



The Irrigated Lands Regulatory Program in California

Mark Lubell

University of California, Davis

Center for Environmental Policy and Behavior (environmentalpolicy.ucdavis.edu)

Twitter: [@envpolicycenter](https://twitter.com/envpolicycenter)

Alternative Title: Non-Point Source Pollution is a Myth.....

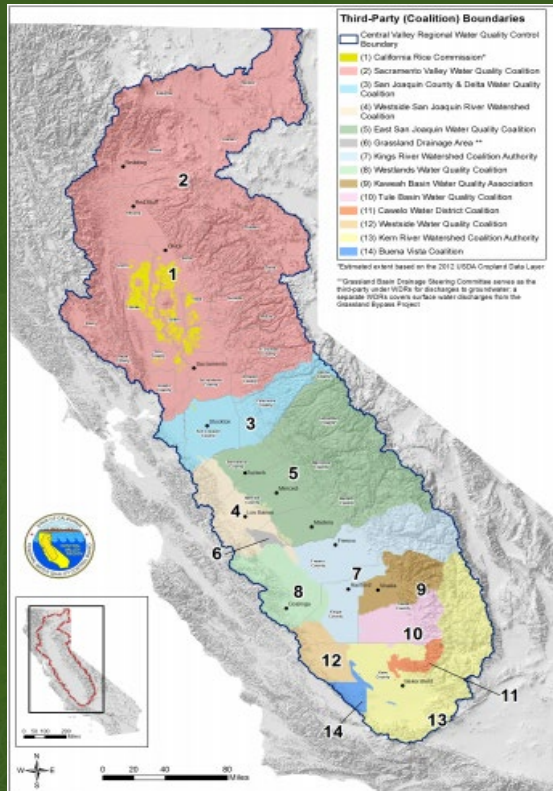
....because it is possible to treat agricultural pollution as a point source with regulatory policy tools and permits at the field level (see also Catherine Kling NYT editorial: <https://www.nytimes.com/2019/08/25/opinion/water-quality-agriculture.html>)

Hence, the real question is about comparative transaction costs: Do regulations, markets, or incentives have lower transaction costs?

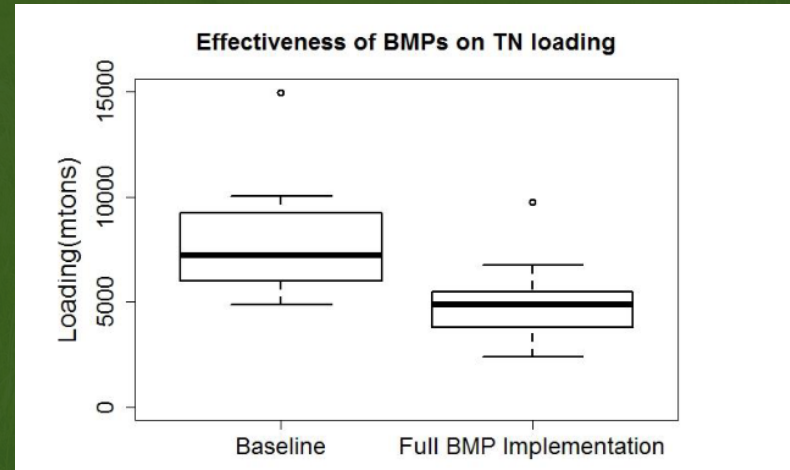
These questions are influenced by regulatory politics: Should the agricultural sector be held accountable via regulatory costs, or receive incentives or property rights for markets?

