Soil Health Management CPA 116 & DIA 162 (CAPGP) to do list:

- Recruit an interested grower
- Schedule farm visit
- Visit farm and survey farmer and land
    - Conduct in field soil health assessment (visual and qualitative assessment) and collect ~1 gallon of soils (either use UCCE worksheet or NRCS croplands in-field assessment both at the bottom of this document)
    - Conduct slake test and infiltration test after soil is dried
    - Consider sending in a soil sample for lab testing (Ward Laboratories or Waypoint Analytical)
- Determine practices that will be included in soil health management plan (done in coordination with producer)
- Write plan
- Submit plan to CAPGP grants team at CDFA and wait for approval
- Share complete, approved plan with producer

To bring on your farm visit:

- Notebook and clipboard
- Soil health assessment worksheet (see end of this document)
- 2-3 aerial maps of the site (preferably ones you can see notes/drawings on)
- Sharpie
- 1 aerial map from Soil Web
- Phone/camera for photos
- Survey questions
- Shovel
- 2 gallon ziploc bags
- 3 flags

Survey questions for your first visit with the grower:

1. Land identification
    a. Farm name, owner name, street address or tract number, and county/state.
    b. Primary phone number of the participant
    c. Do you identify as a socially disadvantaged rancher or farmer? Does not affect eligibility, just something we need to track for our grant reporting
2. Land history
    a. How long have you been farming here?
    b. Do you know what was here before you farmed?
    c. What kind of soil amendments do you use?
    d. What is your soil management (cropland/perennial, till/no-till)?
    e. Have you implemented any kind of healthy soils practices?

   f. Have you tried to access funding in the past for healthy soils practices/did you come up against barriers to that funding?
   g. Have you done soil testing before and are those results accessible?
3. What goals do you have for your soil? (e.g. increasing infiltration, decreasing bulk density, decreasing nutrient runoff, building organic matter or soil carbon, etc.)
4. Are there any resource concerns or patterns that you've observed on your farm? Areas with poor drainage? Areas that experience more erosion? Pedestaling?
5. What practices are you interested in planning for (see list at end of document)?
6. Where would you like to plan for these practices? This may be a field, field border/margins. Try to get as specific as possible with the producer. Draw it out on a map together if possible.
7. What is an ideal timeline for implementation for you (NOTE: You will not be implementing as part of this plan, but the DIA should include detailed steps for how the farmer should proceed to meet their target timeline for one of your identified practices in the CPA)

NRCS CPS common practices for soil health management (DIA 162)

216 Soil Testing
327 Conservation Cover
328 Conservation Crop Rotation
329 Residue and Tillage Management, No-Till
334 Controlled Traffic Farming
340 Cover Crop
345 Residue and Tillage Management, Reduced-Till
484 Mulching
449 Irrigation Water Management
512 Forage and Biomass Planting
528 Prescribed Grazing
550 Range Planting
590 Nutrient Management
595 Pest Management Conservation System
610 Salinity & Sodic Soil Management
336/808 Soil Carbon Amendment

Supporting practices may be designed with primary practices over a transition period to provide the necessary means toward improved soil health.

314 Brush Management
315 Herbaceous Weed Treatment
324 Deep Tillage
330 Contour Farming
333 Amending Soil Properties with Gypsum Products
338 Prescribed Burning
342 Critical Area Planting
382 Fence

394 Firebreak
516 Pipeline
548 Grazing Land Mechanical Treatment
561 Heavy Use Area Protection
574 Spring Development
575 Animal Trails and Walkways
580 Streambank and Shoreline Protection
614 Watering Facility
642 Water Well

Farm:_____ Treatment:_____

Staff:_____ Date:_____

TESTTESTTEST

Test		Rep 1	Rep 2	Rep 3	Avg	Notes
Penetration Resistance	Compacted soil, flag bends readily, can only insert flag 0-2	___ in	___ in	___ in	___ in	
	Thin compacted layer, can only insert flag 5-7 in.					
	No compaction, can insert flag 12+ in.					

