

# ON THE SOIL HORIZON

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## Summary of 2020 Needs Assessment for Soil Quality and Nutrient Management Program

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One of the most important tasks for a new UCCE advisor is to determine the needs of their clientele. There are many ways to conduct a needs assessment, including informal interviews, literature reviews, and surveys. This spring, I decided that I wanted to approach my needs assessment in a very comprehensive way, and I hoped to achieve multiple goals:

- First, I wanted to make sure that I introduced myself to the grower community so that they would know that I am an available resource.
- Second, I wanted to get to know who my clientele are, what challenges they face, and what sorts of soil quality and nutrient management needs they have.
- Third, I hoped to develop a contact list so that I could effectively extend information to those who were interested.

I believe I have achieved all three of these goals.

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On May 27, 2020, I mailed out 5,980 needs assessment surveys to growers in Fresno, Madera, Kings, and Tulare Counties. I got the addresses from the four County Ag Commissioners' offices in 2019 after requesting information for permit holders of all crops. As of August 25, 2020, I have received 597 completed surveys. A 10% response rate for this type of survey is a respectable result, and I am very pleased with it. I am also very happy to have 514 join my mailing lists.

The tables below show a breakdown of the data I collected. Note that participants had the option to select multiple choices, so the totals add up to more than 100%.

Are you a (mark all that apply)		
Occupation	Responses	% of Total Respondents (597)
Grower	579	97
PCA	51	9
CCA	25	4
Other	29	5
What county do you grow/consult in (mark all that apply)?		
County	Responses	% of Total Respondents (597)
Fresno	351	59
Madera	97	16
Kings	87	15
Tulare	216	36
Other	44	7
What crops do you work with (mark all that apply)?		
Crops	Responses	% of Total Respondents (597)
Field Crops	103	17
Vegetables	46	8
Trees	484	81
Vines	221	37
Other	14	2
How would you like to receive educational information on soil quality and nutrient management (mark all that apply)?		
Education Method	Responses	% of Total Respondents (597)
Newsletters-email	377	63
Newsletters-regular mail	264	44
Field days/meetings	203	34
Webinars	105	18
Blogs	32	5
Social Media	26	4
Other	14	2

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In addition to the multiple-choice questions, I also asked participants to answer three short-answer questions:

- What are the main soil quality and nutrient management challenges you deal with on the farm?
- What soil quality and nutrient management related topics would you like more research on?
- What soil quality and nutrient management topics would you like more education on?

The most commonly brought up topics were salinity, nutrients (specifically nitrogen), water infiltration, and sandy soils.

Not everyone chose to answer these questions. For the question on challenges, there were 480 responses. About 34% were related to nutrients (nearly half of those specific to nitrogen), 24% related to salinity, 24% related to soil structure or texture (compaction, sand, clay, etc.), 18% related to soil-water relations (water infiltration, water-holding capacity, leaching, etc.), and 13% related to pH.

There were 422 responses to the research question. Of these, 35% were related to nutrients (more than a third of the nutrient response were specific to nitrogen), 15% to alternative methods (cover crops, compost, manure, etc.), 12% related to salinity, 12% soil-water relations, and 9% were related to soil structure or texture.

There were 387 responses to the education question. Of these, 35% were related to nutrients (more than a third of the nutrient responses were specific to nitrogen), 16% to alternative methods, 11% related to salinity, and 11% related to soil-water relations.

I am so grateful to everyone who participated in the survey. It is immensely helpful to know what your priorities are, and it will help me when choosing what research to consider and what extension topics to cover in the future in order to serve you all better.

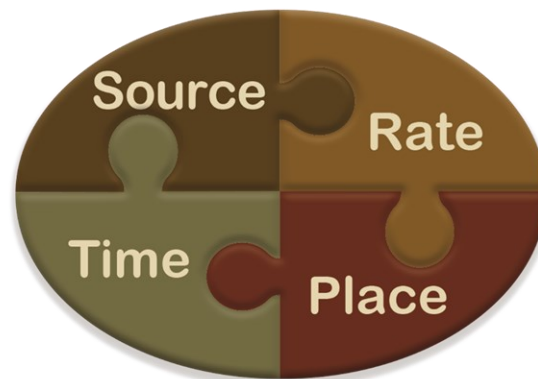
## Finding the Right Fit: 4R Fertilizer Management and Nutrient Stewardship

