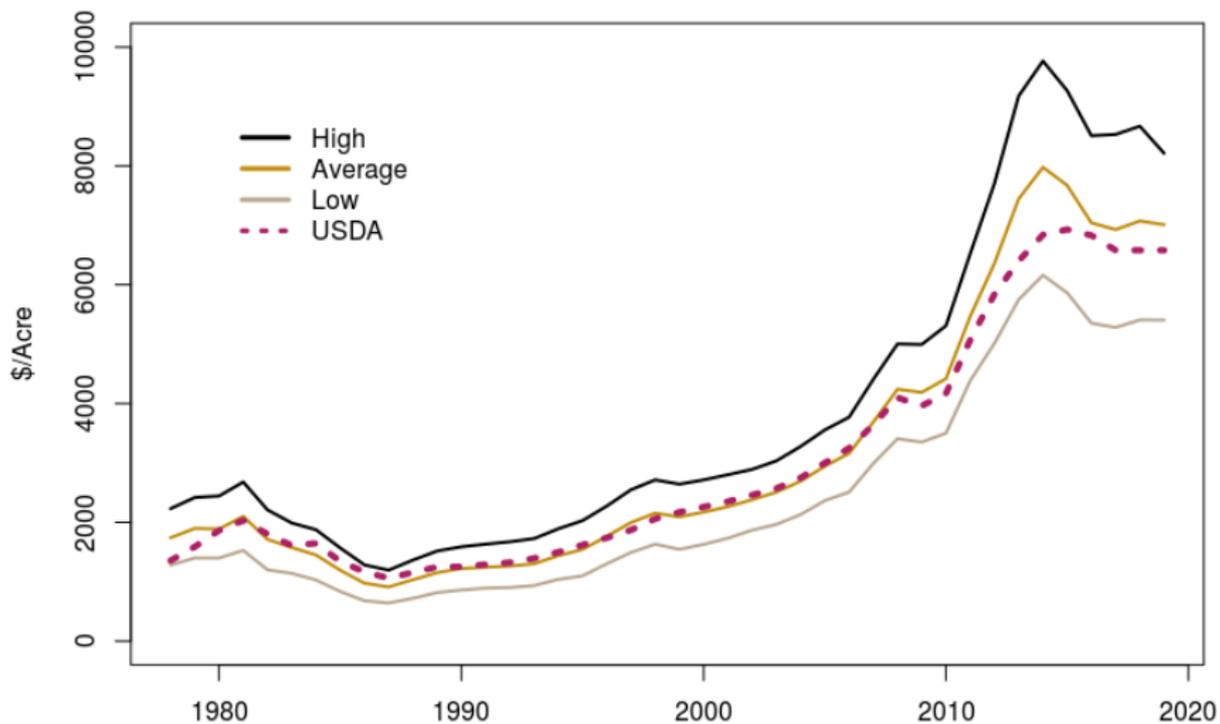
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How are farmland prices determined?

The value of an asset is determined by the *discounted* stream of returns obtained through ownership

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A simple model of farmland prices

$$P = \frac{\mathsf{E}(R)}{(i - g)}$$

Present value formula:

- P: price of farmland
- $\mathsf{E}(R)$: expected returns
- i: cost of capital
- g: growth rate for future returns

Farmland price determination

A simple model of farmland prices

$$P = \frac{E(R)}{(i - g)}$$

Assuming a growth rate of 1%:

		Discount rate i		
		3.0%	4.5%	6.0%
$E(R)$	200	10,000	5,714	4,000
	300	15,000	8,571	6,000
	400	20,000	11,429	8,000

How are farmland prices determined?

We need to examine three pieces of information:

- Farmland returns
- Discount rates
- Potential for growth in returns

USDA's Net Farm Income Forecast
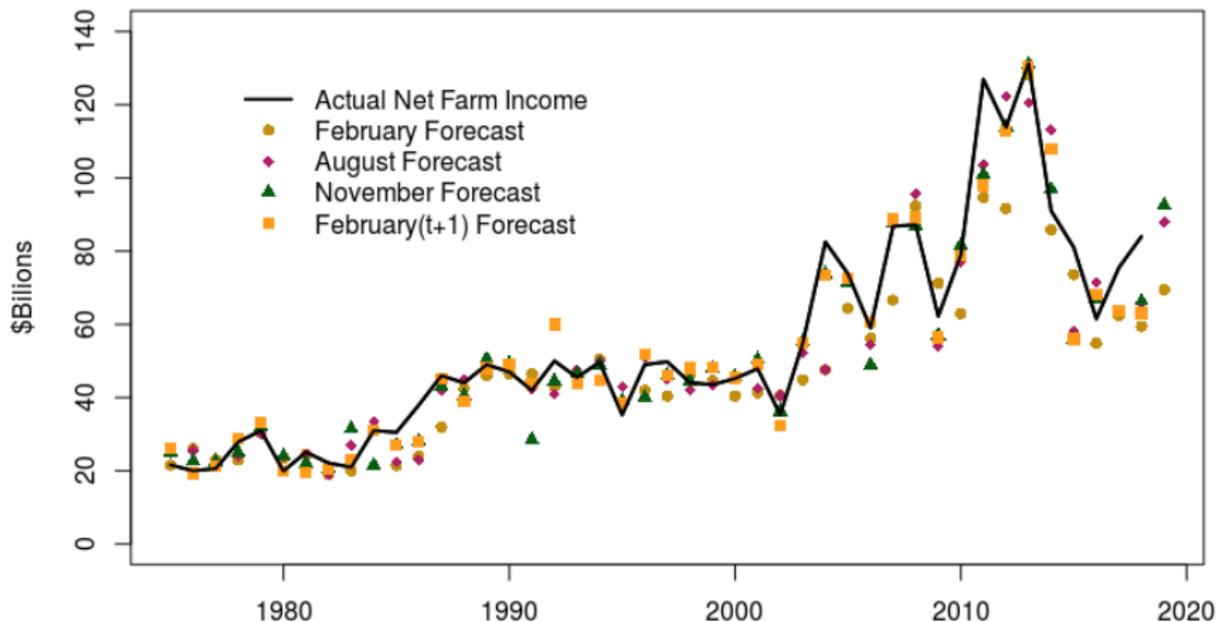
Source: USDA Economic Research Service

