Nitrogen Management Practice Adoption Trends & Reported Barriers

Survey research update from UC Davis

Jessica Rudnick, PhD student

jrudnick@ucdavis.edu

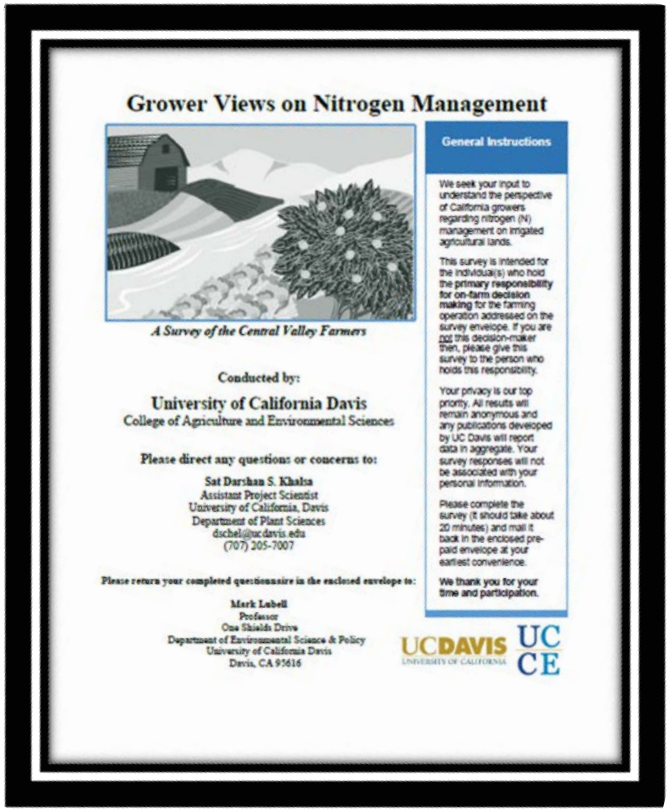
On behalf of research team:

Professors Patrick Brown and Mark Lubell

Sat Darshan S. Khalsa, Stephanie Tatge, Molly VanDop, & Liza Wood

CGSP Annual Grower Meeting

December 9, 2019



University of California
Agriculture and Natural Resources

FERTILIZER RESEARCH AND EDUCATION PROGRAM FREP

Project Team & Research Goals

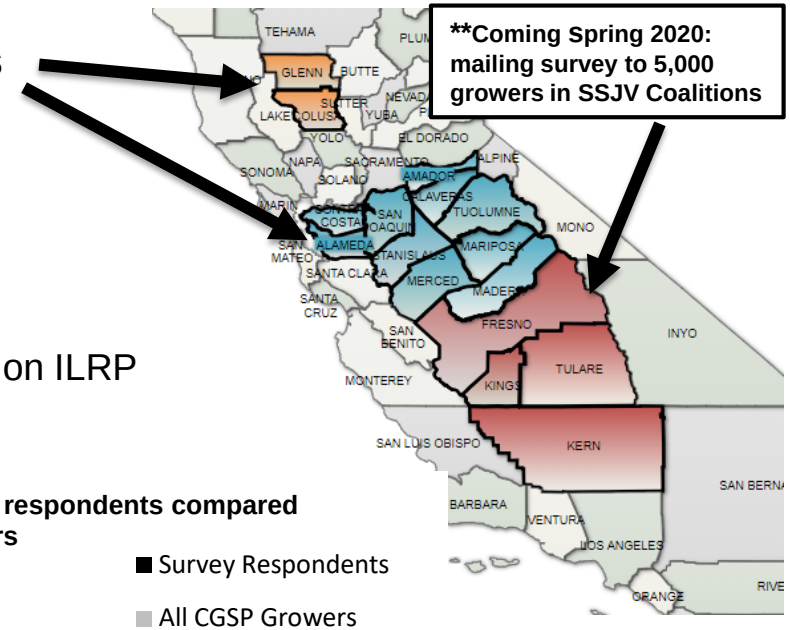
1. **Improve UCCE, Subwatershed Programs, and other information sources' outreach and extension by addressing grower-identified needs:**
   - Identify, understand and overcome barriers to adoption and expand factors that enable/ motivate adoption
   - Improve access & reliability of information about nitrogen management practices and regulations

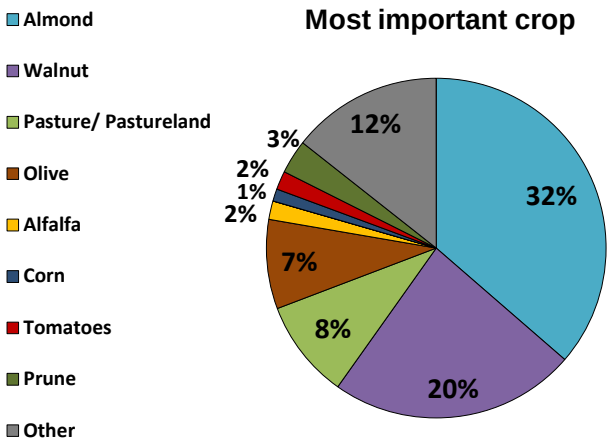
2. **Provide feedback to Subwatershed Programs & Central Valley Regional Water Board on the Irrigated Lands Regulatory Program**
   - Highlight growers' perspectives on the program: what works vs. what could be improved

