

Innovations in Agriculture and Rural Development



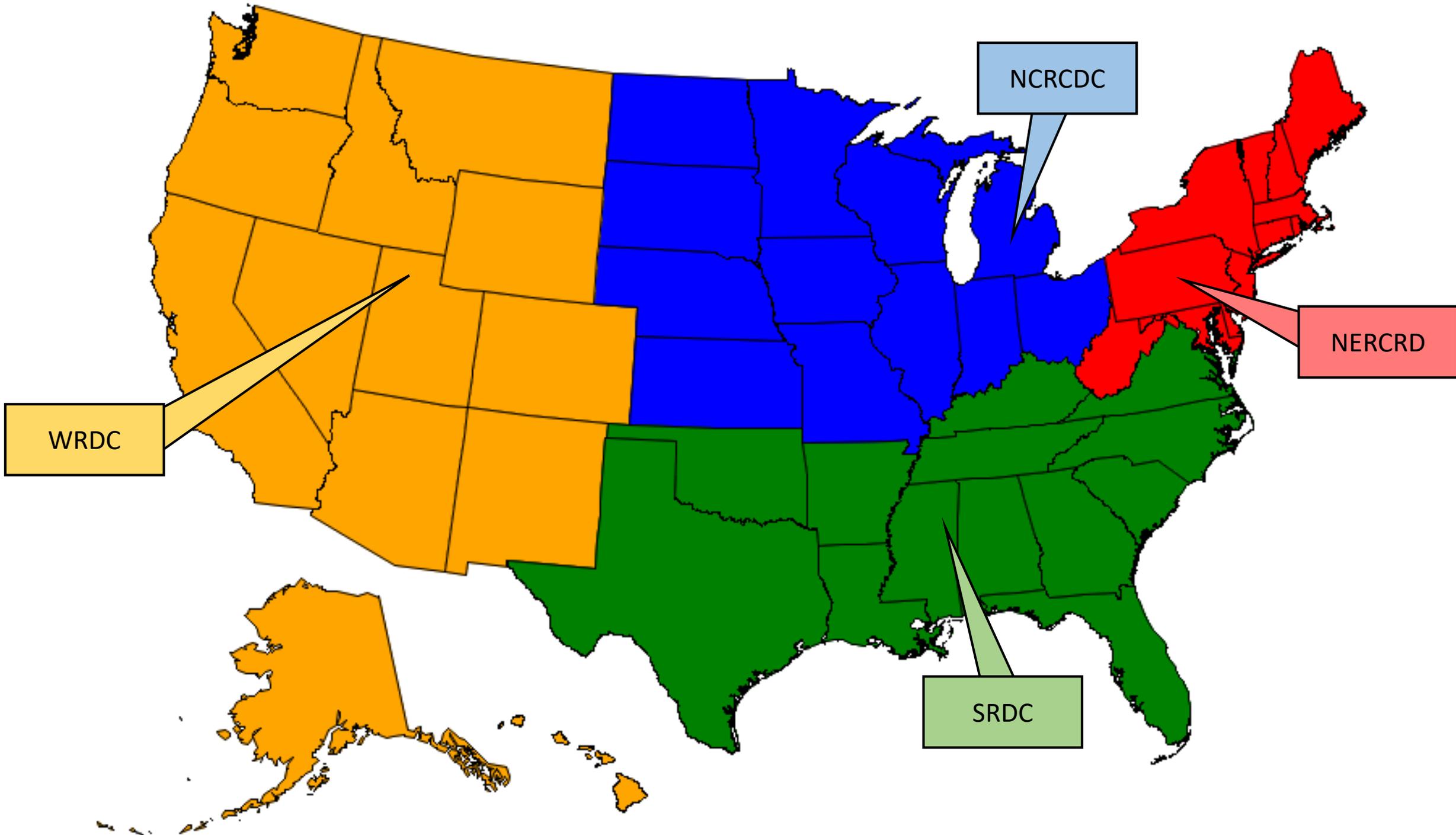
MICHIGAN STATE

UNIVERSITY

John Mann

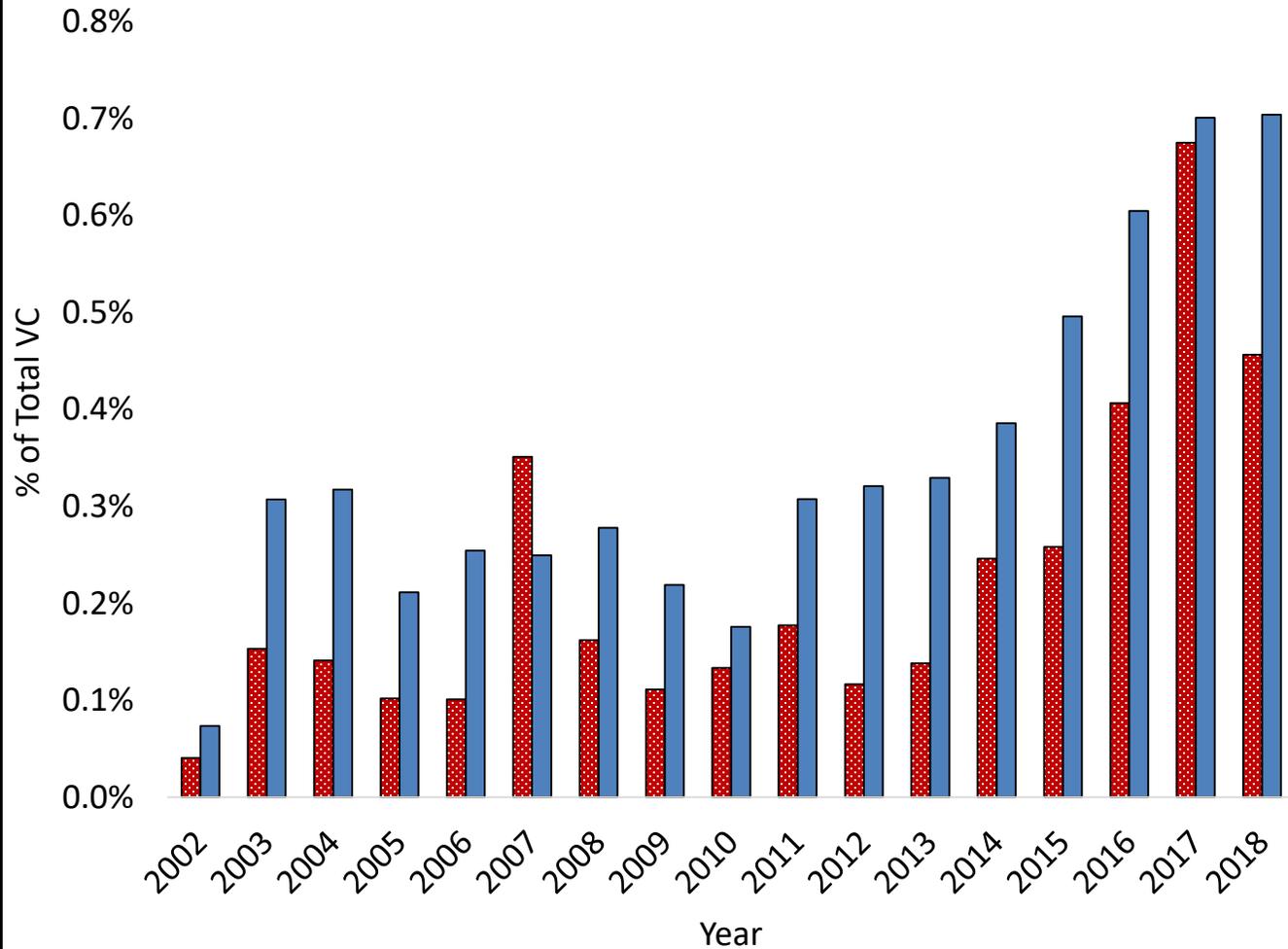
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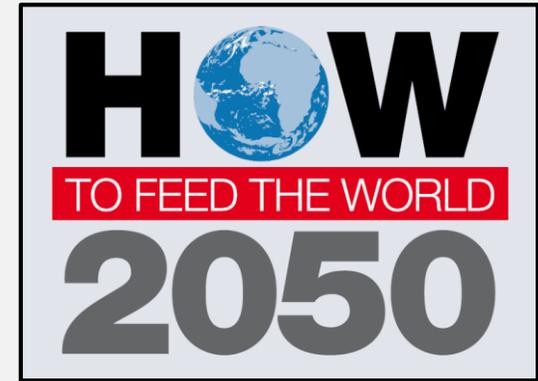


Ag Tech – Share of total VC

■ Share of Dollars
■ Share of Deals



Source: Chart constructed from PWC MoneyTree VC data series



October 2009

“Food production must double by 2050 to Meet Demand from World’s Growing Population...”