Indiana cash rents
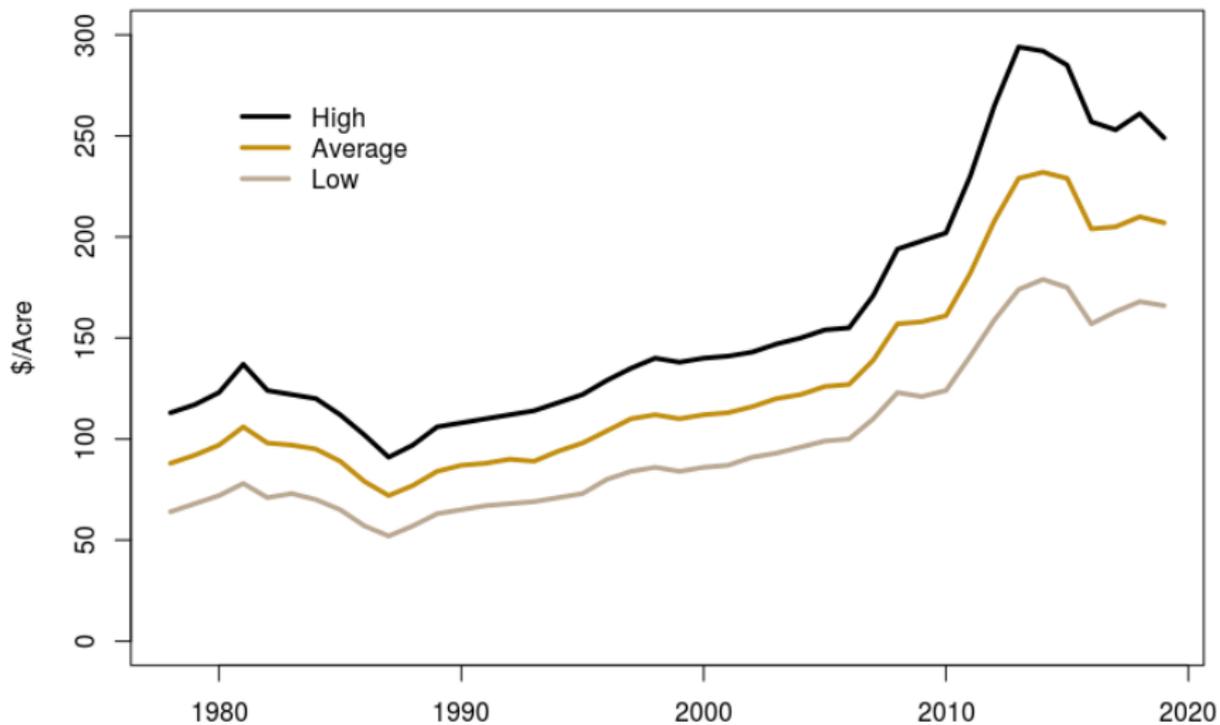
Source: Purdue Center for Commercial Agriculture