Don't Believe Me? Three Flagship Regulatory Programs

California ILRP

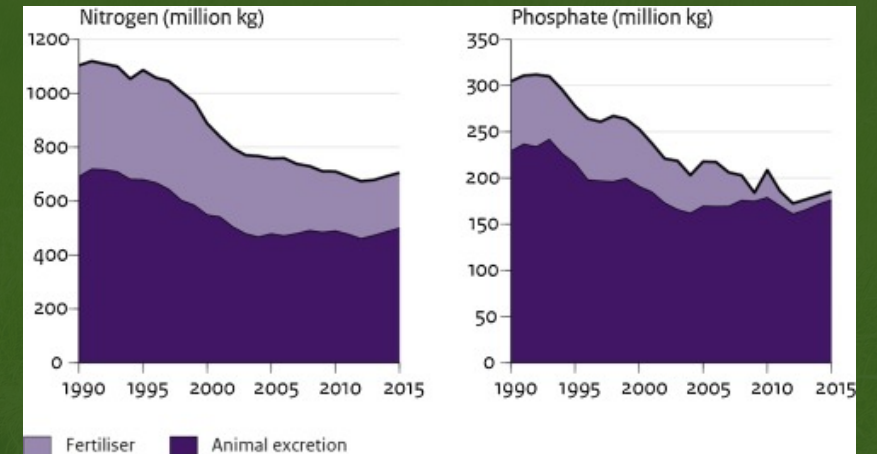


Everglades BMP Program



https://www.fdacs.gov/content/download/76316/file/NC2_FinalReport.pdf

EU Nitrates Directive (figures shows Dutch data)



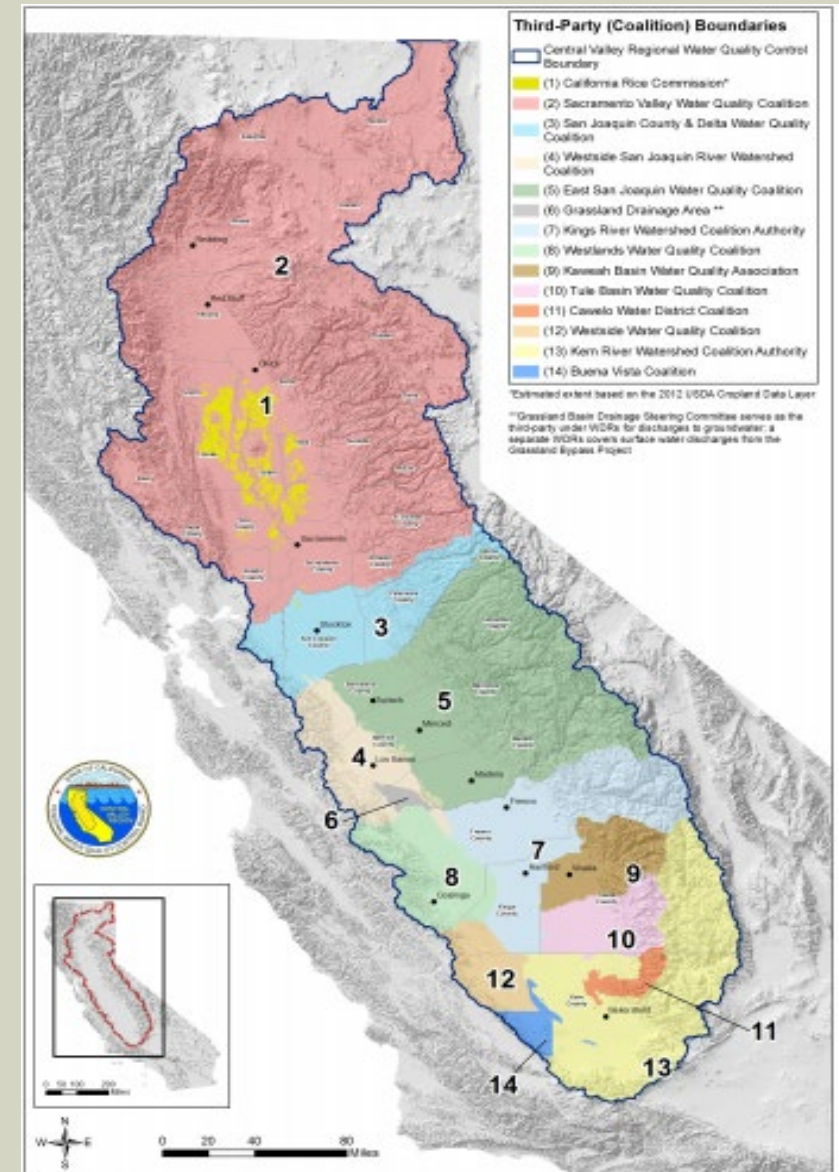
Van Grinsven, H. J. M., Tiktak, A., & Rougoor, C. W. (2016). Evaluation of the Dutch implementation of the nitrates directive, the water framework directive and the national emission ceilings directive. *NJAS - Wageningen Journal of Life Sciences*, 78, 69–84.
<https://doi.org/10.1016/j.njas.2016.03.010>