Anthony Fulford, Farm Advisor, Nutrient Management/Soil Quality, UCCE Merced, San Joaquin, and Stanislaus Counties

Sustainable agriculture minimizes risks and optimizes beneficial economic, social, and environmental outcomes. Proper fertilizer management is crucial to sustainable agriculture because it not only optimizes profitability, but guards against the pollution of surrounding natural ecosystems and groundwater resources. The 4R concept has been used for decades and remains a cornerstone of nutrient management used by consultants, agronomists, and conservationists. More recently, there has been a focus on broadening the 4R concept by considering factors related to nutrient management that go beyond the 4Rs. This much broader nutrient stewardship perspective places the 4Rs within the wider landscape and recognizes the role of soil health and conservation in sustainable nutrient management.

### What is 4R Fertilizer Management?

4R fertilizer management matches fertilizers, or other plant nutrient inputs, to crop needs. The “4Rs” of fertilizer management refers to the Right rate, Right source, Right timing, and Right placement of plant-available nutrients. 4R fertilizer management is at the core of best management practices in sustainable cropping systems because it does not focus on the importance of an individual component, rather it recognizes the connection among individual components (**Diagram 1**). The 4Rs support on-farm production practices by aligning fertilizer management decisions with optimal



**Diagram 1.** 4R Fertilizer Management (<http://ipni.net>)

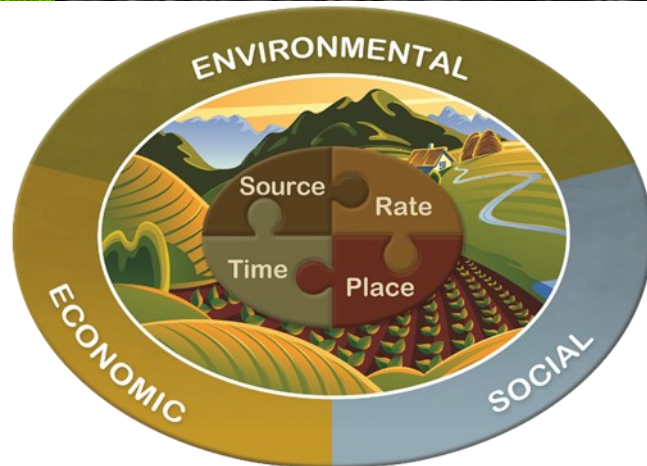
crop nutrient use efficiency, crop production, and harvestable yield. The initial focus of 4R fertilizer management

was on improving crop nutrient use. Consequently, 4R fertilizer management was mainly viewed as a way to support farm-level profitability. The pressure to meet the consumption demands of a growing population as well as the simultaneous need to eliminate negative environmental impacts has led to a renewed vision of the 4R concept for modern-day cropping systems. This newer 4R concept, known as 4R Nutrient Stewardship (4RNS), emphasizes how field-level decisions can be linked to ecosystem-level sustainability indicators such as soil health, air, and water quality.

### What is 4R Nutrient Stewardship?

4R Nutrient Stewardship links site-specific fertilizer

management to landscapes and ecosystems using indicators of economic, social, and environmental sustainability. The 4RNS concept still emphasizes 4R fertilizer management at the field-level, but the overall benefits and deficits of this approach are evaluated using indicators of sustainability that occur beyond the boundaries of an individual field. This idea is nicely conceptualized in the 4RNS schematic design (**Diagram 2**). The placement of the 4Rs within the wider landscape indicates that in addition to fertilizer management, conservation planning to reduce soil erosion and greenhouse gases, or increase biodiversity should also be considered best nutrient management practices. 4RNS is only the beginning of the fertilizer management decision-making process, further refinement of these general guidelines should be based on the limitations of site-specific nutrient use efficiency.



**Diagram 2.** 4R Nutrient Stewardship (<http://ipni.net>)

The 4Rs provide a general approach to nutrient management that can serve as a starting point for field-level fertilizer application decision-making. While the 4R concept is useful for guiding fertilizer management practices, the more recent desire to connect fertilizer management to broader sustainability indicators using the 4RNS concept will help identify when and where 4Rs succeed and what improvements may be needed to support 4R nutrient management.

