

SUPPLEMENTARY INFORMATION

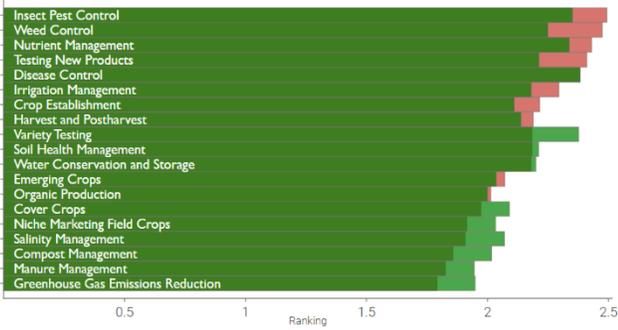
Setting research and extension priorities for agronomic crops in California.

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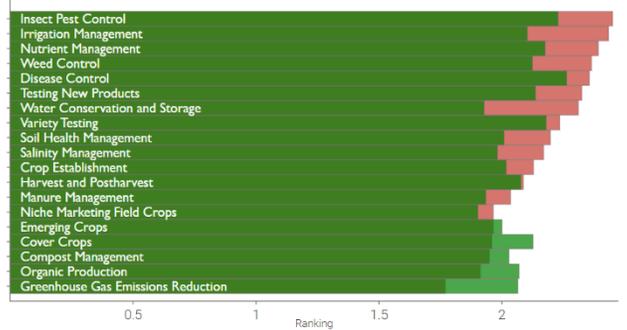
[California Agriculture](#)

■ Meeting Information Demand
 ■ Exceeding Information Demand
 ■ Not Meeting Information Demand