Irrigated Lands Regulatory Program in California

Requirements of growers :

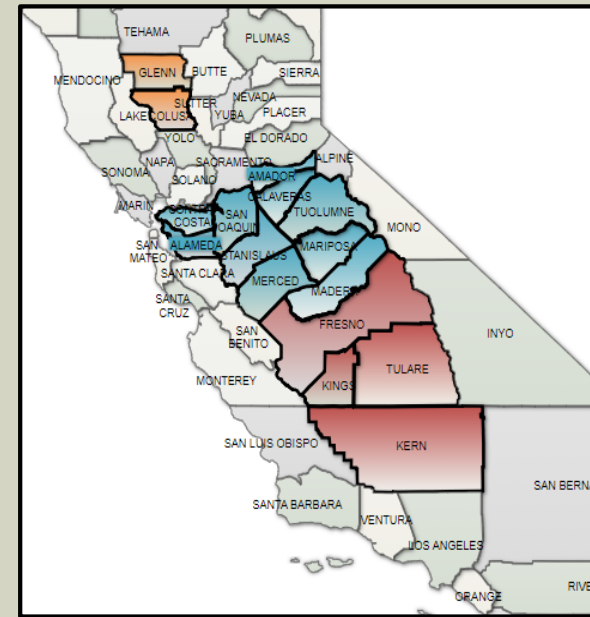
- Hybrid of collaboration and regulation: Join Coalition –OR– register individually with Water Board
- Reporting requirements:
 - **Farm Evaluation Plans (FEP):** management practices in use to protect surface & groundwater; report every 5 years
 - **Irrigation & Nitrogen Management Plan (INMP):** Irrigation and N application plan for crop year; must be certified if in “High Vulnerability Area”; report every year*
 - **INMP Summary Report:** actual N applied during crop year and removed in harvest (based on crop yield); every year*
- Monitor nitrates in domestic wells located on irrigated parcels and inform any residents on land of exceedances*
- Practice farm management techniques that are protective of water quality

*Regulatory order update adopted by State Water Resources Control Board in spring 2018