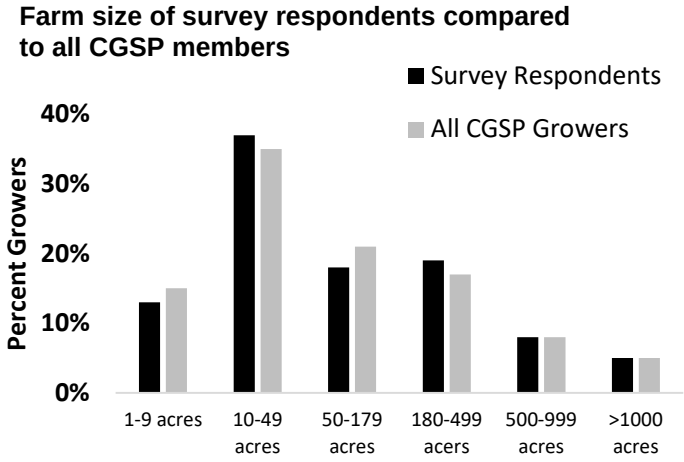
Grower Views on Nitrogen Management Survey

2018: mailed survey to 5,000 growers in 3 Coalitions

- 966 responses (~19% response rate)
  - **377 response from CGSP (31% response rate)**
- Adoption of 11 practices N management practices
- Farm operation characteristics & farmer demographics
- Attitudes, motivations, barriers, information source, opinions on ILRP