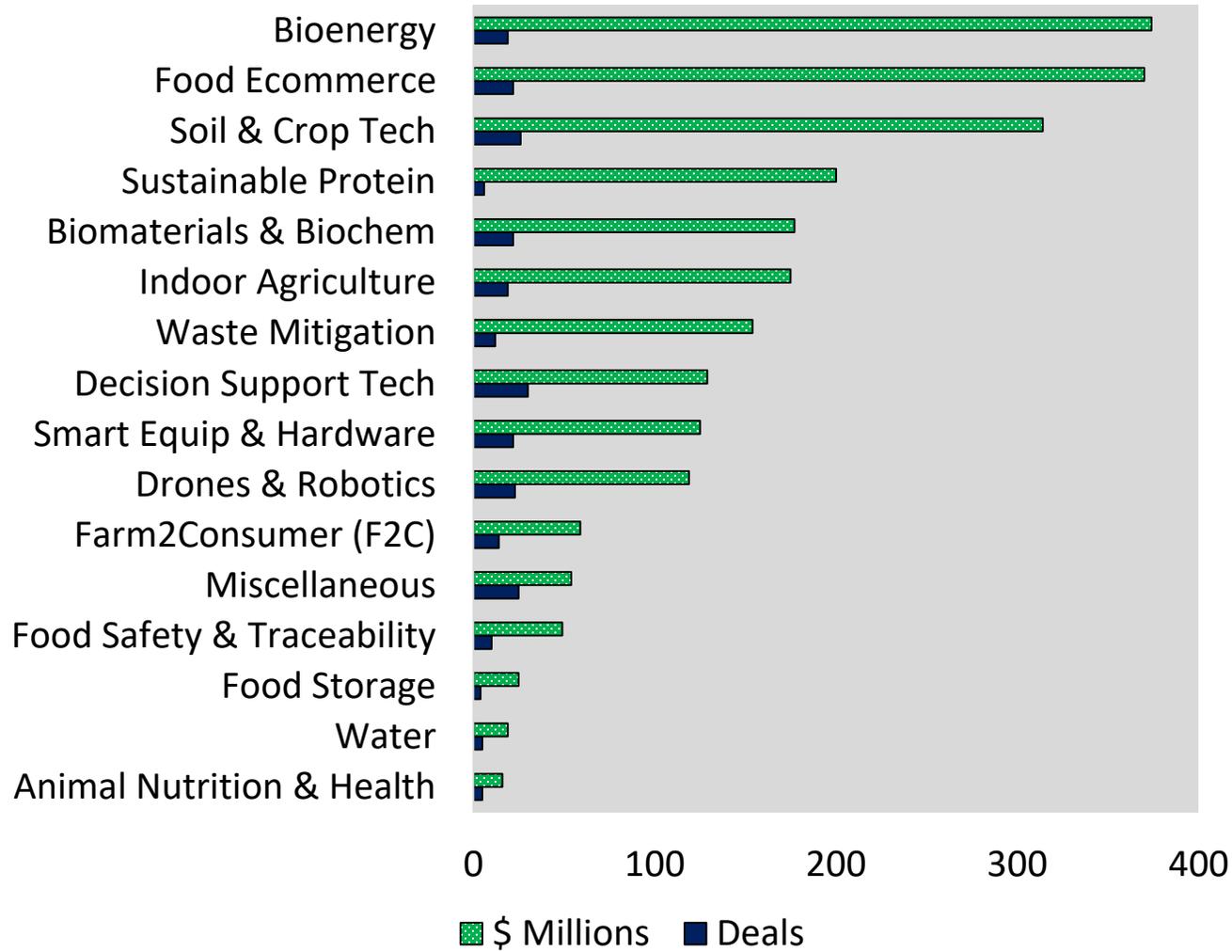
Source: UN General Assembly 2009

IPCC Report 2008

Climate Change and Water

“Changes in water quantity and quality due to climate change are expected to affect food availability, stability, access and utilisation.” (P. 3)