Mixed Methods for Studying Grower Decision-Making

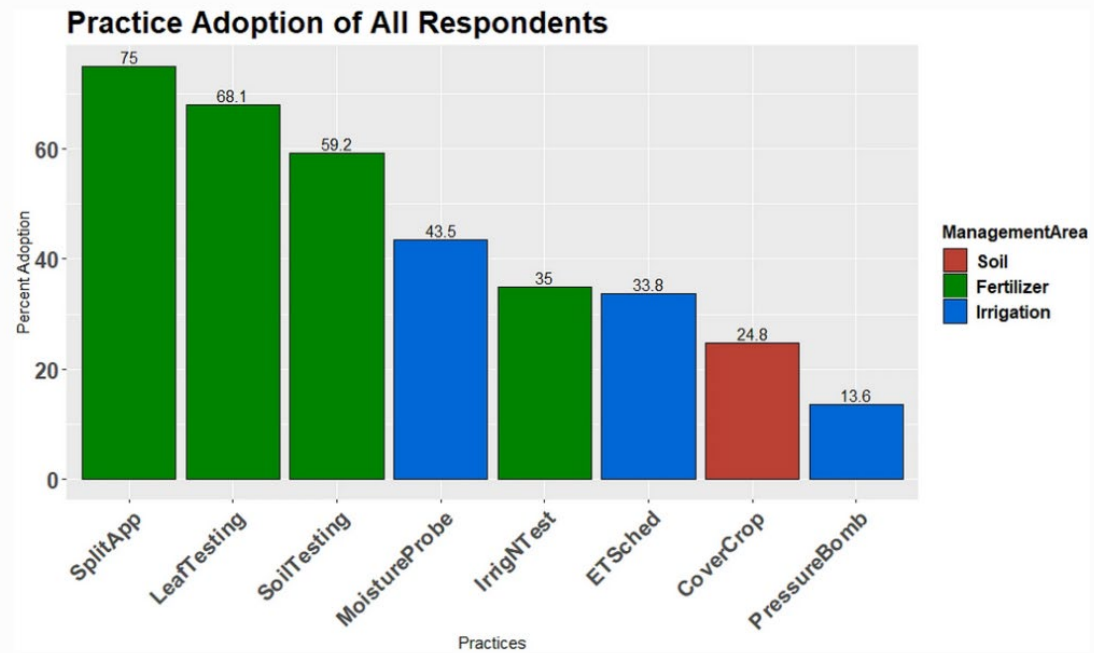
Data collection mode	Regions	Sample size (response rate)	Research Focus
Grower meeting surveys (in person)	<ul style="list-style-type: none">NSJV – 2 coalitionsSSJV – 7 coalitions	<ul style="list-style-type: none">NSJV n=565 (~35%)SSJV n=528 (~30%)n=1,093 total	<ul style="list-style-type: none">Practice adoption ratesPractice-specific barriers
Grower and key informant interviews	Central Valley wide	<ul style="list-style-type: none">18 growers5 farm advisors1 Regional Water Control Board(pending 3 Coalition directors)	<ul style="list-style-type: none">N mgmt as a piece of the “farm system”Perceptions of N regulations, ILRP, Coalitions
Grower mail surveys	<ul style="list-style-type: none">NSJV – 3 coalitions:<ul style="list-style-type: none">CGSPSJDESJ(Spring 2020) SSJV – 7 coalitions	<ul style="list-style-type: none">CGSP n=377 (31%)SJD n=312 (15.5%)ESJ n=183 (14.5%)n=965 total	<ul style="list-style-type: none">Adoption behavior & predictor variablesAttitudes & awareness of N problemOpinions on ILRP and Coalitions
Participant observations	<ul style="list-style-type: none">NSJV Coalition meetingsCentral Valley Regional Water Board stakeholder meetingsGrower field days	<ul style="list-style-type: none">10 Coalition meetings10 CV Water Board Stakeholder meetings6 grower field days	<ul style="list-style-type: none">Coalition narratives to growers and to State Water BoardDiscourse on N management
Certified Crop Advisor & PCA surveys	(Spring 2020) Statewide	<p>Pilot studies (2018-2019):</p> <ul style="list-style-type: none">n=104 CCAsn=46 PCAs	<ul style="list-style-type: none">Advised N mgmt. practicesLinks between irrigation and N management



Key Behavioral Question: What Drives Practice Adoption? (also: read all reviews from Linda Prokopy's research group)

Fig. 2

From: [A farm systems approach to the adoption of sustainable nitrogen management practices in California](#)

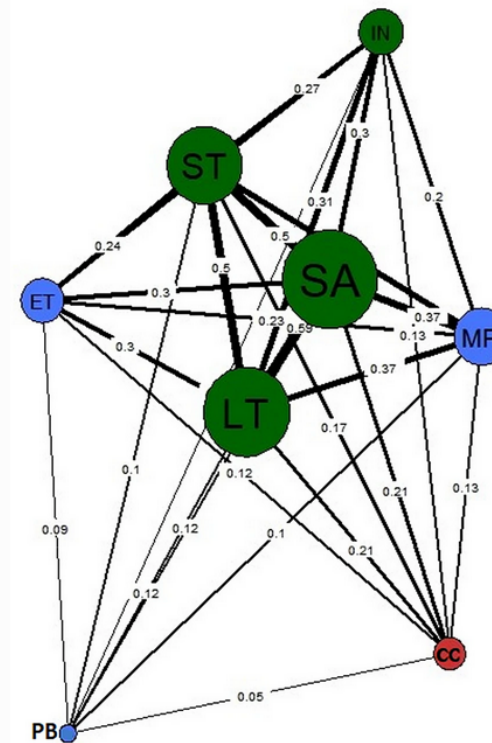


Individual practice adoption rates across all farms; colors indicate management area of the farm. (Color figure online)

