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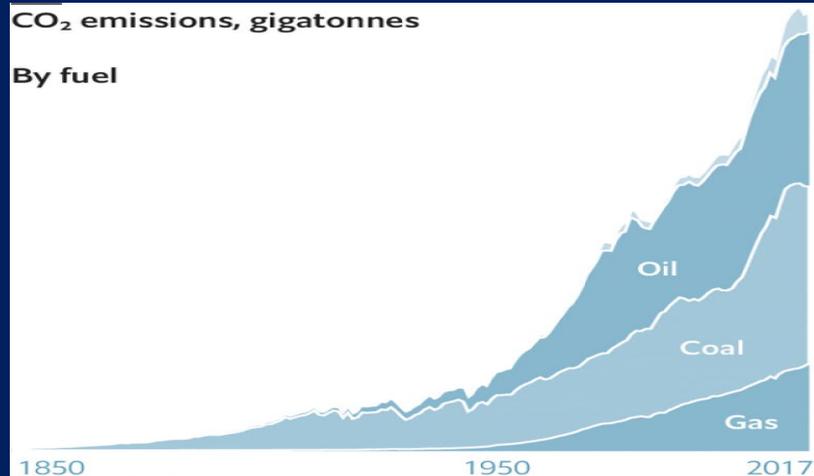
Mitigating Climate Disruption with Crop Insurance: Building Resilient Systems

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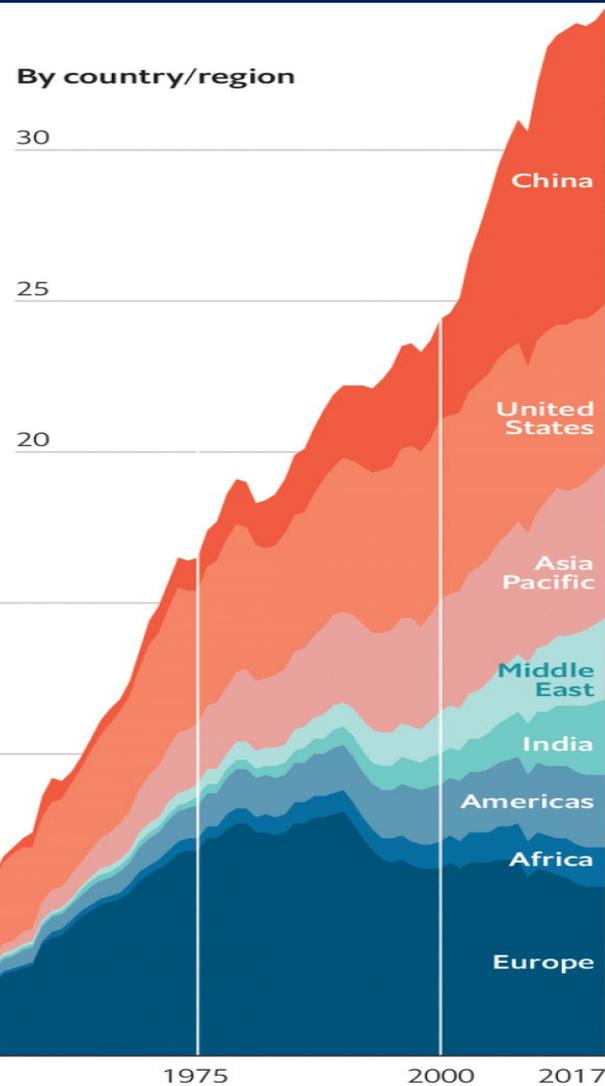


CO₂ emissions, gigatonnes

By fuel



By country/region



Sources: Le Quéré et al. (2018); Global Carbon Project (GCP); Carbon Dioxide Information Analysis Centre (CDIAC)

The Economist

Source: Economist

<https://www.economist.com/briefing/2019/09/21/the-past-present-and-future-of-climate-change>



An Essential Question?

Is climate-friendly farmer behavior primarily constrained by economic factors, including federal crop insurance subsidies and the financial risks of implementing different crops or practices?

Source: Bitterman, P., 2017. *A coupled agent-based model of farmer adaptability and system-level outcomes in the context of climate change*. University of Iowa, Dissertation.