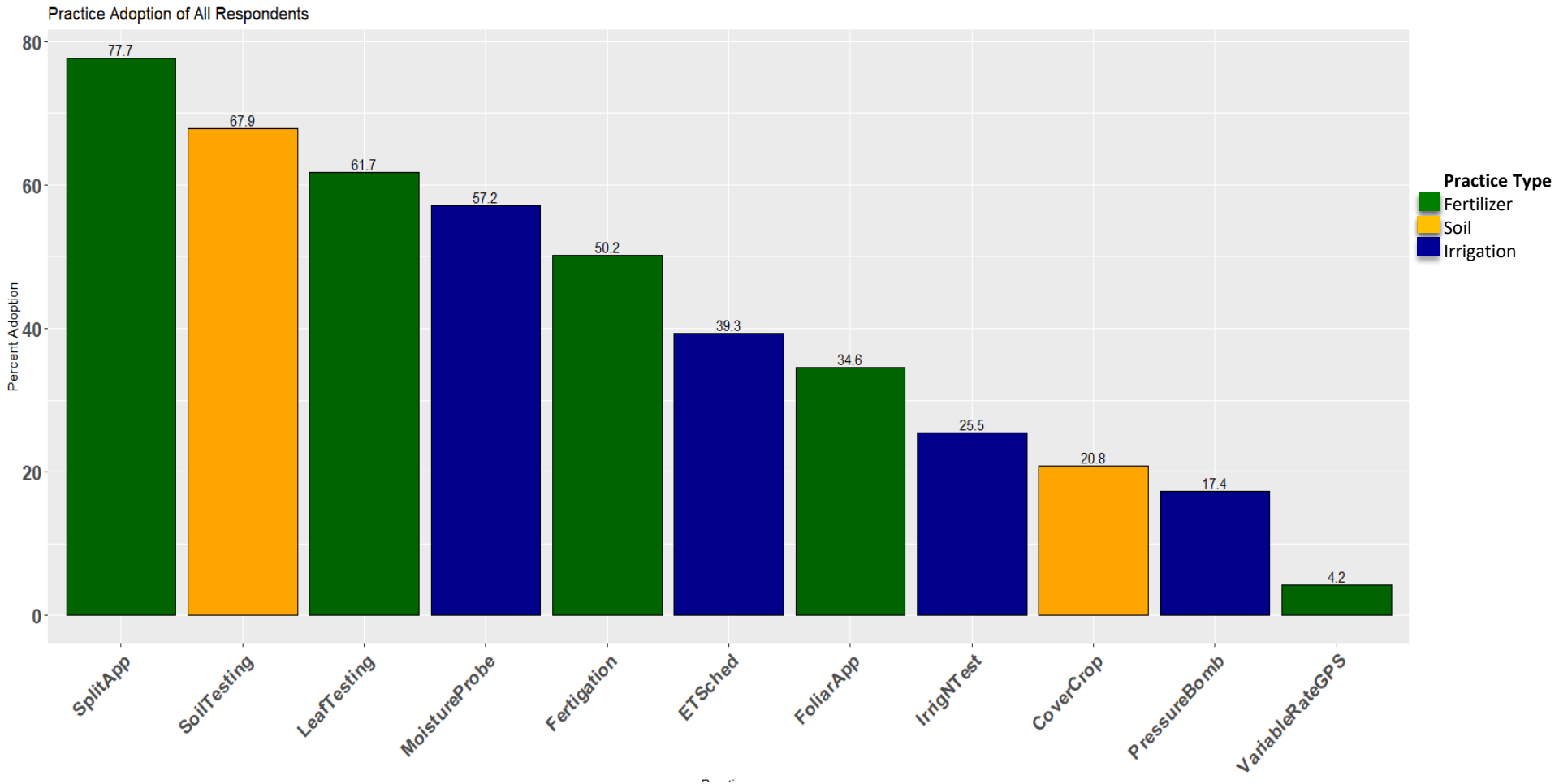


University of California
Agriculture and Natural Resources

4R's Nitrogen Management Practices

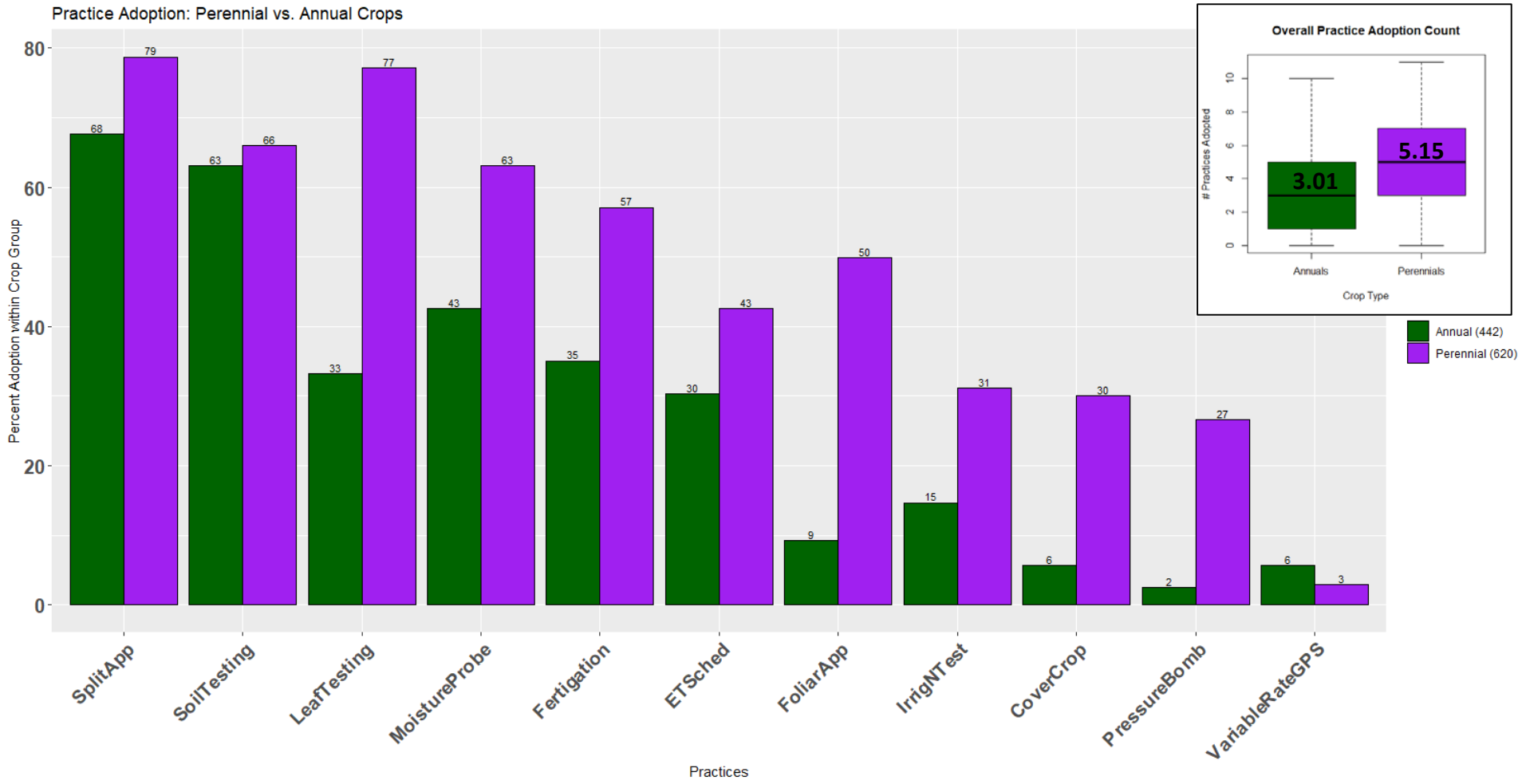
4 R Principles	Fertilizer Practices	Soil Practices	Irrigation Practices
			
Right source	• Appropriate form of N	• Appropriate C:N ratio of fertilizer	
Right Rate	• Nitrogen Budget • **Leaf sampling to determine plant-nutrient status** • **Variable rate application using GPS** • Slow release fertilizers or nitrification inhibitors	• **Soil sampling to determine residual soil nitrate** • **Cover crops** • **Compost/ organic matter**	• **Irrigation water testing to determine N** • **Pressure chamber to measure plant water stress** • **Moisture probe or soil sensors**
Right time	• **Split fertilizer applications**	• Time of field mechanics (tillage, disk, etc.)	• **Use ET to schedule irrigation**
Right place	• **Foliar N application** • **Fertigation**	• Soil type	• Check for distribution uniformity