Capitalized rents (rental rate/10 year treasury)
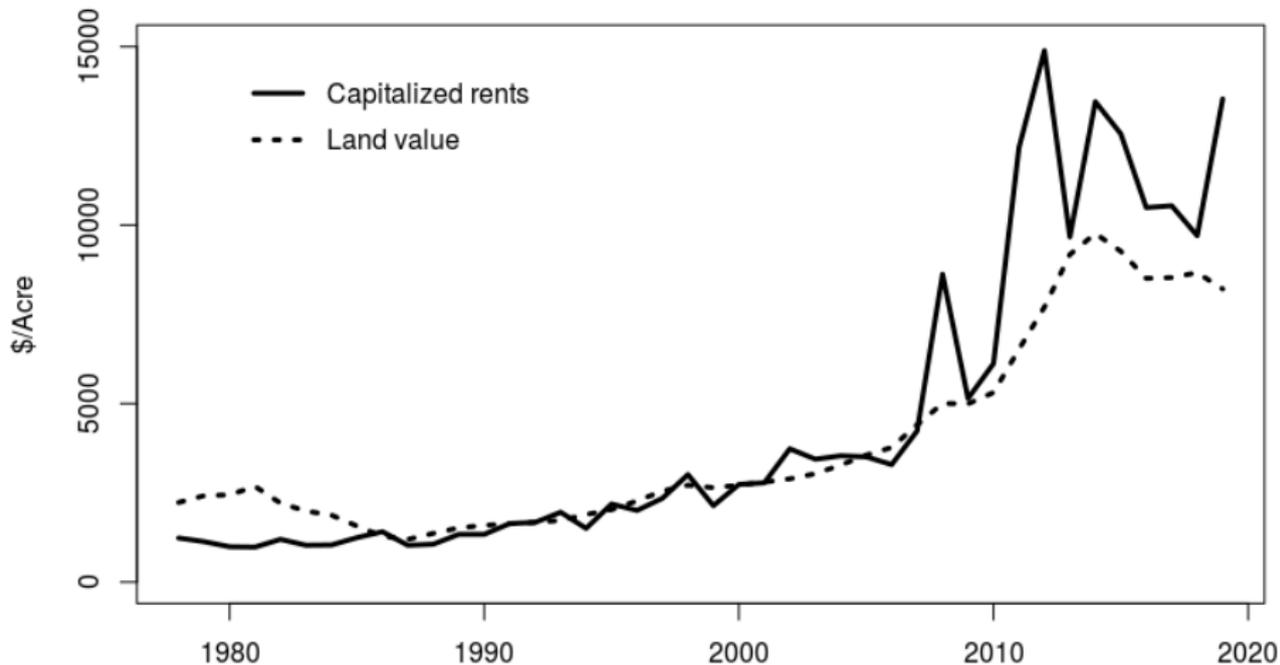
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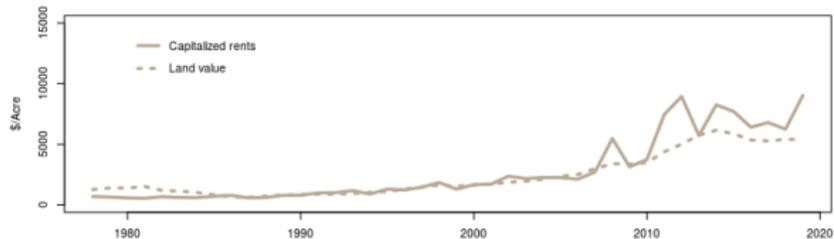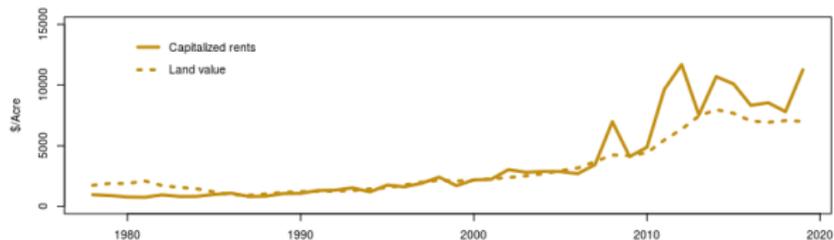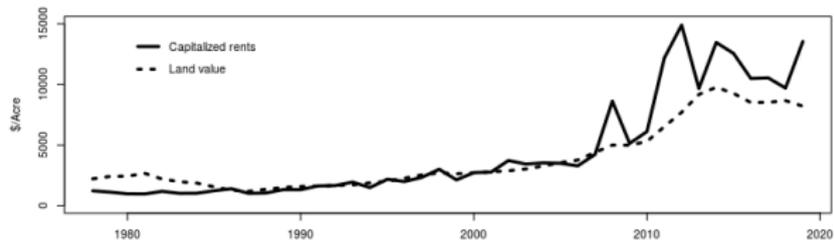
Discount Rates

- Yield on fixed-interest securities relative to maturity
- Yield curve: 2001 – today