The Current Research on this Question

- Most research on Midwest commodity crops (corn, soybeans)
- “If current system is profitable and certain kinds of changes are unprofitable, incentive payments are needed... the more dramatic the change in practices, the more the needed payment.” (2015)
- “By specializing, farms may be able to capture product-specific economies of size, but in the process may also reduce their ability to manage risk or capture economies of scope.” (2017)
- “Crop insurance likely changes land use.... More marginal land brought into production... which leads to loss of soil health... and/or loss of drought resistant varieties (specialization of seed supply) and lack of cropping diversity” (2017)
- “I did find that 70% of ICRB (Iowa Cedar River Basin) farmers agree that climate change is occurring, even if they disagree on the sources of change. My results also confirm federally-subsidized crop insurance as the **primary source** of a farmer coping capacity” (2017)



Whole Farm Revenue Protection (WFRP) for Climate-friendly Agriculture

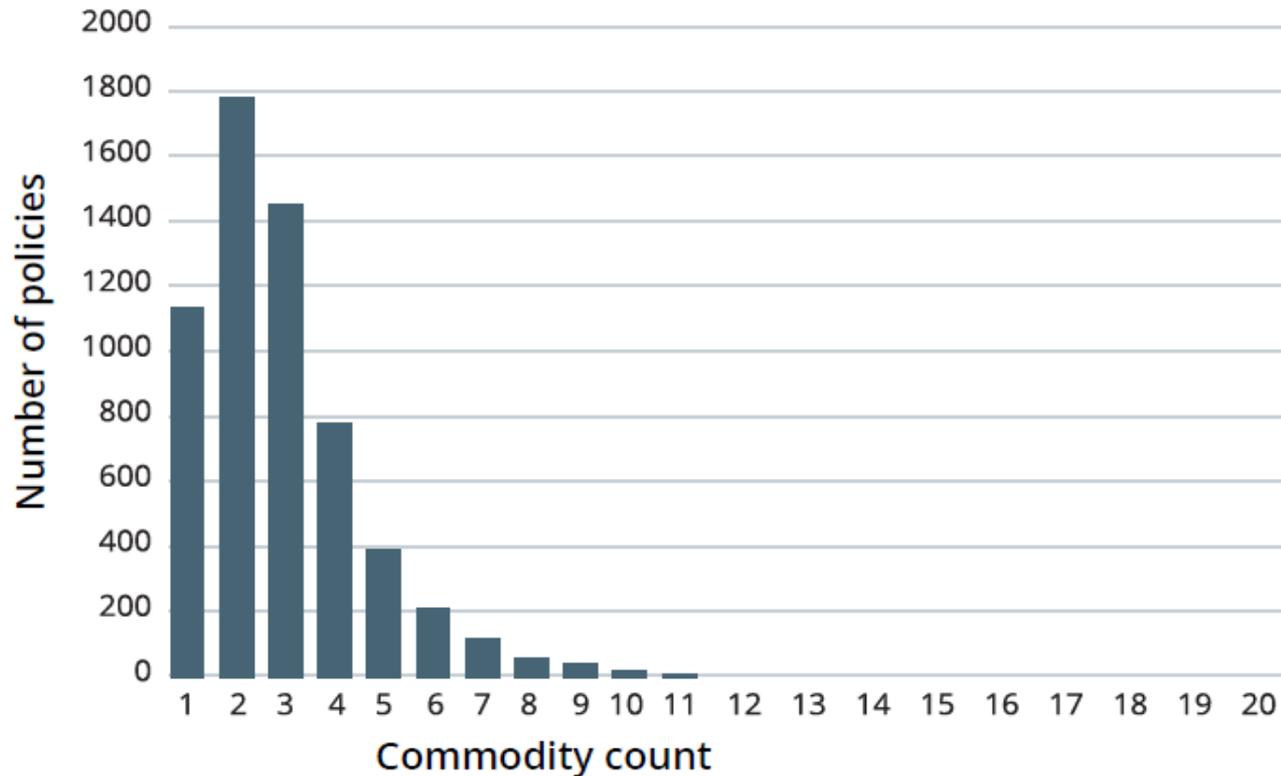
The Ideal: Incentivizes diversity of crop and livestock systems

- Insures WHOLE farm's revenue based on average of five year history— up to 85% of that historic revenue
- Protects price and yield risks= **major sources of financial risk**
- Premium subsidy improves with 3 or more products
- Premium rate lowers with each added product insured up to seven (7).
- Covers ANY crop and livestock product up to \$8.5 million in liability (\$ limit on livestock liability).
- Since based on historic revenue, automatically incorporates organic values (supports organic)