Nitrogen Management Practice Adoption Rates



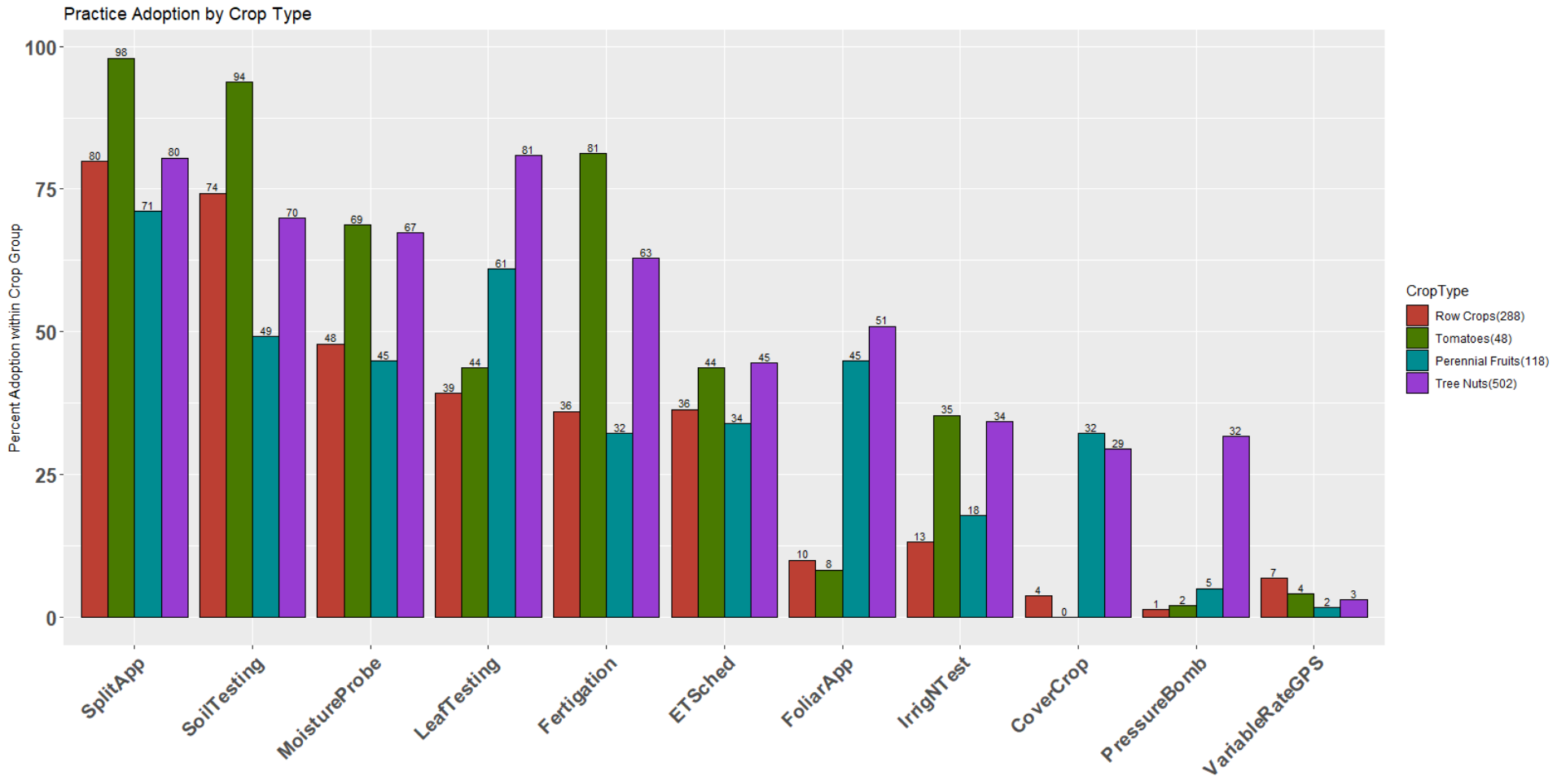
University of California
Agriculture and Natural Resources

