

CSP Soil and Water Eligibility Tool For Cropland Applications

SWET version 4.0
April 2008

This document contains information about the background, applicability, necessary documentation, technical contacts, tips on asking and details about each question, as well as information on how to navigate around the SWET tool. Please browse through to see its contents. The Questions and Tips and Other Features sections should be especially useful to read before conducting your first CSP applicant interview.

Background

The Soil and Water Eligibility Tool (SWET), used nationally for the 2008 Conservation Security Program (CSP) sign-up, estimates soil quality (SQ) and water quality (WQ) conservation efforts on cropland, hayland, and grazed cropland. The number and type of conservation practices applied on the producer's CSP offered acres provides the basis for the estimate. A single tool to evaluate soil and water conservation effort increases the efficiency of cropland eligibility assessment because many of the conservation practices evaluated by the tool affect both soil and water quality. SWET answers the basic question, "does the producer address the minimum soil quality function and water quality concerns outlined by legislation?"

Management or conservation activities occurring during a rotation contribute to a cumulative SWET score. No one practice or set of practices is necessary; multiple combinations are possible for eligibility. The cumulative SWET score consists of separate scores for SQ and WQ, each including several critical functions or concerns. The functions assessed for soil quality (SQ) are organic matter maintenance, nutrient cycling and retention, physical stability, soil habitat, and soil moisture (and salinity, as applicable). The water quality (WQ) concerns included are nutrients and pesticides for both surface and groundwater, sediment and salinity. SWET uses minimum thresholds for each SQ function and WQ concern, all of which must be met for program eligibility.

There are many activities that contribute to multiple soil functions and/or water quality concern scores. For example, cover crops enhance several soil functions and contribute to improvements in water quality concerns. Conservation activities that are more effective or, in some cases, performed more frequently during the rotation are given greater consideration than activities that are focused on a single soil or water quality issue or performed only infrequently.

By answering yes or no, or entering appropriate values for a series of cropping system questions, CSP applicants will be assessed equally using the same tool across the country. When all of the answers are complete, a clear determination of CSP eligibility based on soil and water quality will be displayed. Eligibility requires a "yes" in each cell of the row marked 'Minimum Score

SWET v.4 Guidance and Instructions

Yes or No' (row 9, columns S – AE on the spreadsheet). Category Placement Score is the Total SWET Score found in cell AE57.

The tool is to be completed in the field office by the NRCS employee interviewing the applicant. The Soil Conditioning Index (SCI) may be used as a substitute for the SQ portion of the tool, if and only if, the WQ portion of the tool is passed. A positive SCI does not contribute to the accumulation of SQ points for category placement. Therefore, all applicable questions in the tool should be completed because the final score is used for category placement.

Considerations:

SWET is not a planning tool. However, an attachment to this document provides a list of possible scores for each practice. This list may be used by the NRCS conservationist to provide applicants with information about how they might improve conservation on their operation. Any such advice must also ensure that only practices which meet resource concerns are recommended, regardless of the scoring in this tool.

SWET allows the best stewards to document that they are addressing soil and water quality concerns. It also allows consistent implementation of a nationwide program with minimum requirements for soil and water quality. There may be situations where producers following local NRCS Practice Standards (e.g. Nutrient Management Practice Standard 590) will not be able to answer yes to the questions about conservation activities required by the tool. Regardless of the answers to individual questions, the tool should discern producers addressing soil and water quality issues from those that need to do more.

While soil quality standards are generally nonexistent, every state has standards for nutrient application, conservation requirements such as soil tests and buffers, as well as state water quality regulations. These standards, requirements and regulations are all rooted in appropriate conservation stewardship, but they may vary from state to state. In the process of implementing a national conservation program like CSP, a tool was required that assessed producers with a common yardstick. The conservation activities within SWET will not necessarily match state quality criteria. For example, the tool asks if producers have buffers at least 20 feet wide. There are some states with local laws requiring 100 foot buffers. Completing SWET does not advocate nor endorse stream buffers that are wider or narrower than state law or local NRCS Conservation Practice Standards.

Scale to apply SWET

SWET will be applied for each rotation on the offered acres (not field by field). It is not necessary that all fields or tracts in a rotation be in the same point of that rotation. For example, in a corn- wheat- bean rotation, if some fields are in corn and others wheat-bean at the time application, they should all be treated as the same rotation. If a rotation is inconsistent, then the most likely or representative rotation should be used.