2014 Investment in Ag-Tech (\$2.4B total – 90% US)



Top North Central States

Illinois \$207M

Missouri \$59M

Minnesota \$40M

Michigan \$28M

Ohio \$6M

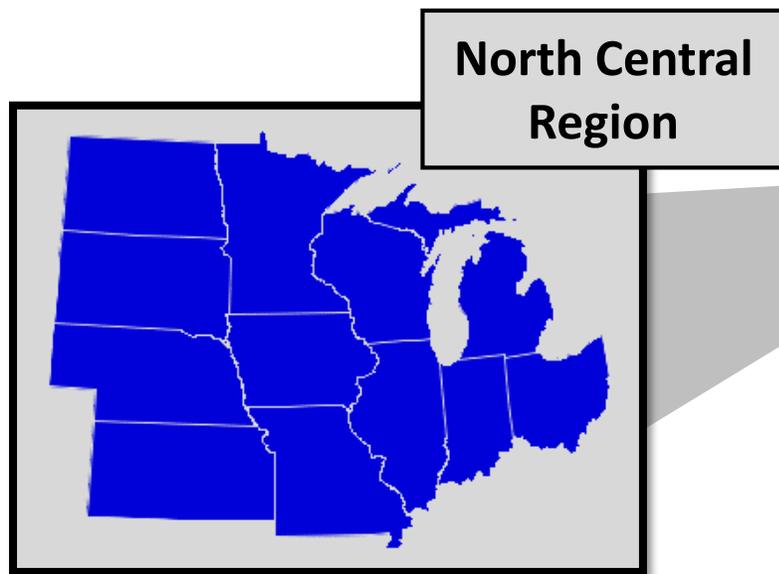
Nebraska \$4M

*California top state \$967M

NCRCRD focus area:
***Innovation Diffusion for
Rural Development***

Other background

- University technology transfer challenge, innovations slow to move off the shelf
- Need more CEOs/firms to match with faculty
- Maybe connect with US rural firms?



Agriculture Experiment Stations



Identify North Central faculty with Ag-tech



Connect to small rural/agricultural firms



Some caveats...

1. Ag-tech venture capital investment data

2014: PitchBook's/PWC's \$340M/\$148M (US)
≠ AgFunders \$2.2B (US)

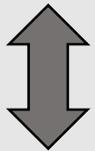
2. Tech transfer offices

- a. Primary focus - “billion-dollar winners”
- b. Limited marketing channels for Ag-tech

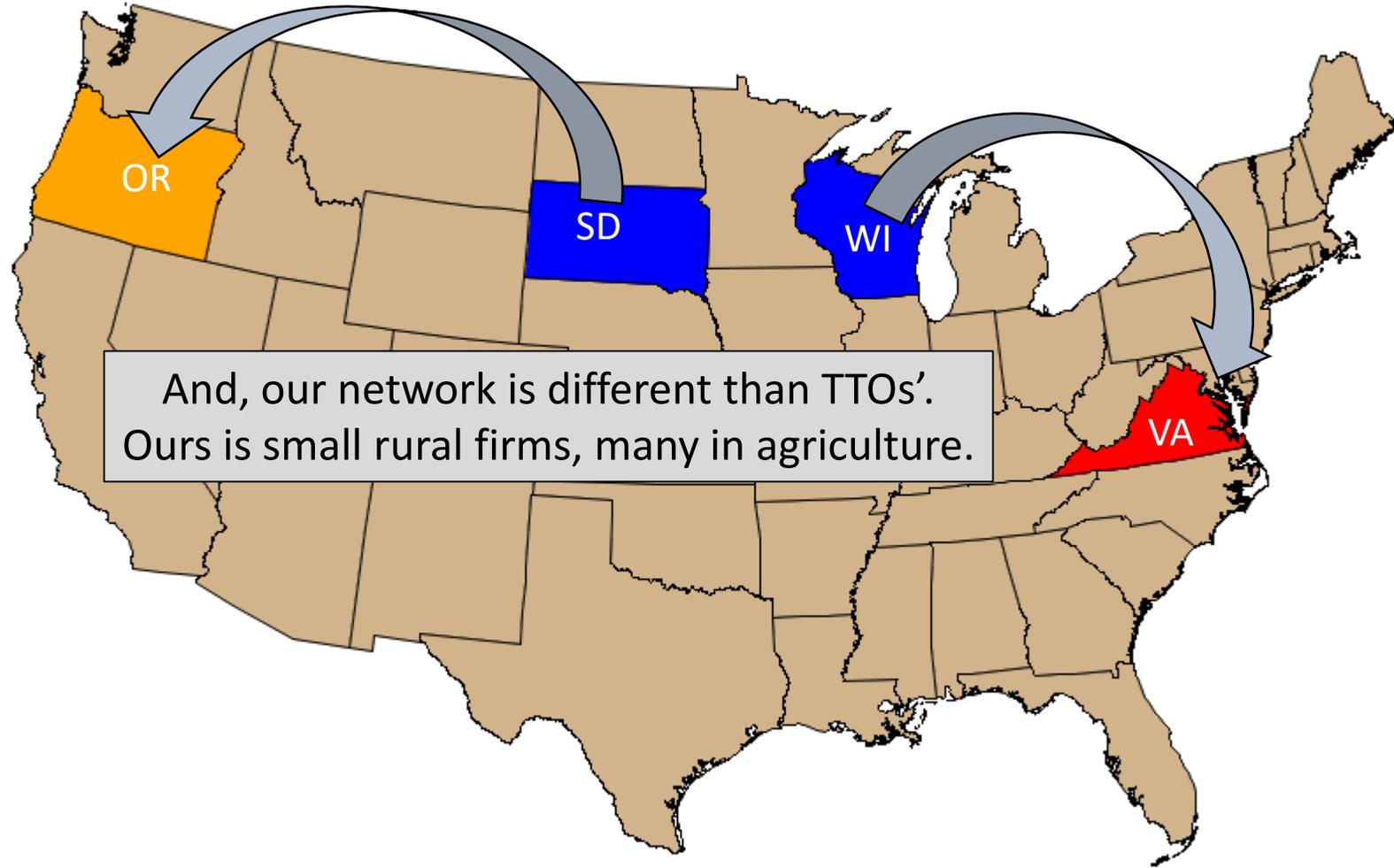
As a RRDC, state borders were not a limiting factor