Practice adoption rates by crop type

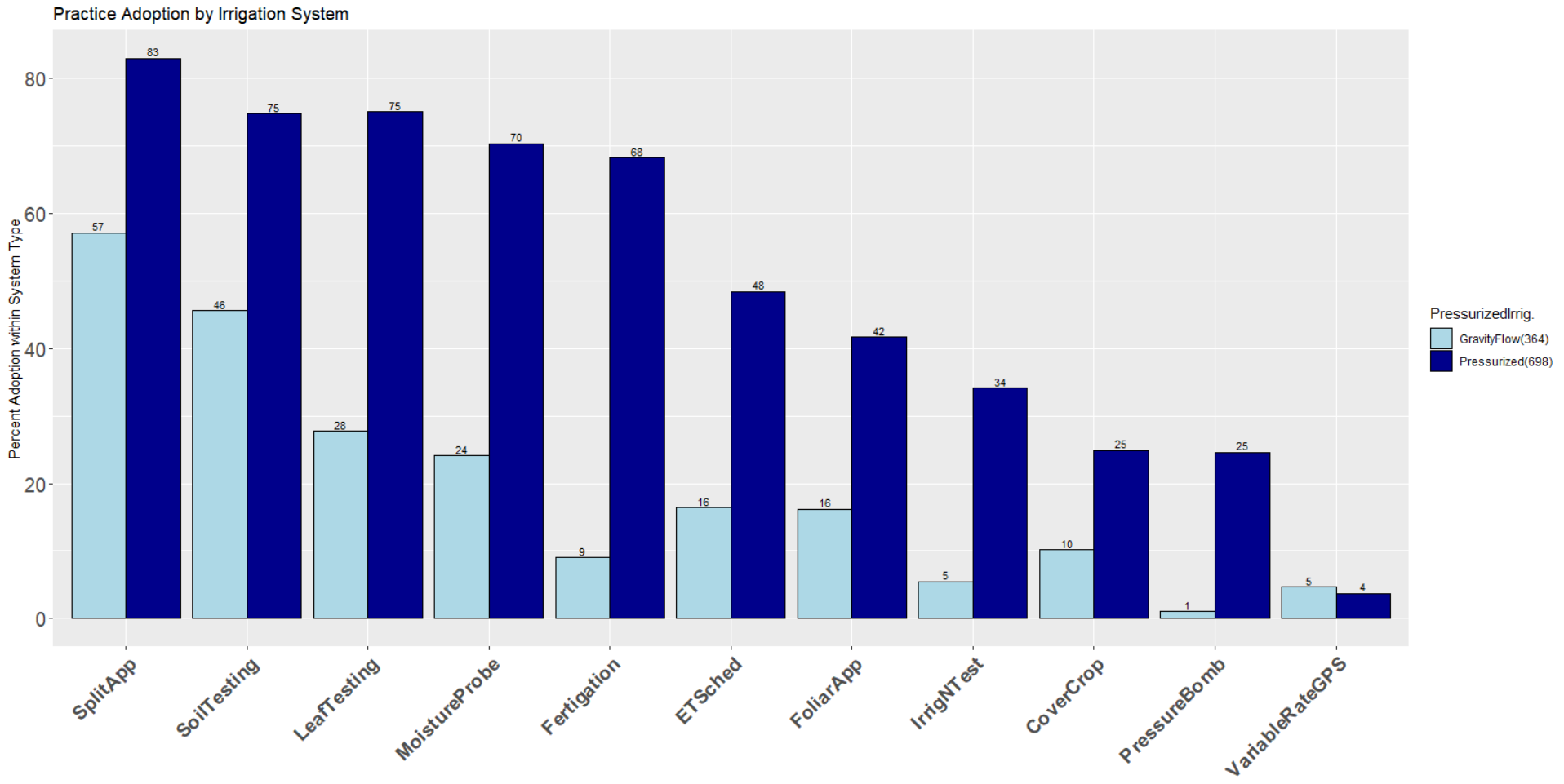


University of California
Agriculture and Natural Resources

Practice adoption rates by crop type

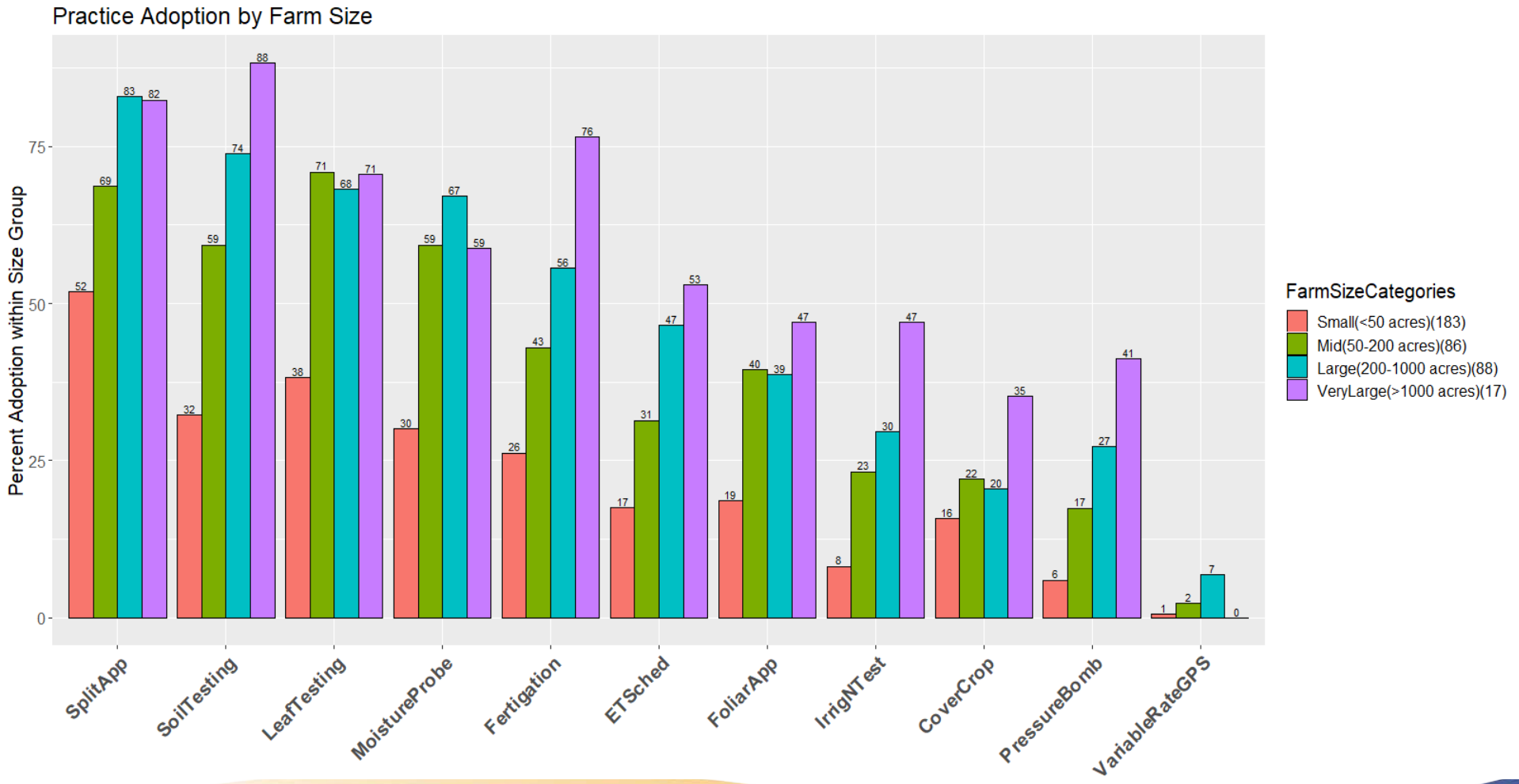


Practice adoption rates by irrigation system

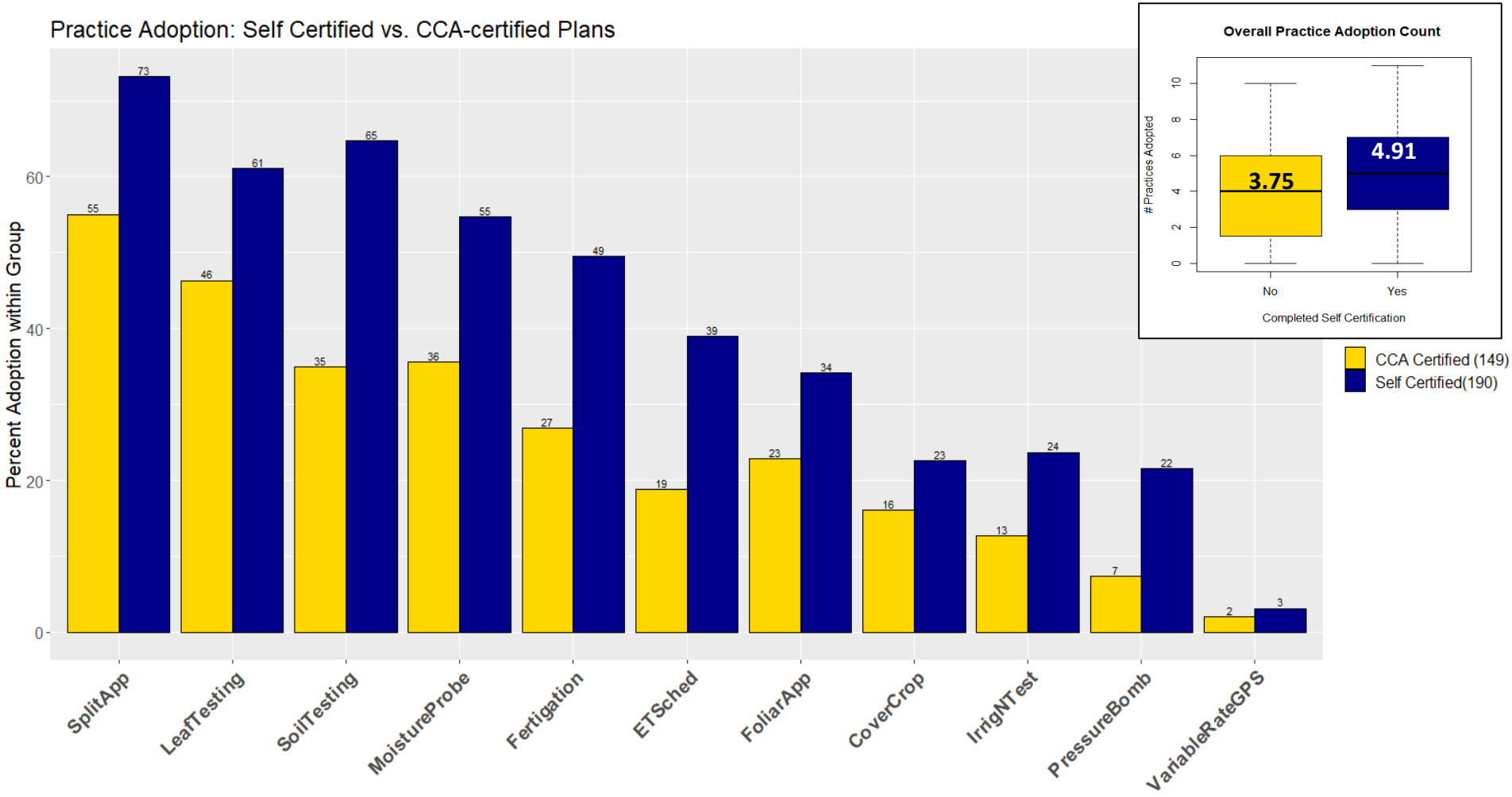


University of California
Agriculture and Natural Resources

Practice adoption rates by farm size

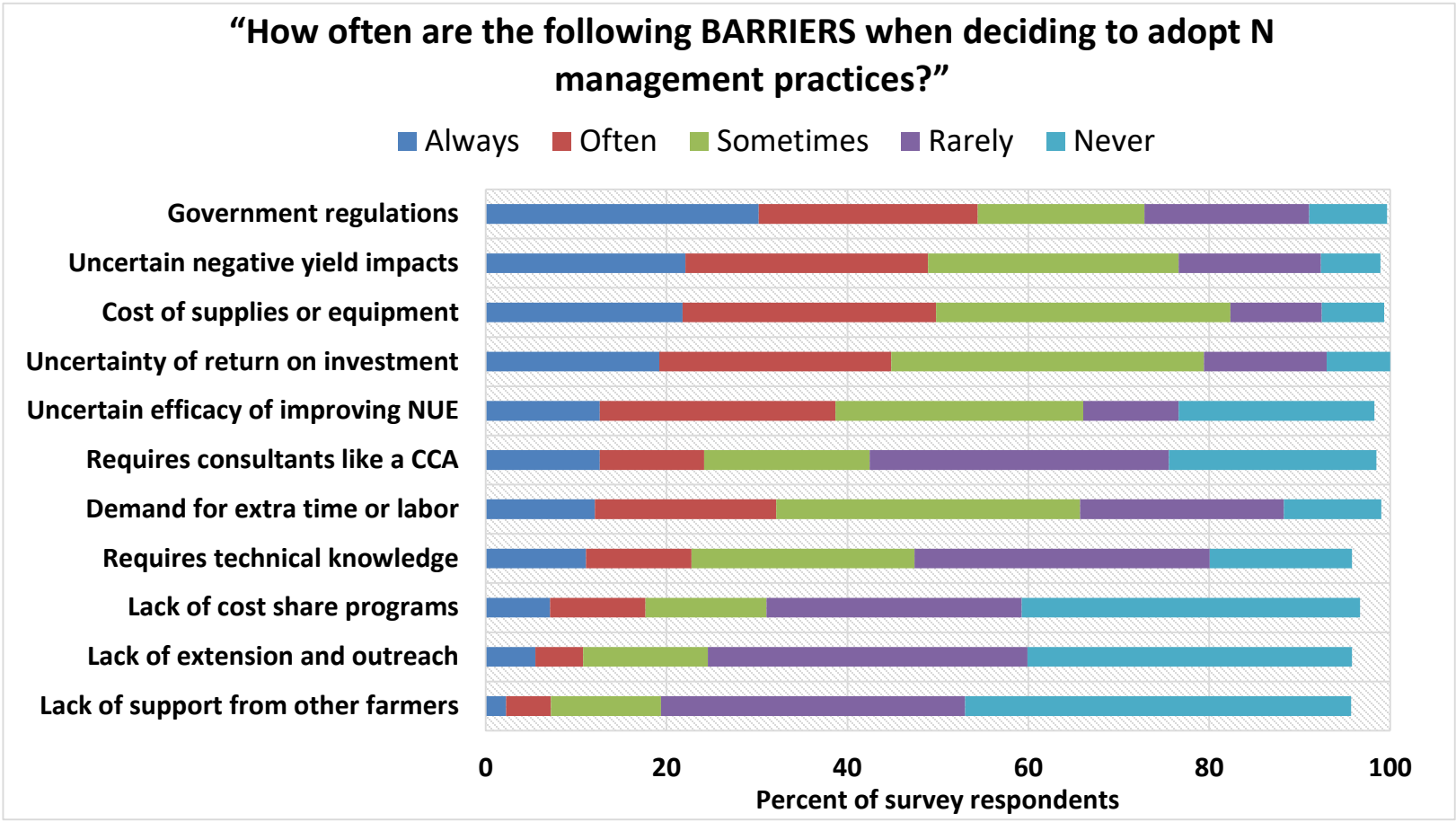


Practice adoption rates by Self Certification