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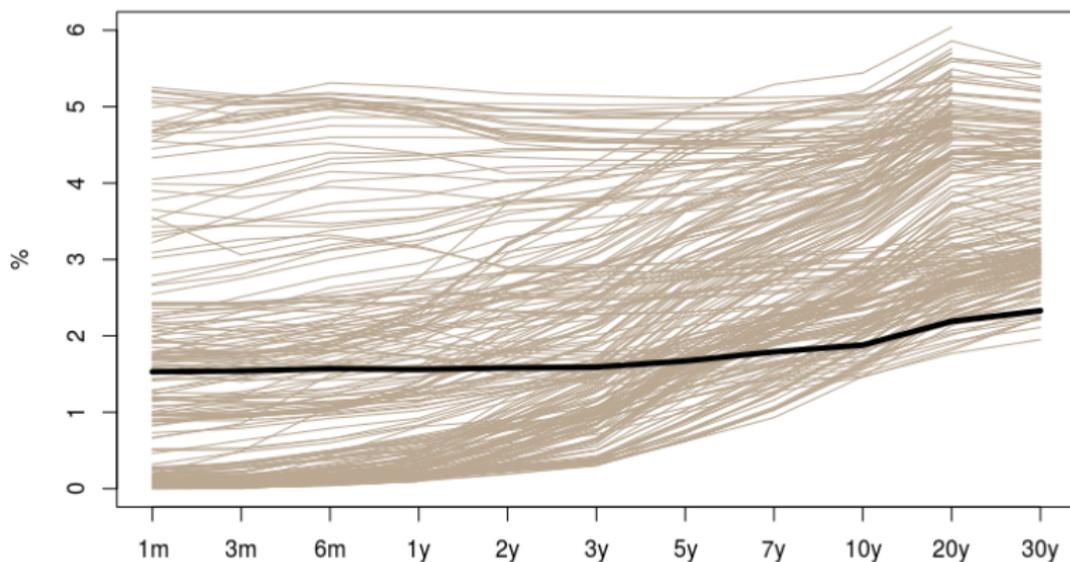
Source: U.S. Department of the Treasury

Yield curve: 2001 – today
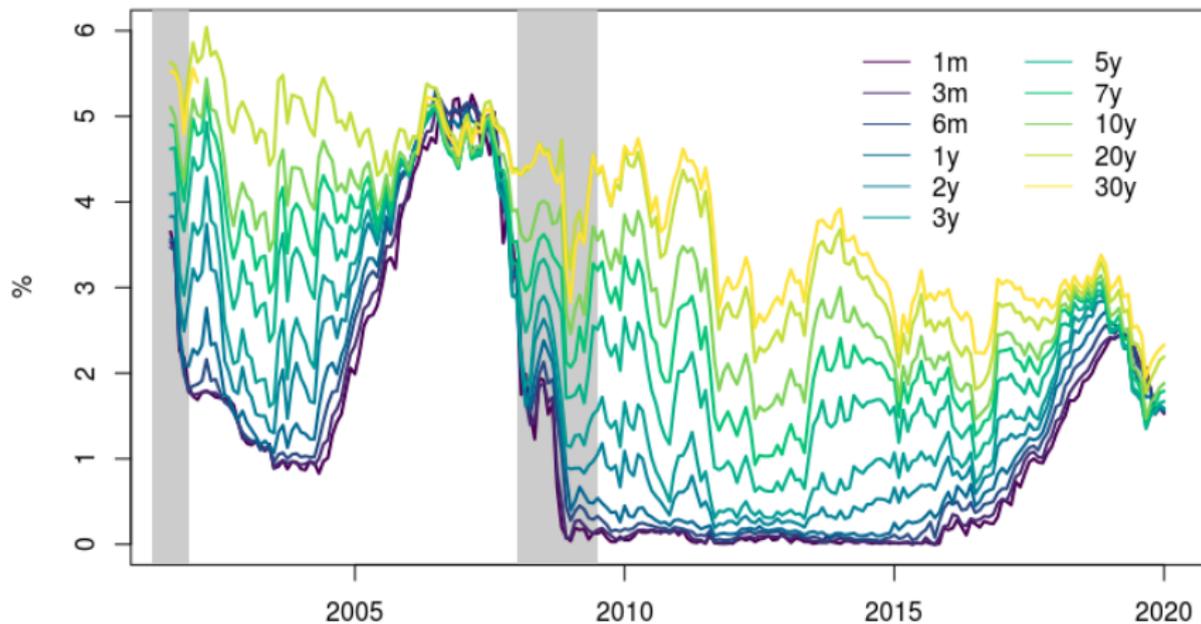
Source: U.S. Department of the Treasury