Fig. 3

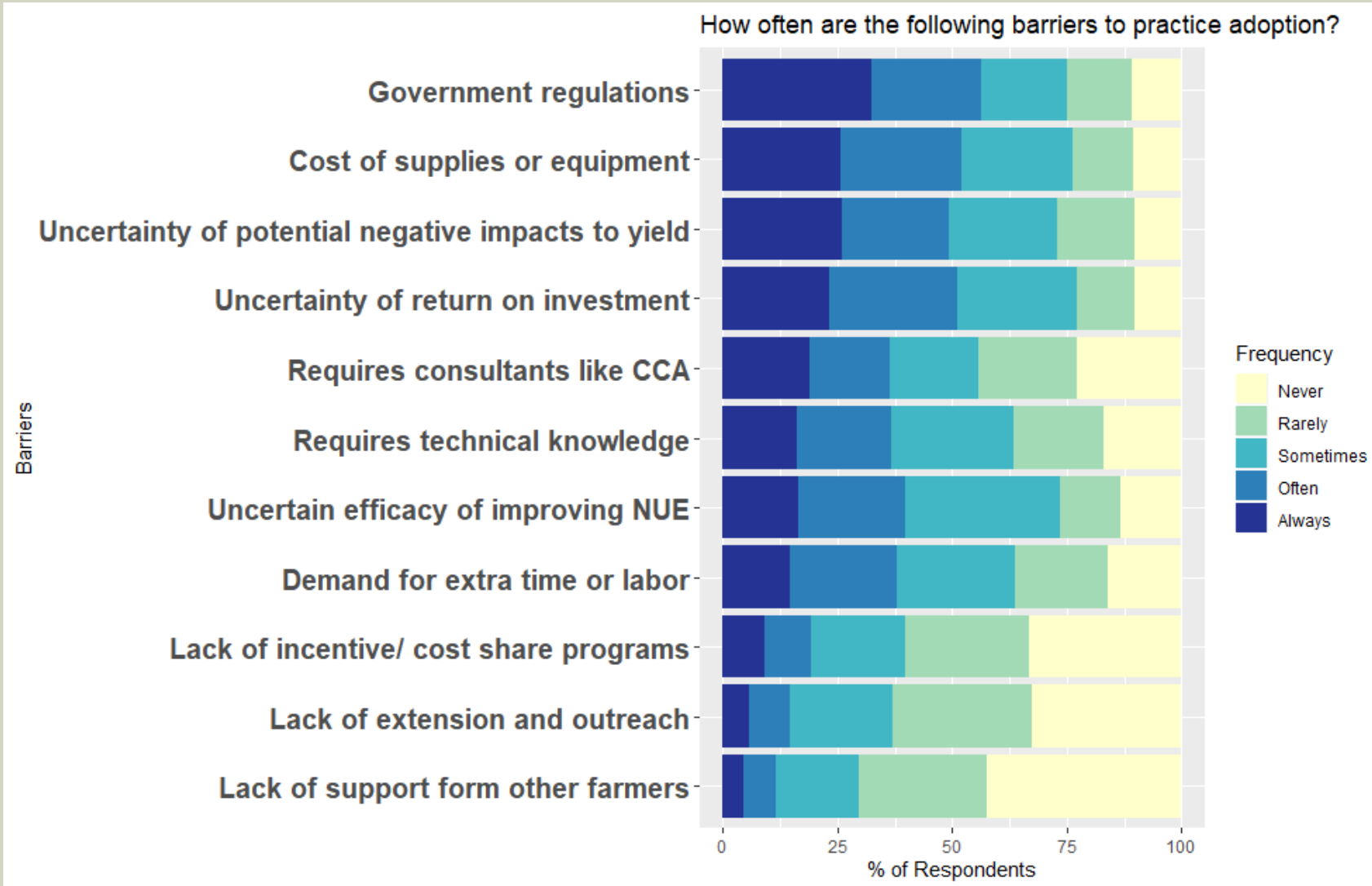
From: [A farm systems approach to the adoption of sustainable nitrogen management practices in California](#)

Practice co-occurrence network



Rudnick, Jessica, Mark Lubell, Sat Darshan S. Khalsa, Stephanie Tatge, Liza Wood, Molly Sears, and Patrick H. Brown. "A farm systems approach to the adoption of sustainable nitrogen management practices in California." *Agriculture and Human Values* (2021): 1-19.