After separate SWET runs are made for each common system/rotation on the offered acres, a weighted SWET score must be calculated for all the offered acres. A worksheet is provided ,

SWET v.4 Guidance and Instructions

found on the 'Weighted Avg Score' tab, to automatically calculate the weighted average for offered acres, once the acreage and SWET score is entered for each rotation. The total SWET score (or weighted average for multiple rotations) will be used to determine category placement. Therefore, all questions should be answered unless otherwise indicated on the spreadsheet.

Producer Documentation

The applicant does not necessarily need to provide documentation for each answer. But applicants should be informed the field checks will be conducted. Use your judgement about the level and amount of documentation needed. The following are examples of appropriate records and documentation provided by the producer:

1. Soil Conditioning Index, if used, (with positive value) provided by NRCS office
2. Crop rotation history, including cash, cover and perennial crops
3. Tillage, planting, and other soil and crop management methods used for production
4. Controlled traffic plan
5. Nutrient management records including:
 - Dates and application rates of all nutrients used
 - Weather conditions at application
6. Nutrient Management Plan that includes one or more of the following:
 - Realistic crop yield goals
 - Soil test results
 - Previous crop credits
 - Leguminous crop credits
 - Manure application history
 - Leaf tissue analysis (if appropriate)
7. Pest management records including:
 - Crop type and target pest
 - Type of pesticides used and dates and application rates
 - Cultural or biological control method(s) used and dates implemented
 - Spot treatments
8. Pest Management Plan that includes one or more of the following:
 - Scouting, followed by Banding, spot or directed pesticide application
 - Pest-free seed or transplants
 - Crop rotations, Trap crops
 - Biological pest control
 - Targeted irrigation
 - Equipment cleaning between uses

SWET v.4 Guidance and Instructions

SWET Evaluation of Soil Quality Functions and Water Quality Concerns

SWET evaluates the following soil quality functions:

- Organic matter - maintenance or accrual of organic matter and/or soil organic carbon
- Nutrients - optimized cycling of nutrients, plant availability, low loss
- Physical stability - minimized erosion and maximized structure and stability
- Soil habitat - optimal conditions for diverse soil food web, minimized disease and pest problems
- Soil moisture - water and solute flow, water availability to plants, optimal soil water quantity, and maximized quality, including salinity, as applicable

SWET evaluates the following water quality concerns:

- Pesticides in groundwater
- Nitrogen in groundwater
- Phosphorus in groundwater
- Pesticides in surface water
- Nitrogen in surface water
- Phosphorus in surface water
- Sediment in surface water
- Salinity and sodicity in ground or surface water

SWET Questions and Tips for Asking Them

SWET should be completed during the interview after determination and delineation of the applicant's control of the land. Each question or statement can be interpreted as asking the question "Is _____ (activity) applied on your offered acres?" A check or value response in the box indicates the answer and triggers an assignment of the indexing points. The tool can be used iteratively on different configurations of fields or potential CSP offered packages.

SWET questions and additional guidance for completing them follows. Carefully evaluate each question asked and answer as appropriate to receive a SWET score that is reflective of management activities taking place on the acres offered for CSP. See **Special Crops** following this section for additional guidance. **In the farmer focus groups, what worked was 1) explaining what each set of questions was about in general, 2) reading the question (at least the part in bold-face- you can skip parts that don't apply, such as exceptions for orchards), and 3) follow up by re-stating the question in plain language. Let's face it: making the tool applicable throughout the US made for some pretty complicated questions.** You will find suggested wording for points 1 & 3 in *Italics*, roughly in order of occurrence. You will also find notes, based on questions asked during the review period to help with interpretation scattered throughout.

NOTE: For every question, practices should be applied on all offered acres in the rotation, as needed (e.g. riparian buffers are only needed on fields bordering streams, grassed waterways are only needed in fields with concentrated runoff or gully erosion...).

SWET v.4 Guidance and Instructions

THE FIRST SET OF QUESTIONS ASKS BASIC INFORMATION ABOUT YOUR ROTATION, IT'S LENGTH, CROP TYPES, AND TILLAGE PRACTICES.

1. **Enter the length of your rotation in “years” for the offered acres.** The number of years is the time it takes to complete the entire rotation before you start with the first crop again. For example: corn-soybeans-corn-soybeans-wheat is a five year rotation. Winter wheat-corn-millet-fallow would be a four year rotation. For continuous cropping or permanent crops, such as orchards, use one year as your rotation length.