Solution in state "A"



Problem in state "B"



“Discoveries” along the way

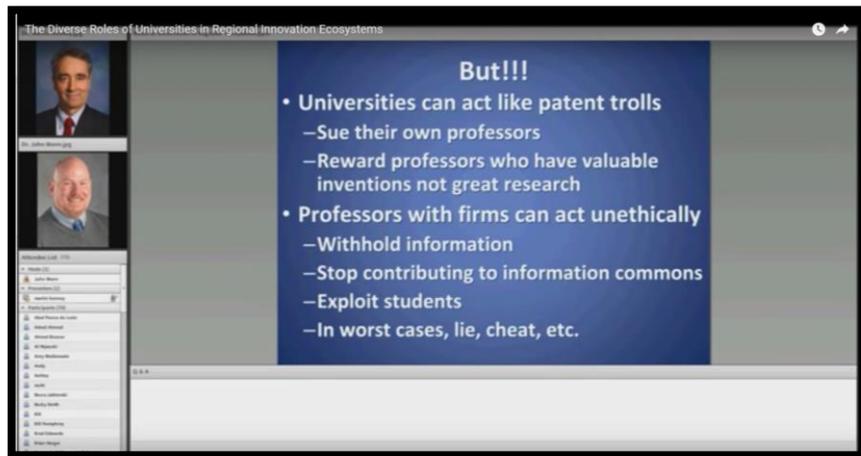
Rural innovators less likely to seek formal IP protection

– *OECD (2012); Renski & Wallace (2012)*

Formal/Informal IP and R&D	Urban	Rural	Difference
Patent	6.1%	4.6%	32.2%
Register trademark	11.7%	7.2%	63.2%
Licenses patents	6.7%	5.8%	15.4%
Conduct in-house R&D	34.5%	31.1%	11.0%
Purchase R&D	11.1%	8.2%	36.2%
Use trade secrets	18.7%	16.1%	15.9%
First mover in market with innovation	30.4%	30.1%	0.9%
Train staff to develop innovations	40.5%	38.0%	6.7%

Source: Table produced from summary statistics of 2014 Rural Establishment Innovation Survey (REIS)

“Discoveries” along the way



<https://www.canr.msu.edu/ncrcrd/webinars/>

Martin Kenney at UC Davis:

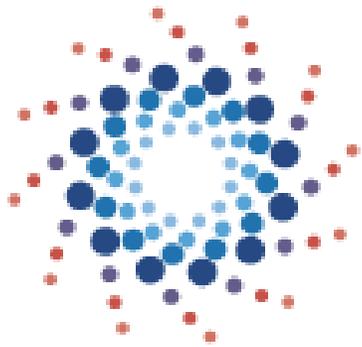
“Should universities patent everything?”

Could new approaches of TTOs managing IP be helpful for small rural firms?