Key Behavioral Question: What Barriers do Growers Face?



Key Behavioral Question: How does the IRLP affect decision-making?

Information-based policy tools facilitate California farmers' learning about nitrogen management

Authors: Liza Wood^{a*}, Mark Lubell^a, Jessica Rudnick^{a,b}, Sat Darshan S. Khalsa^c, Molly Sears^d, Patrick Brown^e

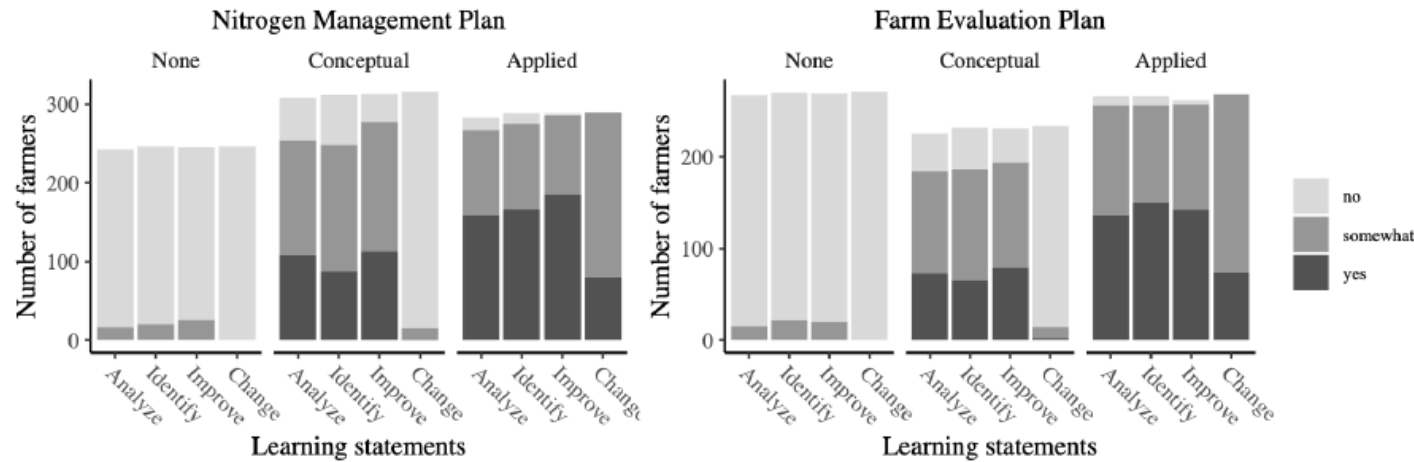
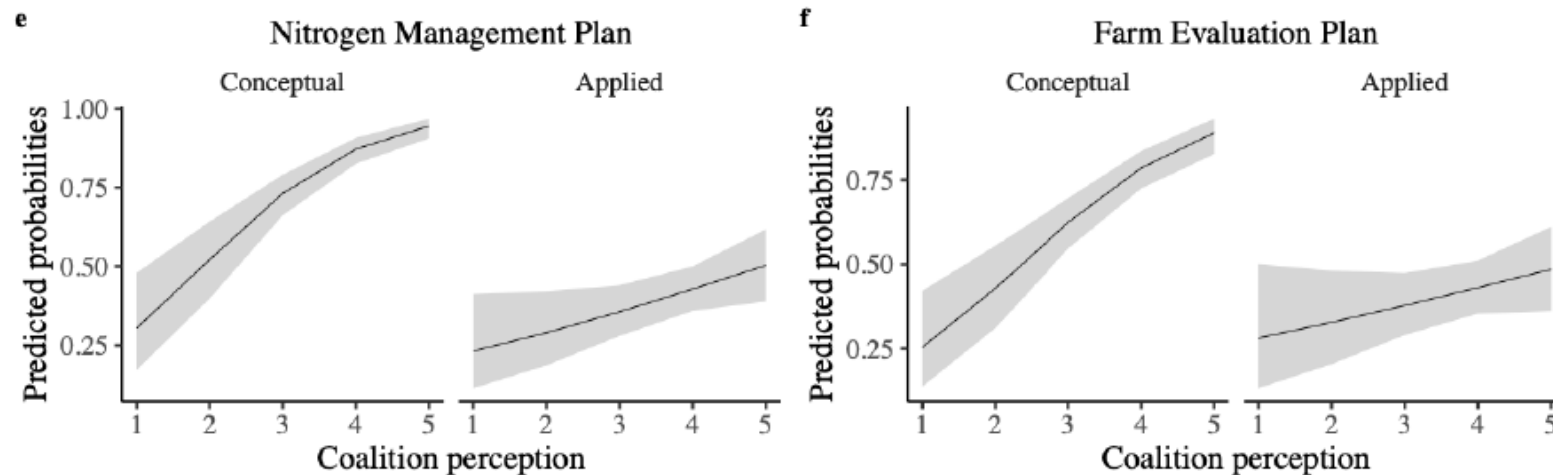