Your rotation length is basically how many growing seasons pass before you start over with the first crop.

Note: For inconsistent rotations, ask the farmer to provide a representative example. If things change but crops and tillage are similar, it is unlikely that a modification will be needed.

2. **Check if the Soil Condition Index (SCI) was used to determine soil quality eligibility and the SCI was positive for the offered acres. This will trigger a pass for soil quality, but provide no points. Complete the remaining questions for soil and water quality points.** You do not need to complete the Soil Conditioning Index to use this tool. The use of the SCI to determine soil quality eligibility is optional. The SCI is embedded in RUSLE2. If you have a positive SCI score, it gives you a pass on the soil quality portion of this tool. If you ran SCI and have a negative SCI score, please continue to answer the questions below. There is more than one way to pass!

NOTE: If a positive SCI score already exists at the time of the interview, check this box on the first run through. If no SCI exists but the application passes the WQ portion but not the SQ half, then an SCI should be calculated. If positive, then check the box and the applicant should receive a pass for the offered rotation.

NOTE: When SCI is calculated, a separate SCI needs to be calculated for each group of offered fields that have a common management system. Use the dominant critical soil slope length, and percent of slope for representative of all the offered acres using the common management system. Use the same procedures used in conservation planning to determine the dominant critical soil.

THIS NEXT QUESTION IS ASKING ABOUT THE TYPE OF CROPS GROWN IN YOUR ROTATION. THE CROPS ARE GROUPED BASED ON HOW QUICKLY THEY DECOMPOST, WHICH AFFECTS SOIL QUALITY. (It is strongly recommended that you review the lists and become familiar with where the dominant crops in your watershed are listed.)

3. **Based on your rotation, enter the number of your harvested crops that are included in each residue category, 3a-e. These questions have crops grouped based on residue quality and quantity. Do not include cover crops in your responses.** Examples: If you have corn and wheat in your rotation, you would enter a “2” for question 3d. For a corn and soybean rotation, enter "1" in 3c (for beans) and "1" in 3d (for corn).

SWET v.4 Guidance and Instructions

Note: For a rotation where a particular crop is grown more than once, enter a number for each time that crop occurs. For example, a corn-soy-corn-alfalfa-alfalfa, would receive a 1 in 3c (for beans); a 2 in 3d for corn; and a 2 in 3e for legume hay.

Note: These crop lists can be found in full as pop up comments over each corresponding question and on the right-hand side of the spreadsheet.

3a. Enter the number of years in your rotation that include the following conditions: fallow crop periods (both chemical and tilled fallow), idle fields, or harvested sod.

Note: Sod harvested for turf is differentiated from hay (which is listed under 3e).

3b. Enter the number of harvested crops in your rotation that are included in the list below or included in the comments (or are similar to those listed if not listed):

Asparagus, Beans dry edible, Beets, Broccoli, Cabbage, Carrots, Strawberries, Vegetables, or similar crops. Enter the total number of times any of these crops are grown during your rotation: Artichokes, Asparagus, Beans dry edible, Bedding/garden plants, Beets, Broccoli, Brussels sprouts, Bulbs/corms/rhizomes/tubers-dry, Cabbage, Carrots, Cauliflower, Celery, Cilantro, Collards, Cucumbers, Daikon, Dill for oil, Eggplant, Endive, Escarole, Fava beans, Flower seeds, Flowers cut and cut florist greens, Foliage plants, Garlic, Ginger root, Ginseng, Green peas, Greens, Horseradish, Kale, Lettuce, Lima beans, Melons, Mustard greens, Nursery crops, Okra, Onions, Parsley, Peppers, Pimientos, Potted flowering plants, Pumpkins, Radishes, Rapini, Rutabagas, Shallots, Snap beans, Spinach, Squash, Strawberries, Tomatoes, Turnips, Vegetables, Watercress, or similar crops.

3c. Enter the number of harvested crops in your rotation that are included in the list below (or are similar to the list below if not listed): Buckwheat, Canola, Chicory, Coffee, Corn silage, Cotton, Flaxseed, Guar, Hops, Lentils, Peanuts, Pineapples, Potatoes, Safflower, Soybeans, Sugarbeets, Sunflower, Tobacco, or similar crops (see list).