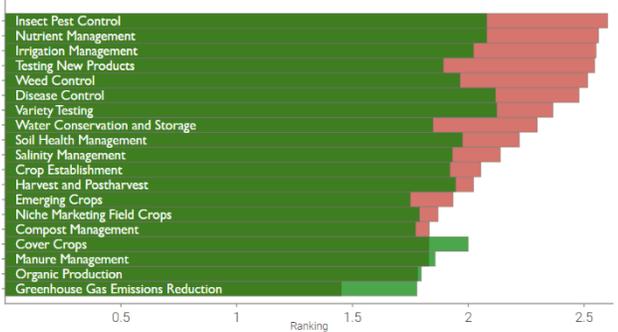
Rice



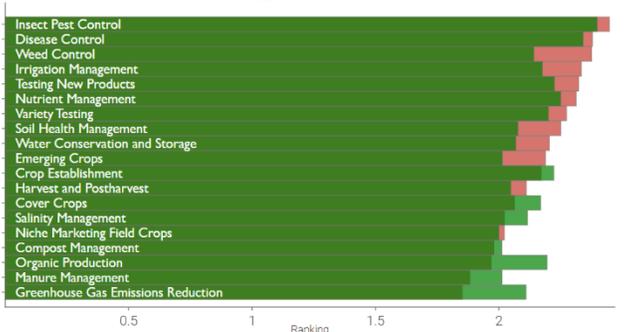
Corn grain



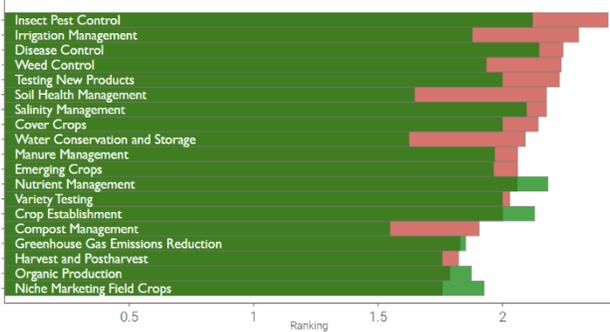
Alfalfa



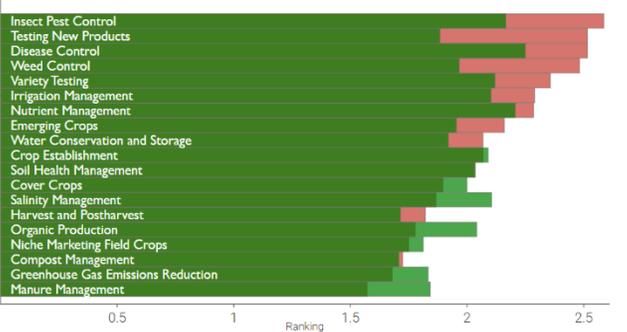
Wheat grain



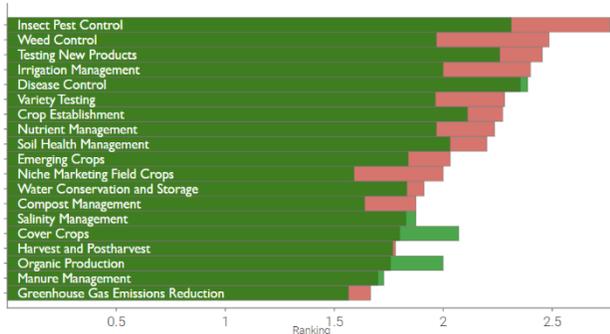
Cotton



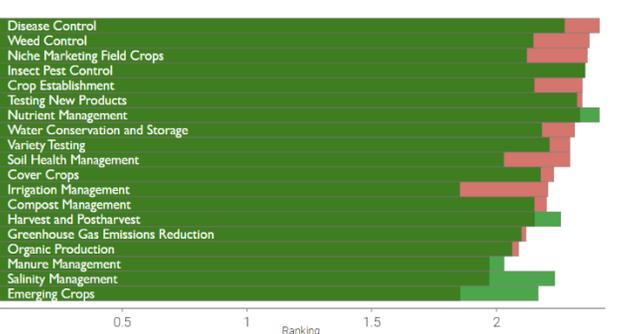
Sunflower



Dry beans

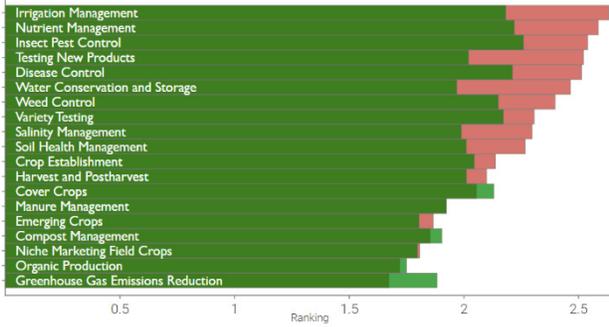


Barley

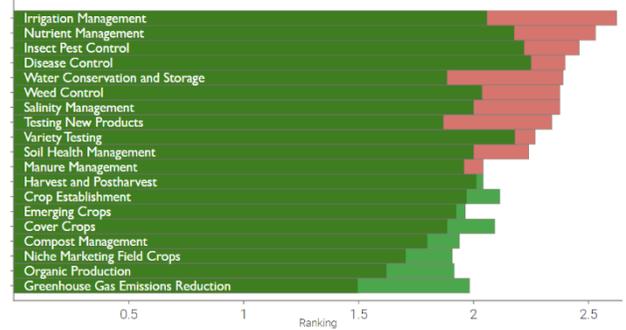


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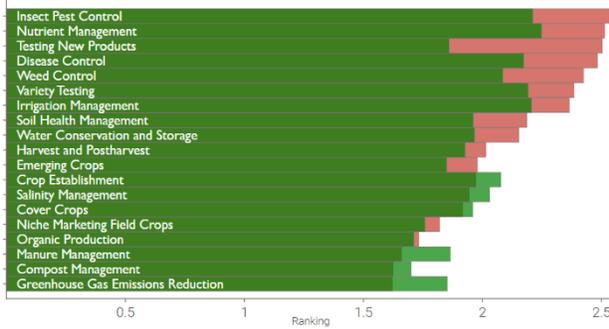
Northern San Joaquin Valley