Figure 1. Learning stages variable construction



Conclusion

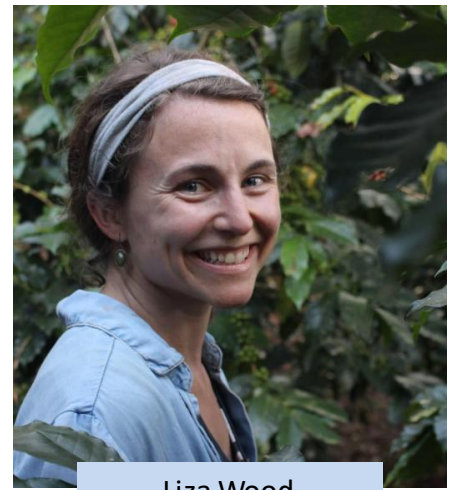


- ILRP's hybrid of collaboration and regulation important model, but is it strict enough?
- Requires a variety of behavioral research for linking program structure to decision-making
- Ultimately requires modeling and evaluation of actual N application and concentrations in groundwater and surface water.

This work was completed by an interdisciplinary team at the UC Davis Department of Plant Sciences and Department of Environmental Science and Policy and UC Berkeley Ag Econ, funded through a research grant provided by the California Department of Food and Agriculture's Fertilizer Research and Education Program (# 16-0621-SA)



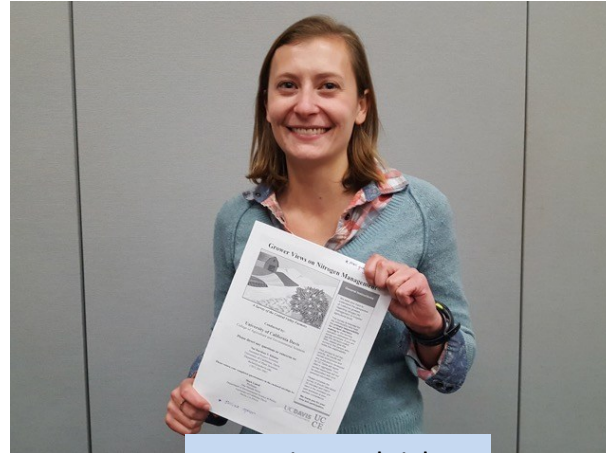
Molly Sears



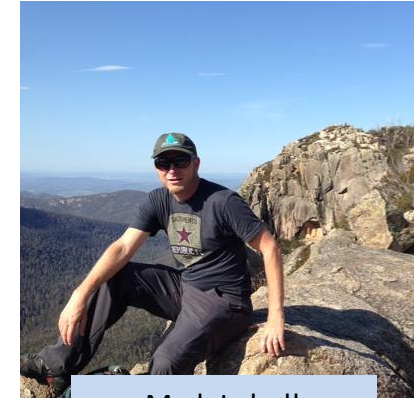
Liza Wood



Sat Darshan Khalsa



Jessica Rudnick



Mark Lubell



Patrick Brown



Stephanie Tatge