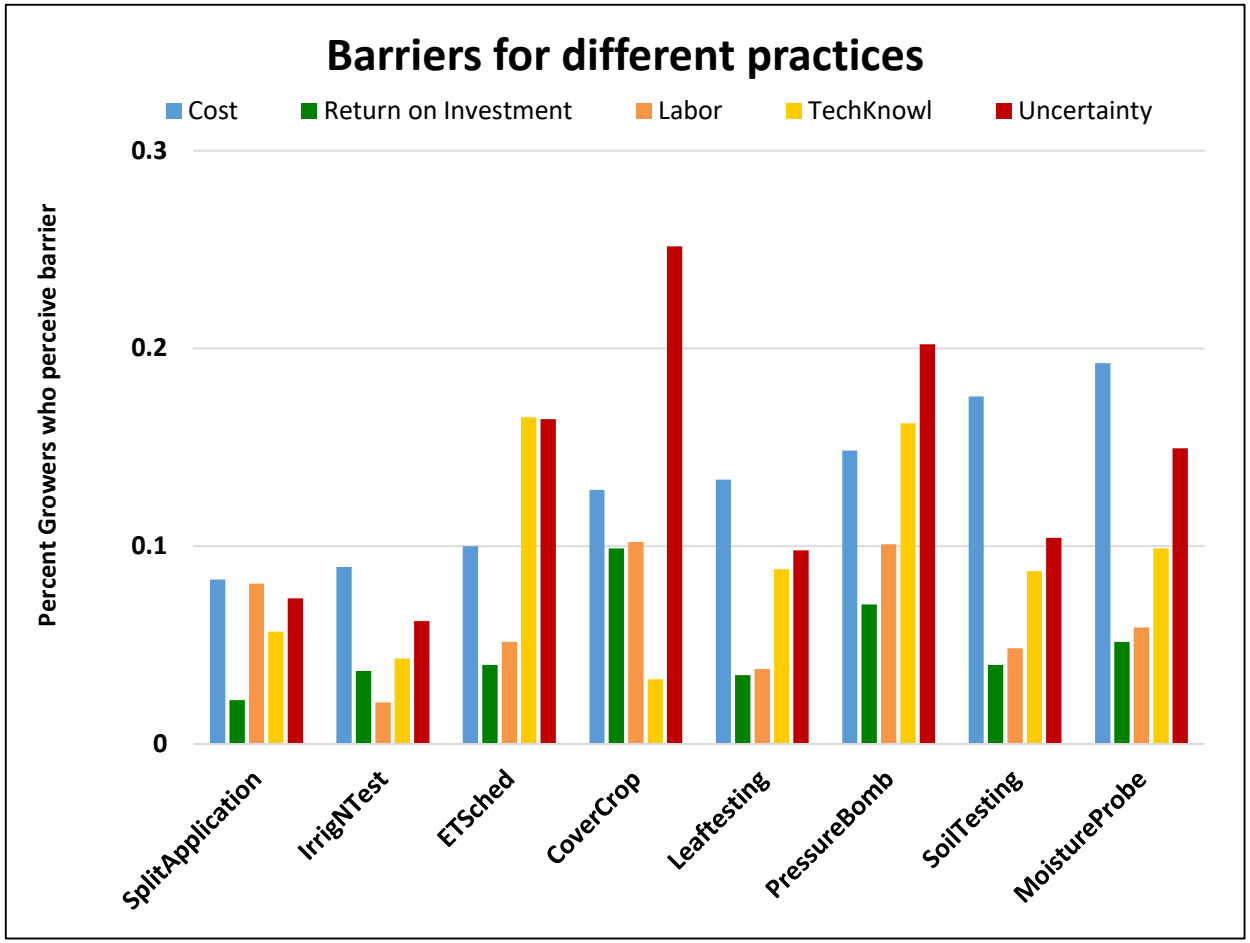


University of California
Agriculture and Natural Resources

Reported barriers to practice adoption



Barriers differ across practices & across growers



In summary

- **Key findings on adoption: farm & grower characteristics have large influence**
  - Perennial crop parcels & larger farms tend to adopt more practices overall and have higher rates of adoption for nearly all practices
  - Pressurized irrigation systems greatly facilitate practice implementation
  - Growers who have completed Self Certification course are more likely to adopt practices

- **Key findings on barriers to adoption: barriers vary across practices & across growers**
  - Largest barriers overall (effecting >50% growers some of the time): governmental regulations, uncertainty (yield impacts, economics, improve NUE), cost, time/ labor
  - Barriers vary across practices, with uncertainty, cost & technical knowledge being most important for most practices
  - Barriers to practices are perceived differently by those who adopt vs. do not adopt the practice

THANK YOU!

Questions?

jrudnick@ucdavis.edu

Thank you to Kandi Manhart, Larry Dominigini, Lester Messina & Bruce Houdesheldt for their support throughout this project!

This work is part of an interdisciplinary project in collaboration with Prof. Mark Lubell, Prof. Patrick Brown, Project Scientist Sat Darshan Khalsa, & graduate students Stephanie Tatge, Molly VanDop, and Liza Wood