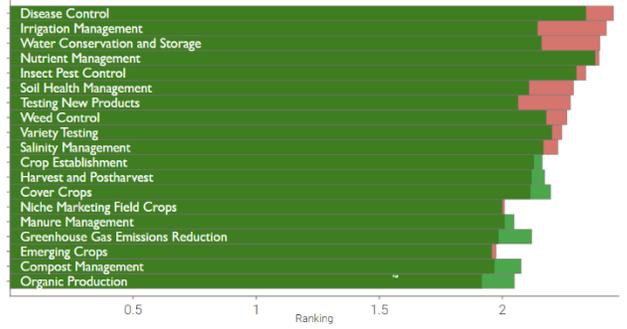
Southern San Joaquin Valley



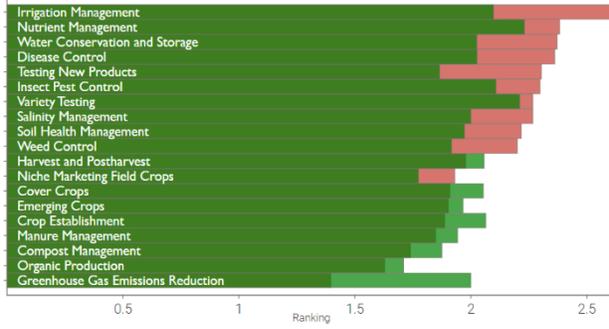
Sacramento Valley



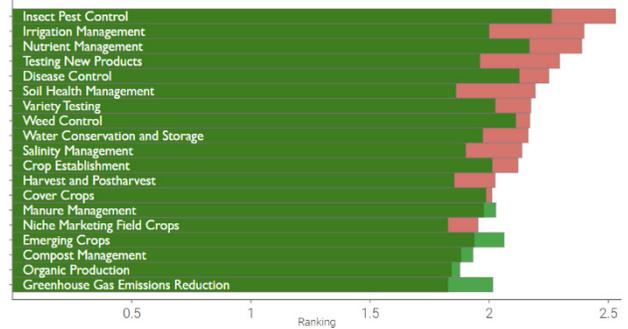
Coastal region



Desert region



Sierra Nevada



Supplementary Table 1. Demographic information for survey respondents. Demographic questions were optional, with 80% of respondents providing answers.

Category	Respondents	Proportion of total
	Number	%
Age		
Under 25 years	5	1
26-34 years	47	12
35-44 years	97	25
45-54 years	80	21
55-64 years	81	21
65-74 years	53	14
75 years and over	15	4
Prefer not to say	6	2
Race		
White or Caucasian	317	78
Black or African American	5	1
Hispanic or Latino	22	5
Asian or Asian American	4	1
American Indian or Alaska Native	7	2
Native Hawaiian or Pacific Islander	1	0.25
Other	22	5
Gender identity		
Male	308	81
Female	58	15
Identity not listed	1	0.25
Prefer not to say	15	4
Years of experience		
2 yrs. or less	6	3
3-9 yrs.	35	19
10-19 yrs.	56	30
20-29 yrs.	30	16
30+ yrs.	60	32

RESPONSES TO OPEN-ENDED QUESTION

Ideas for applied research and extension. If no sample size is indicated, the response was stated by one survey participant. If sample size is indicated, more than one survey participant had the same idea.

WATER RESOURCES AND MANAGEMENT

- Quantification of changes in applied irrigation water relative to soil health
- Management of limited irrigation water for alfalfa production
- Research on water holding capacity of multi-crop systems.
- Water storage and aquifer recharge (N=2)
- Drought tolerant hay crops
- Water conservation products that will reduce crop water use.
- Irrigation, nutrient, and salinity management.
- More practical educational workshops around irrigation
- Single use drip for pre-irrigation
- Irrigation scheduling
- New irrigation methods

SOIL AND NUTRIENT MANAGEMENT

- Carbon sequestration and productivity with organic compost in low fertility soils
- Salinity leaching below the root zone
- Nitrogen leaching with on-farm recharge
- Organic practices - particularly in organic rice production - for fertility and weed control
- Long term nutrient use efficiency in permanent crops (N, P, K)
- Dry fertilizer versus liquid
- Tillage equipment/practices
- Crop rotation combinations in respect to yield
- Soil health and profitability
- Variable rate application/seeding
- Soil moisture sensors/methods
- No-till rice production
- Soil health management (N=3)
- Nutrient management using manure, compost, and other organic fertilizers (N=2)
- Biochar
- Nitrogen use efficiency
- More cover crop alternatives for trees and vines.
- Crop rotation with minimum input crop management including small grain in rotation with vegetable crops.
- More research on "no till" and cover crops specifically as it relates to California crops.
- No till impacts on soil health
- Microbial additions for nitrogen management

- On-farm salinity forage trials
- Whole orchard recycling
- Alfalfa soil health benefits (carbon sequestration, alfalfa as rotation for other cash crops, aquifer recharge during dormant alfalfa)
- How to build organic matter in the soil (N=2)
- How to increase Mg in sandy soils to improve water holding capacity
- Use of limestone – impact on soil pH, Calcium availability as compared to Gypsum
- How much added microbes and fungi are dependent on soil pH and how much calcium they need to feed on to be healthy.
- Cover crops and erosion control
- Soil microbiology and invertebrate communities.
- Impact of one field crop on next crop (And how incorporation depth of the crop impacts the next crop)
- Grazing in a crop rotation that could be adapted to our conditions in California
- If cover crops with nematocidal properties can increase the productive lifespans of orchards
- Research looking at deep ripping foothill grazing lands to improve percolation during storm events
- Better understanding of soil quality as it relates to suitability for cropping
- Soil amendments for improving biomass production on pasture.