So Far Not High Diversity

Figure 6.1. Number of products per WFRP policy, 2015-2017



Source: RMA, 2018a

Source: NCAT, 2019



Covers 165 Distinct Products

Table 6.4. Expected value of top 20 crops insured by WFRP in 2015-2017

	Expected value	of Total
Apples	\$2,315,171,912	25%
Corn	\$705,660,312	8%
Potatoes	\$533,451,861	6%
Wheat	\$509,548,873	6%
Cherries	\$505,611,361	5%
Soybeans	\$419,763,131	5%
Alfalfa	\$378,075,475	4%
Pears	\$283,668,026	3%
Almonds	\$241,377,445	3%
Onions	\$226,257,256	2%
Grapes	\$210,524,520	2%
Barley	\$173,950,855	2%
Cotton	\$171,672,590	2%
Sweet Potatoes	\$161,192,391	2%
Watermelons	\$136,002,033	1%
Walnuts	\$131,662,478	1%
Cattle	\$128,124,492	1%
Blueberries	\$122,169,889	1%
Sugar Beets	\$113,262,253	1%
# Products: 20	\$7,467,147,153	80%

Note: Total different number of products insured is 165 (not all shown) and the total expected value is \$9.2 billion dollars.



Vermont DATA of Crop Insurance (2018)

- 403 policies sold (2.2 million*)
- \$ 2.5 million dollars in liabilities (\$101 billion*)
- \$ 2.9 million dollars in premiums (\$9.3 billion*)
- \$ 1.9 million dollars in subsidies (\$5.9 billion*)
- \$ 1.0 million dollars in indemnities (3.9 billion*)
- 66 percent of premium is subsidized (66 percent*)
- Vermont farmers have never used WFRP

* Nationwide



WFRP: An Example

Vermont, Bennington County, 2020 Expected Revenue

Product	Acres	\$/Unit*	Units /Acre**	Revenue /Acre
Organic Apples/bu	1	\$45.00	328	\$ 14,760
Organic Beets/lbs	1	\$1.53	24,000	\$ 36,240
Organic Carrots/lbs	1	\$0.74	26,000	\$ 19,200
Organic Cipollini Onions/lbs	1	\$2.40	30,000	\$ 72,000
Organic Eggs/dozen		\$6.00	5,000	\$ 30,000
Total Revenue 2020 estimate (year of insurance)				\$ 172,200
Five Year Historic Adjusted Average Approved Revenue				\$170,000
*Source: AMS or RMA most recent available				
** Source: Park Sloop Food Cooperative, UV Extension				



A Simple Example

- @ 85% coverage:
 - farmer premium is \$5,913
 - subsidy is \$7,526 (56 % of total cost)
- To receive any benefit the farmer must have a loss greater than \$25,500



Loss of 50% of Revenue

With WFRP

- Expected Revenue: \$172,200
- Actual Revenue (50% loss): \$86,250
- Indemnity Payment ($\$144,500 - \$86,250$) = \$58,250
- Net payment (minus premium of \$5,913) = \$52,337
- Actual Net Revenue ($\$86,250 + \$52,337$) = \$138,587

ONLY Alternatives:

- Apples- APH (yield only) and only 75% coverage= \$224 premium but only valued at maximum of \$13.05 per bushel

Diversity Matters

- @ 85% coverage and same level of liability, BUT with only 3 products; apples, beets and eggs:
 - farmer premium is \$7,058 vs \$5,913 with 5 products
 - a 16% premium rate discount for diversity



Conclusions

- Crop insurance is highly subsidized so providing small percentage discounts to change farmer conservation behavior may not work.
- Too good crop insurance likely pushes farmers to acquire additional marginal lands- with climate implications as per soil organic carbon loss
- WFRP offers financial incentives for crop and livestock diversity and may be particularly beneficial to organic farming. More organic farming adoption the better for the climate.



Vision

- WFRP becomes the dominant form of farm insurance leading to greater crop and livestock diverse systems at less public expense.
- WFRP and other conservation programs incentivizes farmers to adopt certified organic systems of production (and beyond organic—resilient systems?)



Questions?



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