Enter the total number of times any of these crops are grown in your rotation: Buckwheat, Canola, Castor beans, Chicory, Coffee, Corn dry fodder hogged or grazed, Corn silage, Cotton, Flaxseed, Guar, Hops, Lentils, Mungbeans, Mustard seed, Pea Type Crops, Peanuts, Pineapples, Potatoes, Safflower, Sage, Soybeans, Sugarbeets, Sunflower, Sweet potatoes, Tobacco, are grown during your rotation.

3d. Enter the number of harvested crops in your rotation that are included in the list below (or are similar to the list below if not listed): Amaranth, Berry/Fruit Crops (Trees and Shrubs), Corn Grain/Popcorn, Cranberries, Mint all for oil, Mushrooms, Nut Trees, Rapeseed, Rice, Small Grains, Sorghum all, Sugarcane, or similar crops (see list).

Enter the total number of times any of these crops are grown during your rotation: Amaranth, Apricots, Berry Crops (Trees and Shrubs), Chufas, Corn Grain/Popcorn, Crambe, Cranberries, Desert grass, Fruit Trees, Grapes, Guava, Herbs, perennial, Kenaf, Maple trees for syrup, Mint all for oil, Mushrooms, Nut Trees,

SWET v.4 Guidance and Instructions

Peppermint for oil, Pine tree, Rapeseed, Rice, Sesame, Small Grains, Sorghum all, Sugarcane, Teff, Temples, or similar crops.

- 3e. **Enter the number of harvested crops in your rotation that are included in the list below (or are similar to the list below if not listed): Dichondra, Grass Hay/Seed, Legume Hay /Seed, Lotus root, or similar herbaceous perennial crops.** Enter the number of times any of these crops are grown during your rotation: Dichondra, Grass Hay/Silage/Seed, Legume Hay/Silage/Seed, Lotus root.

NOTE: This does not include grass harvested for sod.

THE NEXT TWO QUESTIONS ARE ABOUT TILLAGE.

4. **Enter the number of harvested crops in your rotation that have “full-width tillage, deeper than 4 inches” less than 60 days prior to planting. This does not include fertilizer injectors, in-row subsoilers or cover crops.** Enter the number of crops for which a moldboard plow, chisel plow, or raised beds are used within 2 months prior to planting- a.k.a. spring tillage

This question is asking whether you do tillage (deeper than 4 in) before planting (in most of the country this is spring tillage but it also includes pre-plant tillage for fall crops.) If you double crop and till before both then you include both.

5. **Enter the number of crops in your rotation that have full-width tillage, deeper than 4 inches, performed post-harvest or more than 60 days prior to the normal or next planting date. Ignore alternate year cultivation in every other alleyway during dry season to manage moisture competition in orchards and vineyards. Does not include seedbed preparation immediately prior to planting a cover crop.** Enter the number of crops for which tillage occurs at least 2 months prior to planting- a.k.a. fall tillage. Does not include emergency type tillage to correct a weed escape or repair/fix ruts. Ignore alternate year cultivation in every other alleyway during dry season to manage moisture competition in orchards and vineyards.

This question is asking whether you do tillage (deeper than 4 in) before after harvest (in most of the country this is fall tillage). Tillage to establish a cover crop is not included.

Note: The response should be indicative of normal circumstances and management practices. Response should NOT include crops for which emergency tillage was performed because of chemical failure or other exceptional occurrence or conditions.

THIS QUESTION IS ABOUT PRACTICES USED TO AVOID SOIL COMPACTION.

6. **Do you use controlled traffic consistently OR do you closely monitor soil moisture prior to all field operations to determine when it is safe to perform field operations to**

SWET v.4 Guidance and Instructions

minimize soil compaction. Check if controlled traffic is used or soil moisture conditions are closely monitored to minimize compaction and field operations are not performed under high soil moisture conditions. Moisture should be tested by feel or other locally recommended method. Controlled traffic can be either high tech, GPS, or low tech, field markers.

Do you make sure the soil is dry enough to avoid compaction before getting on it?

Note: True controlled traffic systems will have the same wheel spacings on all machinery.

Note: A common moisture monitoring method is 'moisture by feel.'

THE NEXT TWO QUESTIONS ARE ABOUT CONSERVATION TILLAGE.

7. **Enter the number of crops in your rotation for which you establish using a no till system (no full width tillage) with at least 30% residue cover after planting.** Enter the number of crops in your rotation for which a no till system (with no full width tillage) is used to establish a crop and 30% surface residue is maintained after planting.