Federal Reserve districts

92 counties in Indiana

- 68 in Chicago
- 24 in St. Louis

Farm mortgage rates (fixed)
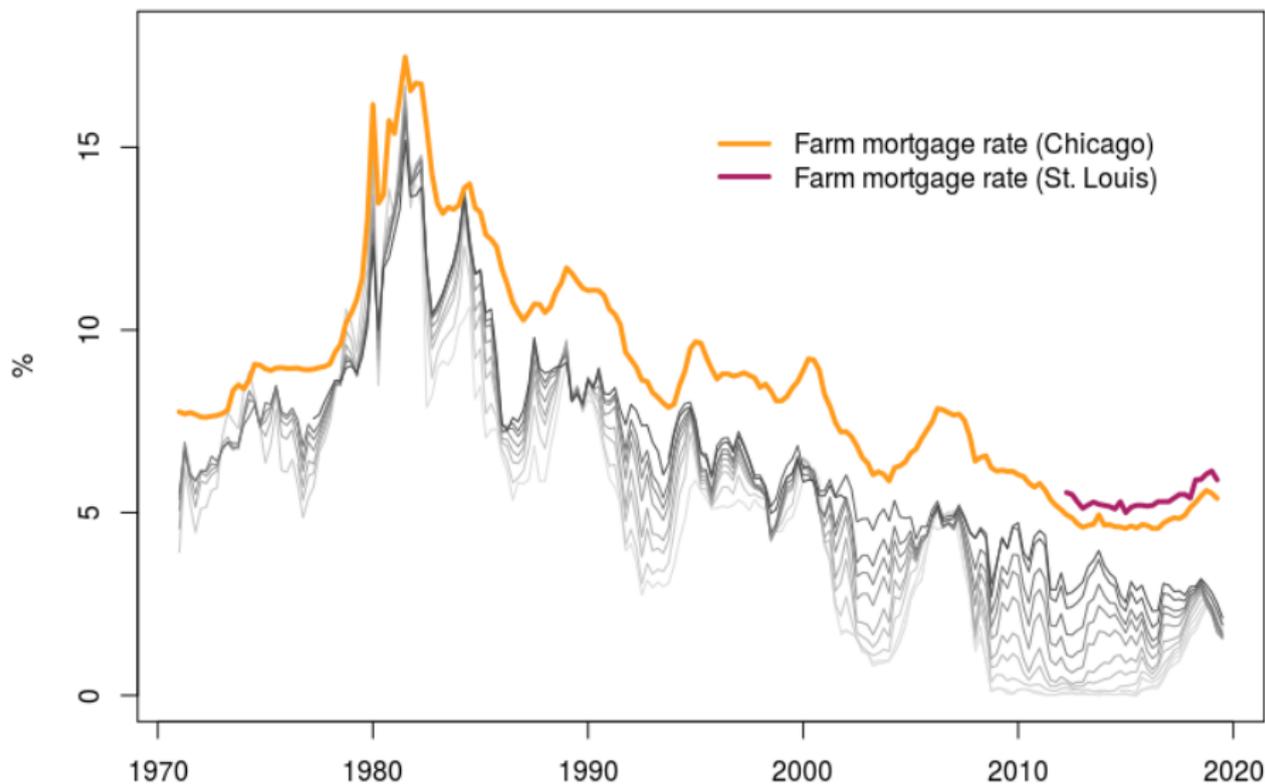
Farmland conversion and the development premium
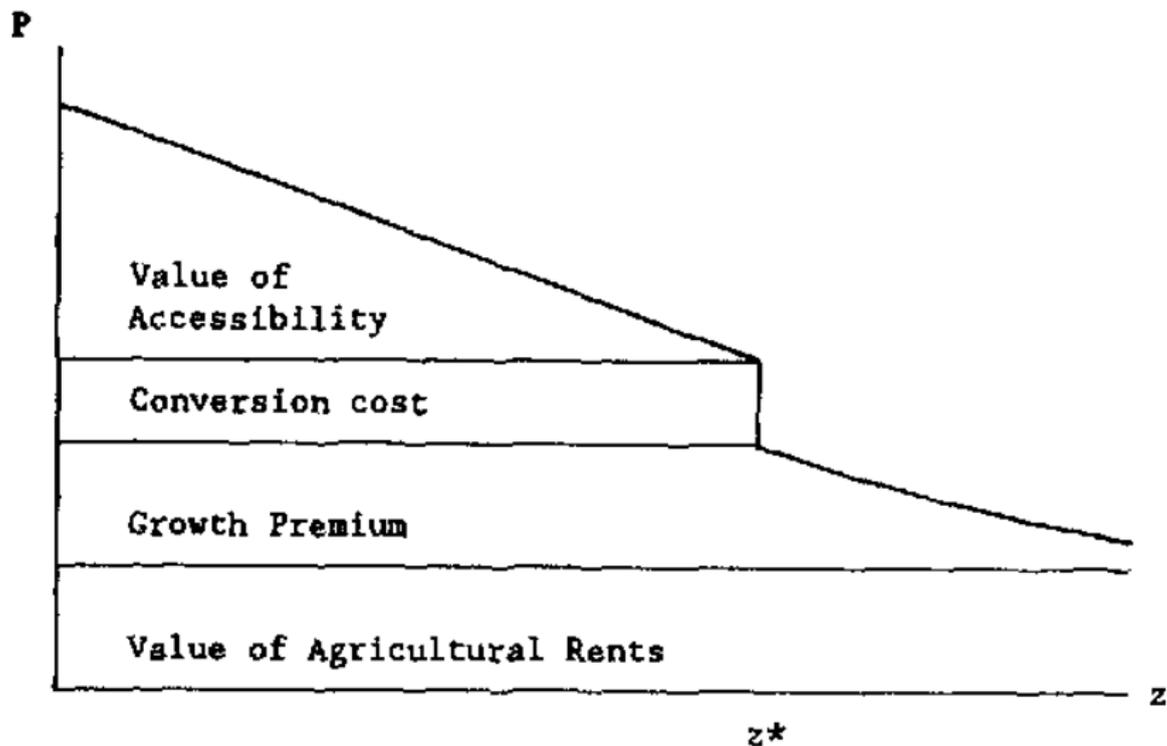
Source: Capozza and Helsley (1989)