**Resources and Additional Information**

**USDA-NRCS Conservation Practice Standard Nutrient Management (590);** [https://efotg.sc.egov.usda.gov/api/CPSFile/26404/590\\_CA\\_CPS\\_Nutrient\\_Management\\_2016](https://efotg.sc.egov.usda.gov/api/CPSFile/26404/590_CA_CPS_Nutrient_Management_2016); Note: USDA-NRCS periodically reviews and updates conservation practice standards

**A Brief Account of the Genesis of 4R Nutrient Stewardship;** <https://doi.org/10.1002/agj2.20315>

**September Announcements and Events**

**Sep 10**

9:00 am–10:30 am

**2020 Cover Crop Virtual Field Day**

*Recorded Video Presentations and Panel Discussion*

This event will include a pre-recorded overview of the 2020 warm-season cover crops at the Plant Materials Center in Lockeford, CA. A panel discussion entitled, “What’s New and Available for Fall Cover Crop Planting?” will take place during the live event using the free app Microsoft Teams.

To receive a registration invite, please email: [Shawn.Vue@usda.gov](mailto:Shawn.Vue@usda.gov)

**2020 Alfalfa and Forage Virtual Field Day**

*In-Field Video Presentations and Live Webinar*

A virtual field day will replace the annual Alfalfa and Forage Field Day held at the Kearney Agricultural Research and Extension Center. The traditional in-field tour will be replaced with a series of prerecorded in-field videos posted online prior to the webinar portion of the event. Registered attendees can access video presentations and join the live webinar to ask questions of speakers during a Q&A panel discussion.

**Register online:** <https://ucanr.edu/survey/survey.cfm?surveynumber=31830>

**Sep 23**

8:30 am–Noon

**Women for the Land Virtual Learning Circle**

American Farmland Trust and local conservation agencies are offering a Women for the Land Learning session. This series is intended for, “People who identify as women and play a decision-making role on agricultural land, be that as a landowner or producer, in MERCED, MADERA, or STANISLAUS counties.”

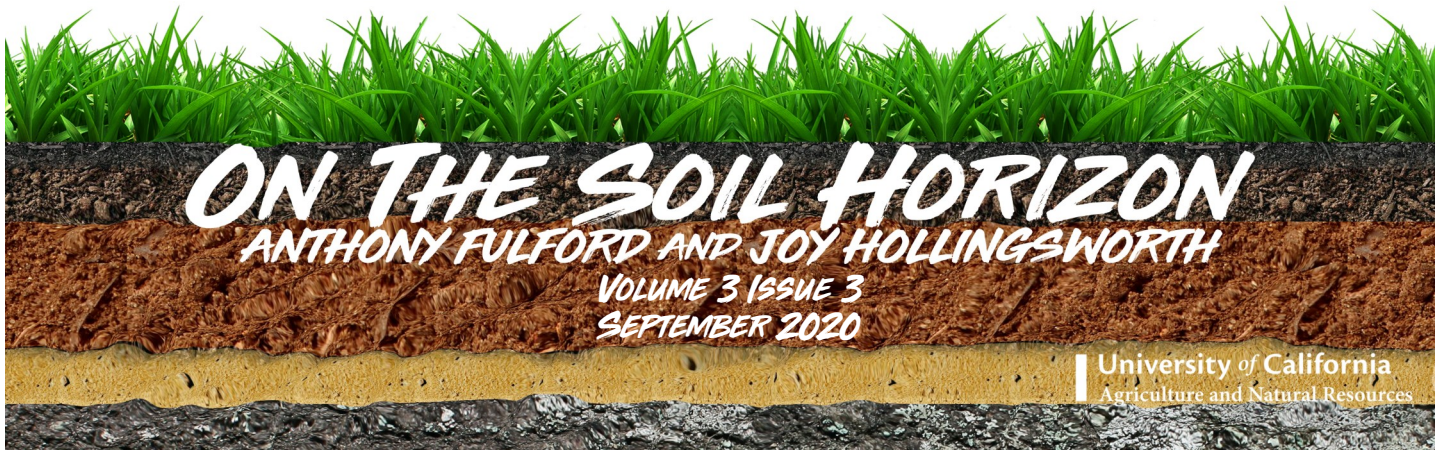
Discussions will focus on *Planning for Resilience in the San Joaquin Valley*.

**Register online:** <https://zoom.us/meeting/register/tJMvdeqtqzIsGNGd7m6k2z-uX9fcofK8pGIG>

**Sep 17 &**

**24**

3:00 pm–5:00 pm



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*Joy*

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