PEST, DISEASE, AND WEED MANAGEMENT

- Alternatives for pesticides that are approved in other states but not in California
- More testing done on pest management for beans
- Continued testing of new pesticides, specifically herbicides and fungicides (biologicals as well)
- Field trials with old vs. new products to look at pest resistance
- Herbicide resistant weeds in strip till programs
- Herbicide resistant weeds in rice
- Weedy rice control
- Stand establishment and weed control in organic rice (N=2)
- Herbicides for nutsedge in row crop farming
- Insect control
- Weed control for organic farms (N=2)
- Research on how we protect future pesticide availability for the Ag Industry
- Effect of pesticides on plant phytotoxicity for crops or products lacking data
- How to choose correct adjuvants when mixing multiple products or how to avoid incompatibles.
- Calibrating spin spreaders - importance of understanding effects of product density and speed on overlap and consistency of application.
- Pest economic thresholds
- How to incorporate newer crop protection products into IPM program, are there low risk products that will work
- Alternatives to glyphosate
- Weed trials
- Developing new herbicides or working with chemical companies to develop new MOAs

- Tank mixing herbicides insecticides and fertilizers together to build more efficient recommendations
- Expansion of non-input pest management (i.e. timing of bed preparation to alter the weed spectrum)
- Fungicide use
- Broomrape eradication

VARIETIES AND BREEDING

- Improve aromatic rice
- Alfalfa seed that can grow through the auto toxicity
- Research into heritage grain varieties
- Value-added cereal crops.
- Selected varieties of small grains and legumes as cash cover crops in an organic soil building rotation system
- New biotype of BA
- Rootstocks for Almonds in Solano County
- Variety Research
- Fine stem alfalfa
- Drought resistant grass
- Trials with different commodities in areas beyond San Joaquin
- Forage variety trials (N=2)
- Testing for pasture & harvested forage especially grass and legumes
- Corn trials
- Sugar beet trials
- Rice in the Delta

TECHNOLOGY

- New mechanization for tree nut production
- More aerial application products certified in Ca
- Automation and applied technology (Irrigation automation, drone tractors, robot cultivators, remote sensing and reporting)
- Researching and testing biostimulants
- New weeding technologies. Robotics, zappers
- Ways to reduce labor / mechanization

PRODUCTION, PROCESSING, & MARKETING

- Processing/exporting excess dairy manure as a value-added product and demonstrating its utility on non-forage crops
- Increase ease of use and predictability of subsurface drip irrigation systems using liquid manure.
- Processing greens for market
- More hemp production facilities in California

- Further and continued look at storage forages, preservation, conservation, utilization
- Alternative uses or new uses so the creation of niche industries for our products
- Involvement in promoting more foreign trade - studies on how much of our export hay is RRA versus conventional and organic and an understanding of what foreign market opinions actually are regarding these categories
- Help in management practices - cost accounting, software to reduce time in the office, access to data in the field
- Production and harvesting of alfalfa - new methods for softening windrows for improved leaf retention.
- More scientific method of planting
- Farmer control and access to "big data" and interpretation
- Testing and research done that results in improved yield / quality and lower costs.
- Are certified organic farm products worth the extra cost to the consumer?

GROWER CONCERNS

- Overregulation on small and family farms as well as young farmers is leading to corporate consolidation
- Issues that give support to farmers, growers to establish better pricing
- Academics not understanding on the ground realities
- Want to see more younger farmers getting involved in commodity boards
- Transitions to younger farmers, farm children, employee groups
- Adaptive, buffered, resilient farming systems under greater environmental and social uncertainty
- UCCE needs to keep researchers around long enough to catch up and conduct meaningful research
- Applied research positions are under paid and lacking resources to properly support agriculture in CA.
- There are too many resources being devoted to improving environmental quality and regulation compliance
- UCCE is straying away from its job of advising growers on improving cropping systems (N=2)
- More professional guidance, UCCE involvement and on-site teaching
- Better quality, relevant research out of the UCCE
- Having a Rice Advisor in Colusa County
- Focus on real world challenges and opportunities. Get away from theoretical process.