Development premium
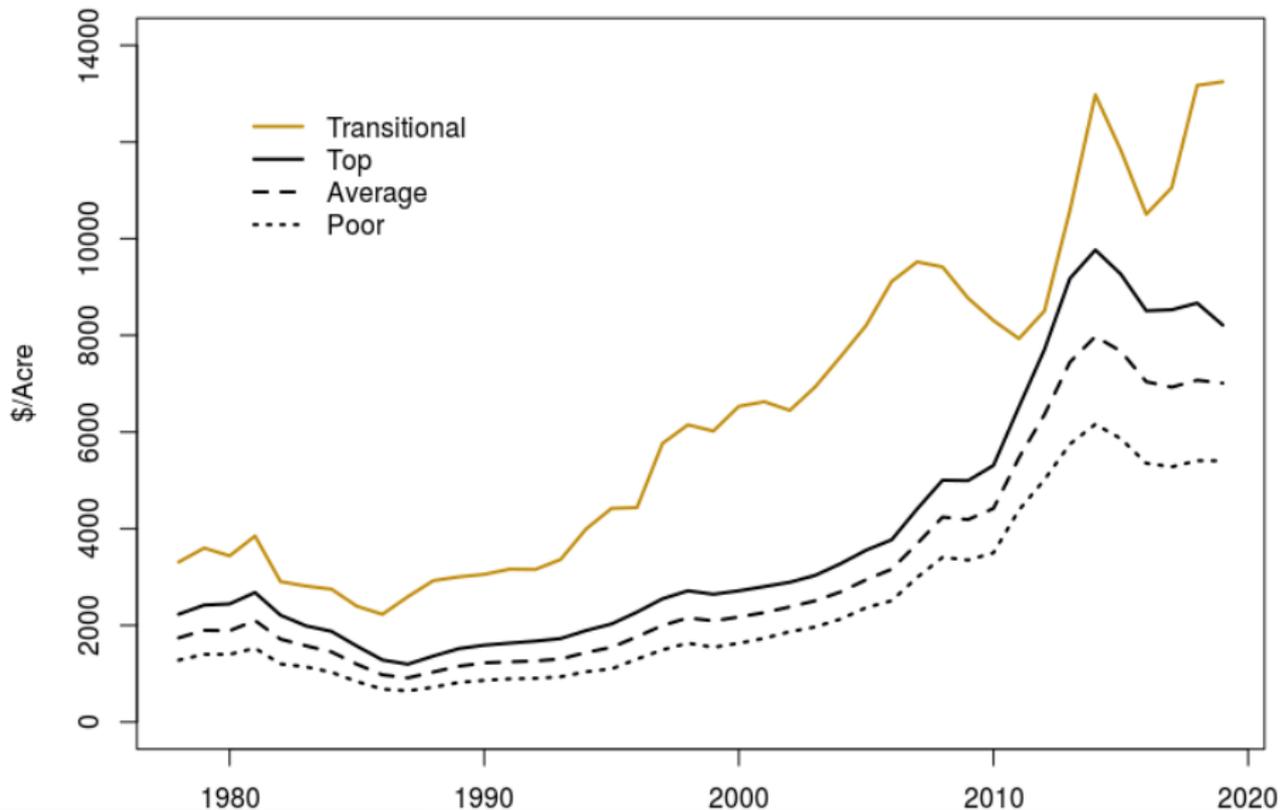
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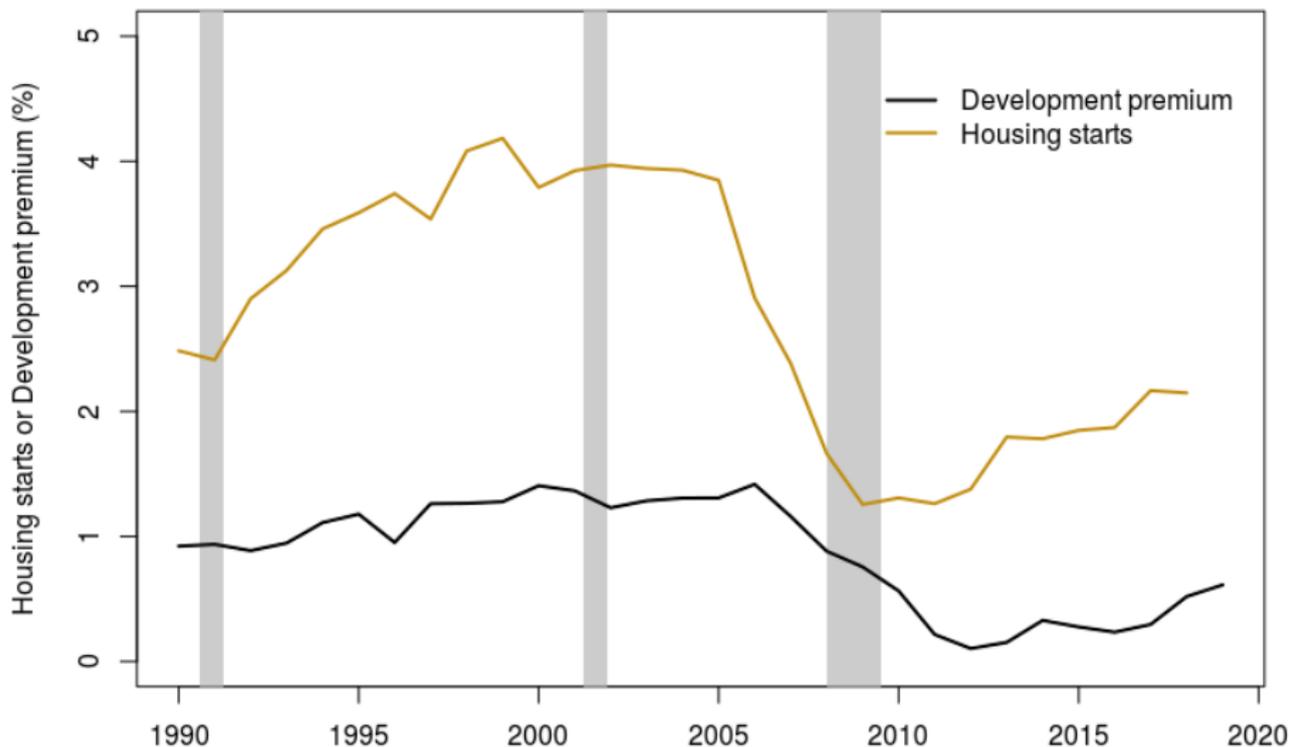
Source: StatsINDIANA