How many of your crops are no-tilled?

8. **Enter the number of crops in your rotation for which you use full width tillage but maintain at least 30% soil cover (residues, composts or other mulch materials) after planting.** Enter the number of crops in your rotation for which 30% surface cover is maintained after planting the crops.

How many of your crops are mulch tilled?

Note: This question can also be an option for organic or other specialty operations that use conventional tillage but then mulch to keep the soil covered. Plastic mulches are not an acceptable option.

Note: For any one crop you would select one or the other (if any) conservation tillage option. You may have both occur in a rotation.

THE NEXT THREE QUESTIONS ARE ABOUT CONSERVATION PLANTINGS AND CROP DIVERSITY

9. **Enter the number of crops in your rotation for which you establish a cover crop either prior to or after harvest and do not harvest the cover crop; OR you maintain vegetation between the rows in areas such as vineyards or orchards.** Enter a check if cover crops (includes grasses, legumes, forbs, or other herbaceous plants) are established for seasonal or perennial cover and not harvested. This does not include nurse crops unless the nurse is planted in the off season to avoid a fallow period.

SWET v.4 Guidance and Instructions

How often to you plant a cover crop?

Note: Grazed covers do not count.

Note: Volunteered covers are permissible, provided they give full cover for the entire off season.

- 10. Enter the number of years in your crop rotation that have perennial vegetation (hay or grass cover and permanent covers in orchards and vineyards) – include the establishment year.** During how many years of your rotation are perennial crops such as hay or grass cover (including the year of establishment) maintained.

How many years of hay or pasture to you have in your rotation? OR Do you keep a permanent cover between rows in your orchard/vineyard?

Note: It is OK to double dip here: if you have an entry in 3e above, you should enter the number of years in which the perennial is grown here.

- 11. Enter the number of different crop species/types in your rotation, including different types of cover crops.** Enter the total number of different crops grown during your rotation, including cover crops.

This question is about diversity. We want to know how many different plants are grown during the rotation.

Note: In mixed plantings, as occurs for hay or intercropped covers (ie oat/vetch), include all the species present.

THE NEXT THREE QUESTIONS ARE ABOUT EROSION CONTROL.

THE FIRST QUESTION IS APPLICABLE ONLY IN ARID AREAS.

- 12. CHECK if your operation is in a low rainfall area (less than 14 inches of annual precipitation) AND most of the water needed for crop production is applied through a high efficiency sprinkler or drip irrigation system that produces no surface runoff. Does not include furrow or flood irrigation.** Does not include flood or furrow irrigation.

This question is a yes only if rainfall is less the 14 in/yr AND your sprinkler or drip system produces no runoff.

- 13. CHECK if there are no visible signs of sheet and rill erosion AND concentrated flow areas show no signs of gullies AFTER 2 inches or less of rain in 24 hours (temporary or permanent).**

SWET v.4 Guidance and Instructions

We realize that after a major storm you are likely to see some evidence of erosion, even in the best of systems. Here we are trying to find out if you see evidence after a good rain (≤ 2 in/d) not a flood.

Note: This applies to all the offered acres in the rotation, regardless of changes in slope.

14. **CHECK if you maintain at least two of the following in-field erosion control practices, such as but not limited to: (a) a crop rotation with high residue crops, (b) residue management practices, (c) cover crops, (d) covered alleyways, (e) contouring, (f) strip cropping, (g) windbreaks, (h) terraces, (i) grassed waterways, (j) contour buffer strips, (k) field borders, (l) water and sediment control basins.**

Any two practices will allow a 'yes' answer.

Note: Practices are applied and maintained to reduce erosion and minimize sediment transport to surface waters. These practices are applied on all offered acres, as needed.

THE NEXT THREE QUESTIONS ARE ABOUT WATER QUALITY CONSERVATION ONLY. IF #15 IS ANSWERED 'YES,' ANSWER THE NEXT TWO (#16 & #17). IF #15 IS ANSWERED 'NO,' SKIP TO QUESTION #18.

15. **CHECK if you have water courses or water bodies (lakes, ponds, ditches or intermittent or perennial streams) on the offered acres.**
16. **If #15 was checked yes, CHECK if all Perennial streams, ponds and lakes are bordered with vegetated buffers at least 20 feet wide.** If livestock are grazed on these cropland acres, they restricted from water sources or water bodies by fencing or water gaps. For flooded rice and cranberry fields, dikes that are at least 20 feet wide can substitute for vegetated buffers.