Infiltration	Rep 1 Infiltration Time	Rep 2 Infiltration Time	Rep 3 Infiltration Time

Status of Residues	Residues from last year are mostly intact, little to no signs of decomposition					
	Last year's residue shows some signs of decomposition					
	Residues are mostly well-decomposed					
Soil Coverage	% of soil covered by live or dead plant material (0-100%)					

Plant Roots	Roots are well branched and do not show signs of balled roots	☐ Rep 1	☐ Rep 2	☐ Rep 3	
	Fine root hairs branch off main plant roots	☐ Rep 1	☐ Rep 2	☐ Rep 3	
	No signs of lateral root growth along compacted or restrictive soil	☐ Rep 1	☐ Rep 2	☐ Rep 3	
	Soil aggregates are enmeshed within plant roots	☐ Rep 1	☐ Rep 2	☐ Rep 3	

Biopores	No visible biopores in sample					
	Some visible biopores in sample (3-7)					
	Many visible biopores in sample (10+)					
Biodiversity						
Abundance	No or low species abundance (0-1 individuals per species)					
	Some abundance (3-7 individuals per species)					
	High abundance (10+ individuals per species)					

	Rep 1			Rep 2			Rep 3		
Soil Color *(circle one)*	Pale	Light	Dark	Pale	Light	Dark	Pale	Light	Dark
Soil Odor *(circle one)*	Chemical	None	Fresh	Chemical	None	Fresh	Chemical	None	Fresh
Soil OM *(circle one)*	None	Some	Abundant	None	Some	Abundant	None	Some	Abundant
Soil Structure									
Aggregate Stability	Slakes App Index Score:			Slakes App Index Score:			Slakes App Index Score:		
N Quick Test	Nitrate ppm:			Nitrate ppm:			Nitrate ppm:		

Management History – Interview

The following questions are offered as examples to guide a conversation with the client and help the planner more thoroughly understand current conditions, the client's management and how these may contribute to existing soil health resource concerns. Answers to these and other similar questions will be helpful in assessing some of the indicators.

1. What is the crop rotation?

2. Describe your tillage system?

3. How long have you been in this management system and are you considering any changes?

4. For how many months per year is the soil surface at least 75 percent (estimated) covered with plants, residue or mulch?

5. Is cropland grazed? List animal type, number and weight.

6. Are cover crops a consistent part of the cropping system? If yes, for how many years has the field been continually covercropped?

7. How are the cover crops terminated?

Management History – Interview Cont'd

8. What integrated pest management strategies are used (e.g., crop scouting, selective spraying, treated seeds)?

9. What nutrient management strategies are used (e.g., banding, split application, use of the 4Rs, manure/biochar/compost)?

10. Is the field irrigated? If yes, what type of irrigation system and how many acre-inches are applied for each crop in the rotation described above?

11. Does water pond or run off during or immediately after typical rainfall or irrigation events? Where in the field?

12. Are there problems with crop emergence or early crop growth? Where in the field?

13. Is water management a concern (i.e., field too wet or too dry at planting)?

Other observations not captured in the assessment including plant condition and recent weather and landscape characteristics that may affect assessment results:

Clear Management History

Cropland In-Field Soil Health Assessment Worksheet

Soil Health Resource Concerns

- ☐ CPT: Compaction
- ☐ SOM: Soil Organic Matter Depletion
- ☐ AGG: Aggregate Instability
- ☐ HAB: Soil Organism Habitat Loss or Degradation