Gross domestic product and global population
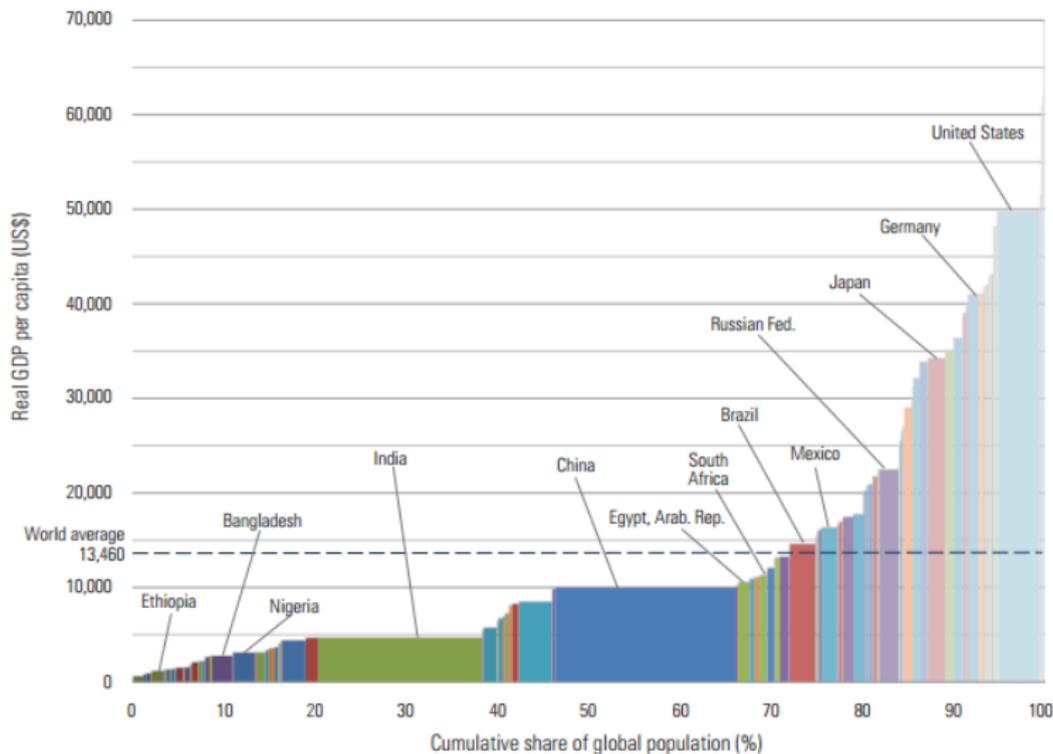
Source: "Purchasing Power Parities and Real Expenditures of World Economies" World Bank