Note: All perennial water must be buffered to check yes.

17. **If #15 was checked yes, CHECK if you maintain a minimum setback of 33 feet or greater when applying manure or pesticides from all intermittent streams/ditches, perennial streams, ponds/lakes, surface water inlets and open sink holes. Spot spraying within the setback is permitted according to the pesticide label.** Check if the 33 ft. setback is maintained and application rates for liquid manure do not exceed the Available Water Capacity of the soil. Winter manure application is limited to daily haul. For pesticides labeled for greater set backs the label directions are followed.

Note: This applies to perennial AND ephemeral water & ditches, including concentrated flow areas such as grassed waterways.

SWET v.4 Guidance and Instructions

THE NEXT SET OF QUESTIONS ARE ABOUT PESTICIDE USE. PESTICIDES INCLUDE ALL FORMS OF HERBICIDES, INSECTIDES, FUNGICIDES, FUMIGANTS, RODENTICIDES OR OTHER TOXINS.

18. **CHECK if no organic or chemical insecticides, herbicides, fungicides, rodenticides, or other pesticides are used. (This triggers a pass for pesticides.)** Includes organic farming operations that do not use pesticides.

This question is checked yes if you don't use any of the above.

THE NEXT QUESTION IS ABOUT THE LEVEL OF IPM USED. PICK JUST ONE OF THE 3 OPTIONS THAT BEST DESCRIBES YOUR SYSTEM/ROTATION. The choices are no IPM, low-level IPM, and basic IPM. Listen carefully to the descriptions to choose.

19. **CHOOSE ONE (a-c) Integrated Pest Management level BELOW**

- 19a. **CHECK if you apply any pesticides (types listed in # 18) without an Integrated Pest Management (IPM) system.**
- 19b. **CHECK if you use a low-level of Integrated Pest Management (IPM) using at least one of the following: using pest-free seeds and transplants, cleaning tillage and harvesting equipment between fields, and scheduling irrigation to avoid situations conducive to disease development, using pest-resistant varieties, crop rotation, trap crops, pest scouting, biological pest controls.**

Note: This includes regular use of one or more IPM management techniques that are appropriate for the crop and site, including prevention, avoidance, monitoring, and suppression. Monitoring can include soil testing for pests and weather forecasting. Suppression can include cultural pest control.

Note: Guidance on application of appropriate IPM management techniques is available from Cooperative Extension.

- 19c. **CHECK if you use a basic (medium level) Integrated Pest Management (IPM) system consisting of scouting and use economic thresholds before treating pests (weeds, insects, or disease) using spot spraying, banding or other reduced usage of chemical.**

Note: This includes IPM systems that use scouting and economic thresholds to manage pests and reduce pest management environmental risk. A basic IPM system utilizes pest suppression techniques (including pesticide applications) only after monitoring (including pest scouting) verifies that a pest population has reached an economic threshold.

SWET v.4 Guidance and Instructions

Note: An economic threshold is the number of pests (weeds, insects, diseases, etc.) per some unit (square foot, plant, feet of row, etc.) that, if left uncontrolled, will soon increase to levels high enough to cause economic injury that is equal to the cost of suppression.

Note: Pest management environmental risk is reduced by applying mitigation techniques. Mitigation techniques include both IPM management techniques, such as timing pesticide application to avoid heavy rainfall, and Conservation Practices, such as a Constructed Wetland that captures pesticide residues and facilitates their degradation. Appropriate mitigation techniques may be selected based on environmental risk evaluation with tools like the NRCS Windows Pesticide Screening Tool (WIN-PST).

Note: Guidance on application of basic IPM systems is available from Cooperative Extension.

20. **CHECK if you use an environmental risk screening tool (such as WIN-PST or similar) to reduce pesticide risk to soil and water resources.**

Note: This is likely to apply only to the largest operations: those employing advisors or full-time staff.

21. **CHECK if you use partial treatment by spot spraying, banding, directed spraying, or hand hoeing to reduce the amount of pesticide applied. This can be checked in addition to the IPM choices above and even if some pesticides are applied to the entire field.**

THE NEXT SET OF QUESTIONS IS ABOUT NUTRIENT MANAGEMENT. (Note that components of CMNP are broken into separate questions.)