Our observations:

- Some faculty-entrepreneurs frustrated with TTOs – may need improved path for *informal IP*
- If innovation not patentable, faculty may get sent back to do more research



SBIR
America's Seed Fund™

USDA NIFA

- (1) Rural and Community Development
- (2) Small and Mid-Sized Farms

*Apply existing technology to solve problems
in rural areas and for small/medium sized*

Potential Opportunities

- Academic engagement – with rural firms
- Solution for “stalled” university tech
- Pipeline for innovative rural startups
- Bridge gap between rural firms and TTOs
- “Alternate” for faculty/rural firms

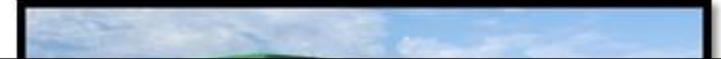
Example technologies in Food and Agriculture



Solution for livestock antibiotic resistance



New media marketing strategies for small producers



Weed management for organic producers



Waste water treatment for swine operations



UV light treatment for contaminated aquaculture water



Fermentation technology for spirits





Setting:

1. Baby boomer's retiring from state and federal regulatory agencies.
2. Surge in small, processed-food launches.

Concern:

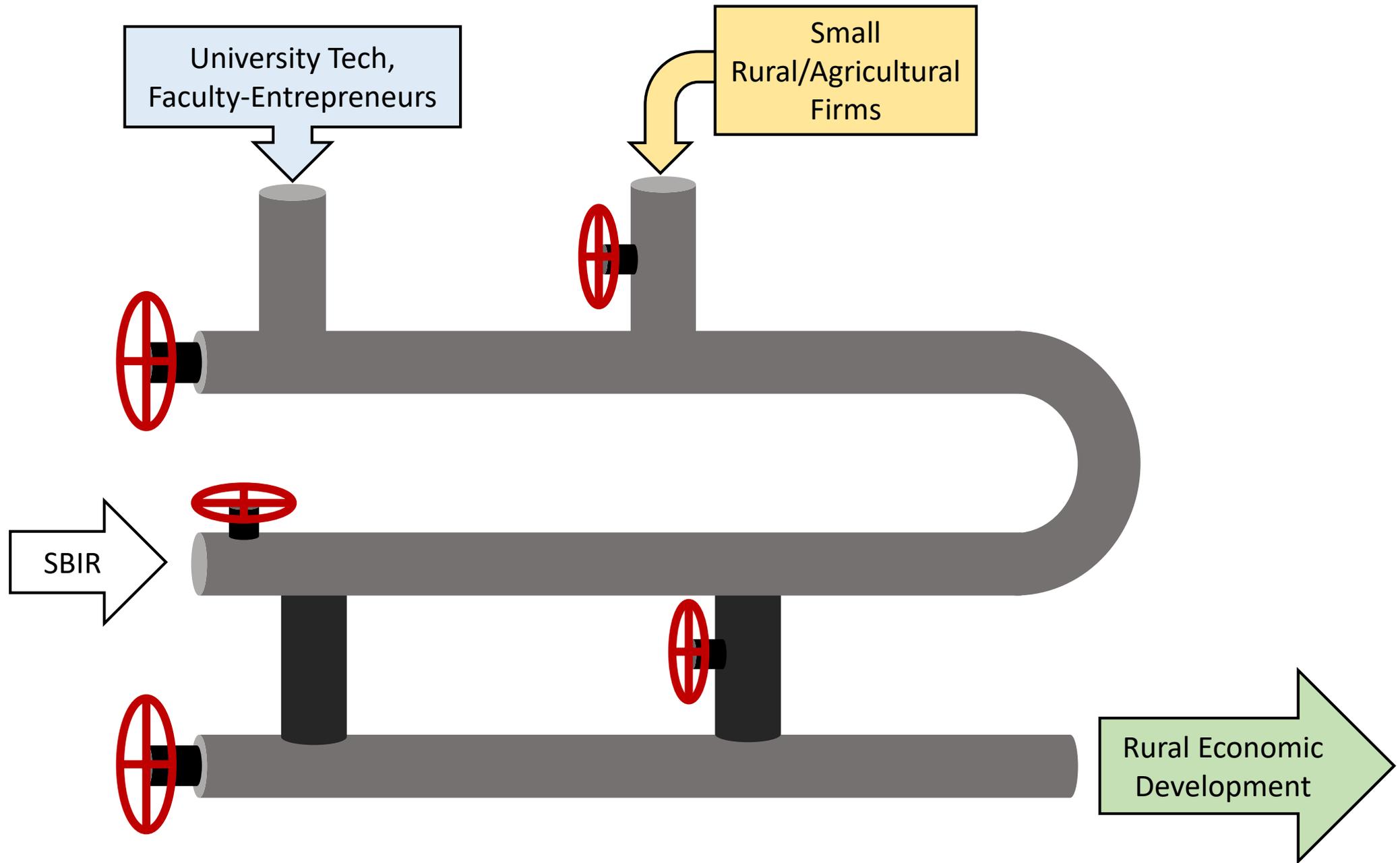
Loss of institutional knowledge on state and federal regulations may impede ability of new processed-food startups.