Meat consumption and gross domestic product
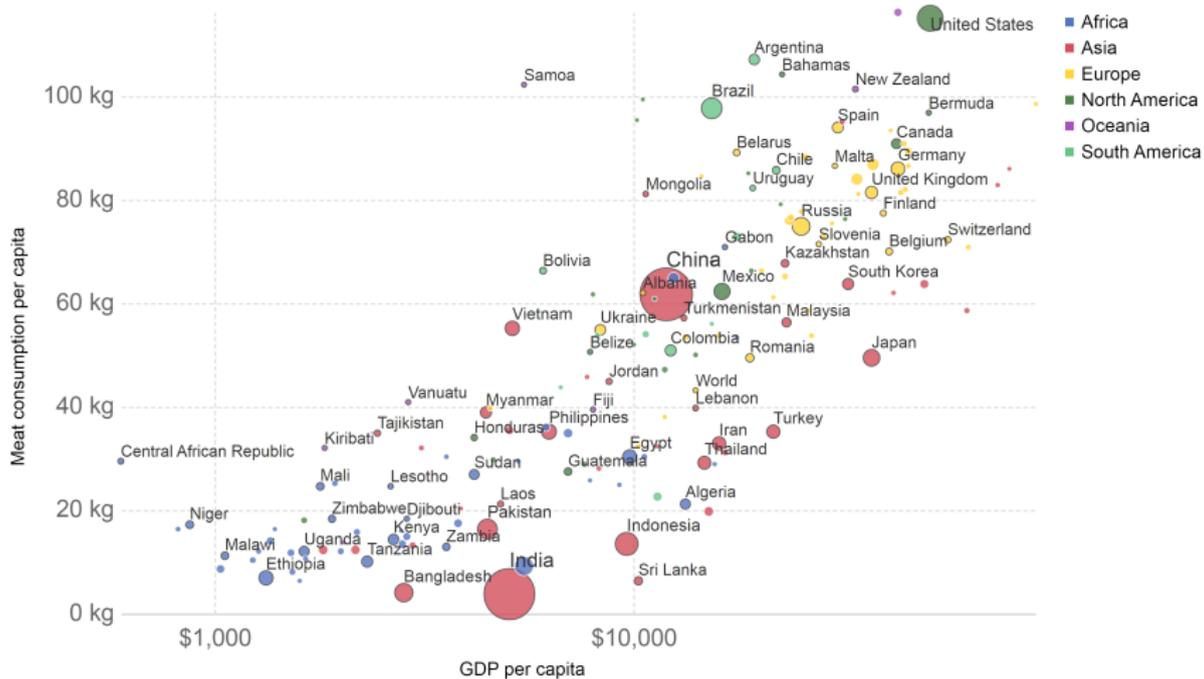
Source: Our World in Data

Agricultural suitability
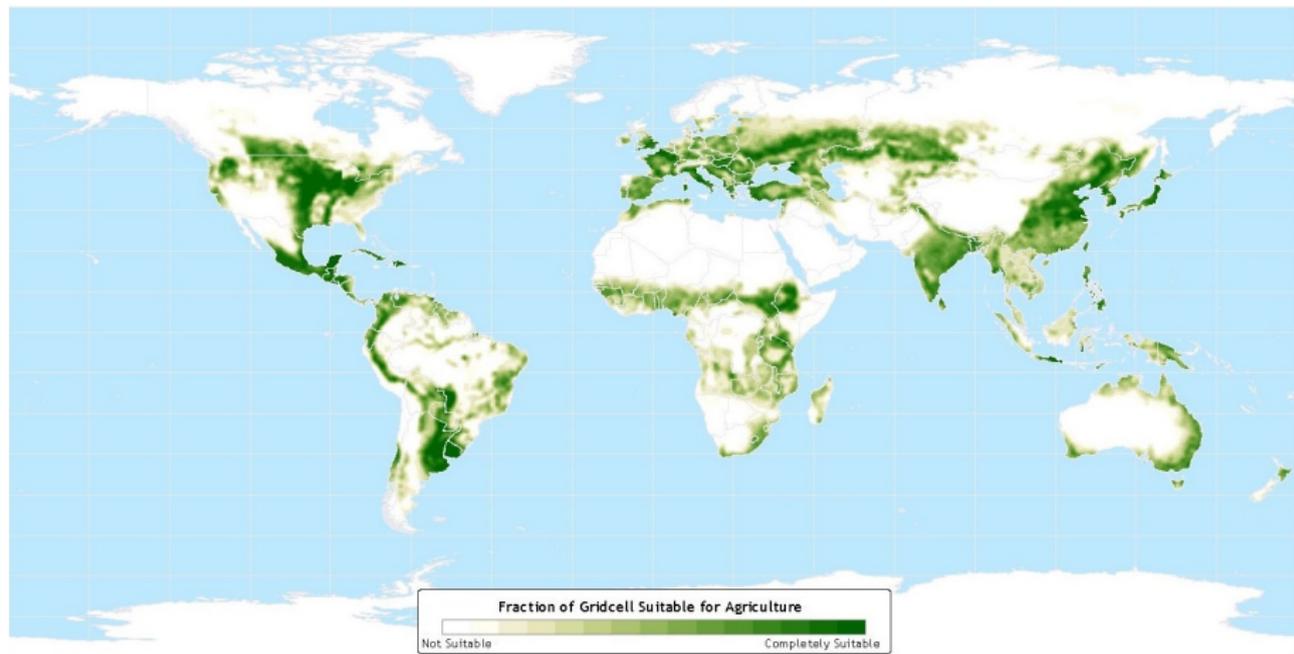
Source: University of Wisconsin, Center for Sustainability and the Global Environmnent

The race to improve returns through digital agriculture

AGTECH LANDSCAPE 2019

Todd H. Kuethe

✉ tkuethe@purdue.edu

🐦 @TKuethe

📞 (765) 494-4251

References I

Capozza, D. R. and R. W. Helsley (1989). The fundamentals of land prices and urban growth. Journal of Urban Economics 26(3), 295–306.