22. **CHECK if you soil test (or tissue test for orchards, vineyards, or other permanent crops) all offered fields on a regular basis (at least once every 5 years) AND you use the test results to plan your nutrient application rates.** Tissue tests are acceptable for orchards and vineyards or other permanent crops ONLY.

The main point here is whether you test regularly and USE the results to plan applications.

Note: Soil samples are analyzed by a recognized land grant university or private laboratory using methods approved by the land grant university for the purposes of determining amounts of nutrients needed for crop / plant production. Producer needs to demonstrate the use of soil tests to plan nutrient application rates.

23. **CHECK if you apply your fertilizers and/or manure based on established or realistic crop yields from crop records.**

SWET v.4 Guidance and Instructions

24. **CHECK if you calculate the appropriate nitrogen and phosphorus credits from manure, irrigation water, previous crop, or soil organic matter from either an analyses or book values to plan your nutrient application rates and timing.** Do not check if you apply manure on frozen or snow covered fields.

Do you account for nutrients from previous applications (e.g. mineralization in manure) or crops (e.g. N fixation from legumes) when planning applications?

25. **CHECK if phosphorus is not applied on fields that have phosphorus soil tests indicated as 'very high' or 'excessive'; OR if no soils on the offered acres have 'very high' or 'excessive' ratings. Use the ratings on the soil test report or ratings for “very high” or higher from your Land Grant University. Small applications of starter fertilizer are exempted.**

This question is asking whether P is applied on soils that are already very high in P. If you have very high P soils and don't apply more, check 'yes.' If you don't have any very high P soils, you also can check 'yes.'

Note: When soil tests results that are analyzed by a recognized land grant university or private laboratory for the purposes of determining amounts of nutrients needed for crop / plant production indicate that phosphorus levels are in the "very high" or "excessive" or "above optimum" rating category (regardless of P extraction method), no phosphorus is applied with the exception of up to 25 lbs/acre of P₂O₅ as starter fertilizer at time of planting.

Note: The P Index is not an adequate substitute for a soil test in this question.

THIS QUESTION IS ASSESSING THE RISK OF P RUNOFF.

26. **CHECK if you do any of the following a) inject or incorporate phosphorus fertilizer or manure at least 2 inches deep within 24 hours of application, according to soil test results and realistic crop yields; b) apply phosphorus on 80% residue cover or 80% crop canopy cover, according to soil test results and realistic crop yields; or c) do not apply phosphorus.**

To check 'yes,' you have to be doing at least one of the three options: a) rapid incorporation, b) application onto residue or canopy cover, or c) no application.

THE NEXT QUESTION IS ABOUT N APPLICATION METHOD. Although we realize that you likely have different methods for different crops in your rotation, pick the answer which best applies for the majority of the N applied.

27. **CHECK one of the Nitrogen Choices (27a-c) below. Answer as an average for the entire rotation:**

SWET v.4 Guidance and Instructions

- 27a. **CHECK if you apply most of your nitrogen (manure or fertilizer) within one month prior to planting OR if most N is applied after soil temperatures are below 50°F.**

This is asking if you apply mostly before planting OR fall apply.

Note: Greater than 75% of the crop nitrogen requirement, as determined by the nutrient management plan, is applied at or within 30 days of crop planting or after soil temperatures are below 50°F.

- 27b. **CHECK if you apply most of your nitrogen (manure or fertilizer) after the crop has emerged.**

Check this choice if most N is applied post-emergence.

Note: Greater than 75% of the crop nitrogen requirement, as determined by the nutrient management plan, is applied as sidedress after crop / plant emergence at the appropriate growth stage. This also applies to split application of nitrogen on hayland or hay fields and foliar applications.

- 27c. **CHECK if no nitrogen (manure or fertilizer) is ever applied OR if most N is applied as a split application (pre-plant & post plant), according to soil tests or crop growth stage.**

This is asking if you apply in a split application that is pre-plant and post-emergence or do not apply N at all.

Note: If no manure or fertilizer nitrogen is applied, the entire source of nitrogen for plant growth comes from carryover of nitrogen from leguminous plants (previous crop or cover crop), nitrogen fixation, rainfall, and soil organic matter. If nitrogen is applied, greater than 75% of the crop nitrogen requirement, as determined by the nutrient management plan, is applied as a split application (pre-plant and post-plant).