Solution:

Develop online/virtual training platform to fill in this knowledge/experience gaps.

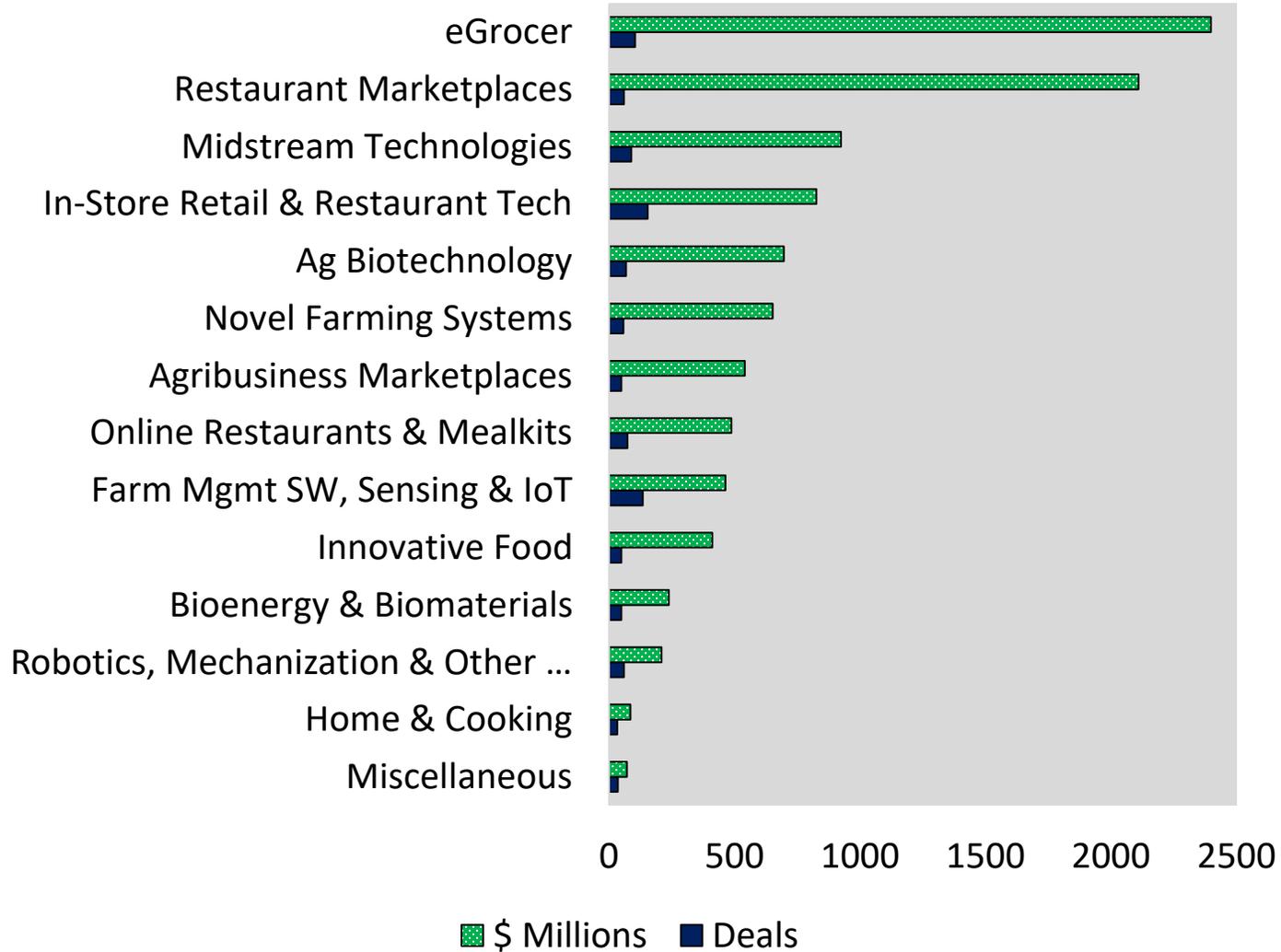
Q: SBIR worthy?