Location

Field/CMU

Tract #

Client/Customer

Plan

Date

Soil Map Units

Soil Moisture

Surface Horizon Texture

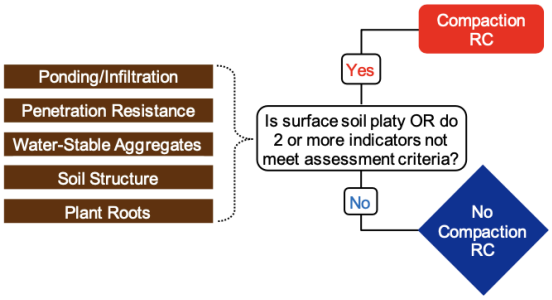
Indicator Timing and Use Anytime | After Rain or Irrigation | With Adequate Moisture | Before a Tillage Event Primarily No-Till Systems | Before Growing Season | During Growing Season | Interview	Meets Assessment Criteria (Yes/No)
Soil Cover | **SOM, AGG, HAB** • Surface cover from plants, residue or mulch; cover greater than 75% (estimated)	☐Y ☐N
Residue Breakdown | **SOM, HAB** • Natural decomposition of crop residues or organic mulch is as expected with crop and conditions	☐Y ☐N
Surface Crusts | **AGG, HAB** • Crusting on no more than 5% (estimated) of the field/CMU	☐Y ☐N
Ponding/Infiltration | **CPT, AGG** • No ponding on non-hydric soils within 24 hours following typical rainfall or surface irrigation event; • OR, no infiltration difference between assessment area and fencerow sample in the same soil type; • OR, soil infiltrates 1-inch of water in 30 minutes or less	☐Y ☐N
Penetration Resistance | **CPT** • Penetrometer rating <150 psi within top 6-inch depth and <300 psi in the 6 to 18-inch depth; • OR, slight or no resistance with wire flag inserted to 12 inches	☐Y ☐N
Water-Stable Aggregates | **CPT, SOM, AGG, HAB** • Strainer: soil structure remains intact with aggregates apparent; • OR, Soil Quality Test Kit (SQTK)/Jornada slake box meets stability class 5 to 6; • OR, Cylinder: At least 80% (estimated) remains intact after 5 minutes with little cloudy water	☐Y ☐N
Soil Structure | **CPT, SOM, AGG, HAB** • Granular surface soil structure and no platy or massive structure in top foot of soil	☐Y ☐N
Soil Color | **SOM** • No color difference between assessment area and fencerow sample in same soil type: • OR, value is on the darker range using color chart and official series description	☐Y ☐N
Plant Roots | **CPT, SOM, AGG, HAB** • Roots covered in a soil film (rhizosheaths) or are part of soil aggregates; • OR, living roots if present are healthy, fully branched, extended and unrestricted	☐Y ☐N
Biological Diversity | **SOM, AGG, HAB** • Evidence of more than 3 different types of organisms observed or biological hotspots present	☐Y ☐N
Biopores | **SOM, AGG, HAB** • Presence of multiple intact root or earthworm channels that extend vertically through the soil with some connecting to the surface	☐Y ☐N

Clear Worksheet | **Clear Worksheet Except Client/Customer, Plan and Date**

Cropland In-Field Soil Health Assessment Resource Indicator Decision Trees

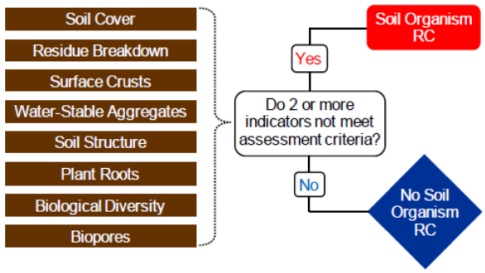
Compaction

Circle the indicators that do not meet assessment criteria during the evaluation and follow decision tree below to determine if the given resource concern (RC) is present. Document on Cropland In-Field Soil Health Assessment worksheet.



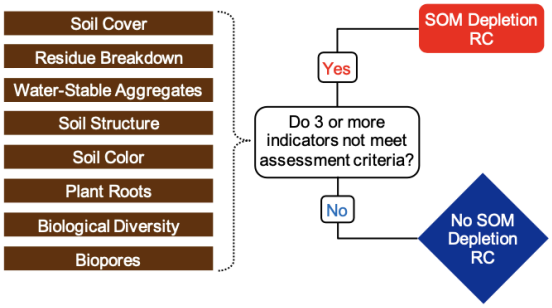
Soil Organism Habitat Loss or Degradation

Circle the indicators that do not meet assessment criteria during the evaluation and follow decision tree below to determine if the given resource concern (RC) is present. Document on Cropland In-Field soil Health Assessment worksheet.



Soil Organic Matter Depletion

Circle the indicators that do not meet assessment criteria during the evaluation and follow decision tree below to determine if the given resource concern (RC) is present. Document on Cropland In-Filed Soil Health Assessment worksheet.



Aggregate Instability

Circle the indicators that do not meet assessment criteria during the evaluation and follow decision tree below to determine if the given resource concern (RC) is present. Document on Cropland In-Field Soil Health Assessment worksheet.