University Tech & Small Rural/Agricultural Firm Pipeline

2017 Investment in Ag-Tech (\$10.1B total – 45% US)



Top North Central States

Illinois	\$69M
Missouri	\$68M
Minnesota	\$55M

*California top state \$2,206M

Source: AgFunder AgriFood Tech Investing Report: Year in Review 2017

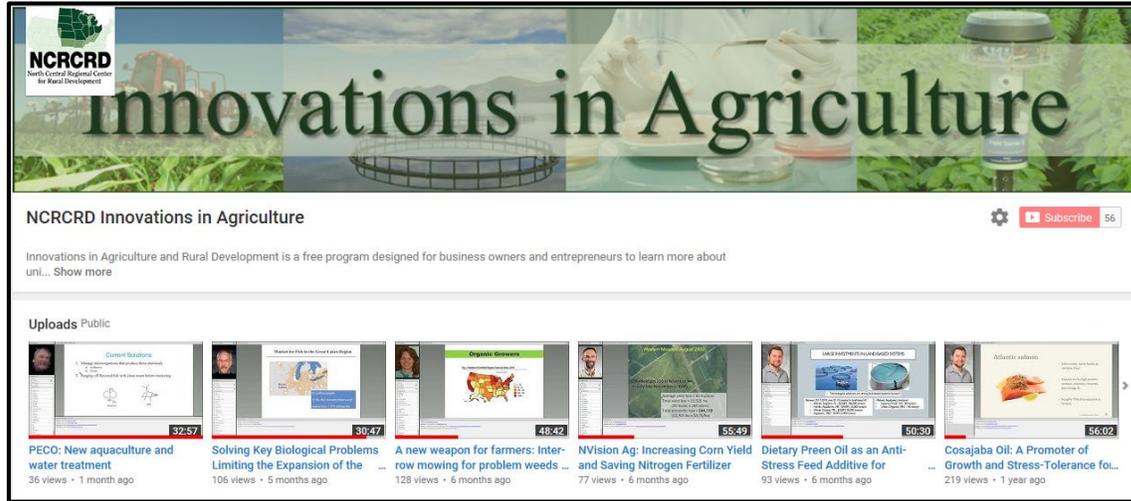
Why Does Rural Matter?

Rural areas have important resources to help:

- Feed the growing global population
- Potentially mitigate challenges from climate change/volatility

Negative externality from the urban-rural innovation gap?

- Could the rural landscape change if we improved rural innovative startup opportunities?



[YouTube NCRCRD Innovations in Ag Channel](#)



[NCRCRD Website](#)

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References

1. PricewaterhouseCoopers (2018). "MoneyTree Explorer." Available at: <https://www.pwc.com/us/en/industries/technology/moneytree/explorer.html#/>
2. AgFunder. (2015). "AgTech Investing Report: Year in Review 2014." Available at: <https://research.agfunder.com/2014/AgFunder-AgTech-Investing-Report-2014.pdf>
3. AgFunder. (2018). "Year in Review '17: AgFunder AgriFood Tech Investing Report." Available at: <https://research.agfunder.com/2017/AgFunder-Agrifood-Tech-Investing-Report-2017.pdf>
4. Kenney, M. & Mann, J. (2015). "The Diverse Roles of Universities in Regional Innovation Ecosystems." Webinar available at: https://www.canr.msu.edu/ncrcrd/webinars/innovations_in_agriculture_and_rural_development
5. Lyons, T., Miller, S., & Mann, J. (2018). A New Role for Land Grant Universities in the Rural Innovation Ecosystem? *Journal of Regional Analysis and Policy*, 48(2):32-47.
6. Mann, J., Loveridge, S. & Miller, S. (2015). "Firm Specialization in Technology Transfer Grants." Paper presentation at the Mid-Continent Regional Science Association Meeting, St. Louis, MO, May 27-29, 2015.
7. Mann, J. (2018). "Firm Behavior Across Increasing Levels of Innovation Activity." Paper presentation at the annual Southern Regional Science Association meeting, Philadelphia, PA, March 15-17, 2018.