THIS LAST NUTRIENT QUESTION DIFFERS FROM THE OTHER QUESTIONS. IT SEEKS TO GIVE CREDIT FOR APPLYING ORGANIC MATTER, WHILE THE PREVIOUS QUESTIONS WERE CHECKING FOR OVER-APPLICATION OF NUTRIENTS.

28. **CHECK if manure, compost, or other organic amendment is applied to meet (but not exceed) crop nutrient needs, according to soil tests (or tissue tests in permanent crops).**

SWET v.4 Guidance and Instructions

THE FOLLOWING QUESTIONS ARE ABOUT SALINITY OR SODICITY CONCERNS. IF NO SUCH CONCERN EXISTS ON THE OFFERED ACRES, CHECK NO AND THE RUN IS COMPLETE. IF CHECKED YES, COMPLETE THE REMAINING QUESTIONS.

29. CHECK YES, if Salinity or Sodicty is a concern on your offered acres. (NO triggers a Pass for Salinity or Sodicty). If YES, complete questions 30-33.

30. CHECK if you have identified saline recharge or discharge areas on your offered acres.

Note: Acceptable methods of identifying saline seep recharge areas include soil maps and geologic information, soil moisture probes and test holes, and visual inspections. Visual assessments and electrical conductivity measurements are acceptable methods of identifying discharge areas. Visual indicators of discharge areas include vigorous weed growth, salt crystals on the soil surface, lodging of the crop and prolonged soil wetness.

31. CHECK if you manage saline seeps by using high water use, salt tolerant crops or cropping pattern to manage or minimize salinity in the soil, surface water, and/or ground water.

Note: An example of high water use crops/vegetation is planting alfalfa in the recharge area. Using a flexible cropping system where planting decisions are based on available moisture is an example of a cropping pattern change.

32. CHECK if you manage the type and rate of soil fertility amendments and irrigation based on your soil and irrigation chemistry for your saline or sodic soils on your offered acres.

This question is similar to the nutrient credit question #24. It is asking if you account for salts in the soil and/or water before applying fertilizers or manures.

33. CHECK if you manage the application of irrigation water to minimize salt delivery to surface and ground water.

Note: Irrigation water is managed to meet the crop needs with minimal deep percolation and surface runoff.

Special Crops

Completing SWET is required for all cropland, permanent hayland, horticultural cropland, orchards, and vineyards. Completing it is also required for specialty crops. Production methods for some of these crops, such as “sugar bush”, require specific directions for appropriate responses in SWET. For sugar bush, ginseng and similar specialty crops where neither pesticides nor nutrients are applied, questions 18, 26, and 27c should be checked. This will result in “pass” marks for pesticide and nutrient concerns. Surface water sediment (evaluated in questions related

SWET v.4 Guidance and Instructions

to tillage, evidence of erosion and erosion control practices, and vegetated buffers) and salinity concerns must be addressed to fully pass the minimum water quality resource issues.

OTHER SWET FEATURES

Print report button

You will need a signed copy of the completed tool for each rotation on the offered acres. To create a printed copy, simply click on the Print Report button on row 5 or on row 59. Do not try to enter anything in the printable version below row 64. This version will automatically be populated as you enter the answers in the worksheet above. The signature box is on the last page of the print out.

Clear all button

You can automatically clear all entries on the worksheet by clicking the Clear All button on row 5.

Create a record file button / Record Files tab

You can save multiple runs in the same file using the Create a Record File button on row 5. To do so, once you have completed a run, click the record file button. This can be done for as many runs as you like.

To retrieve a save record, click on the Record files tab at the bottom of the window. Select the entire column for the record of interest by placing the cursor over the column letter and clicking. Copy that column into column C in the same worksheet (still in the Record Files tab). Then click on the Re-Populate Data button on rows 4-5. Click back to the SQ Tool tab. All of the entries for desired record will be shown in the tool and ready to print or other use.

Recommended usage of this feature:

- Save a new file for each applicant, naming each using the applicants last name first for easy retrieval. Save a record as a back up within the file.
- Use multiple record files for farms with multiple rotations. That way one file can include all the information for one applicant's cropland and hayland eligibility.

Use of the record files is optional.

Weighted Avg Score tab

Use this feature when multiple rotations exist on the offered acres. After completing the SWET runs for each rotation, click on the Weight Avg Score tab. On this worksheet, you will need to enter the acreage and total SWET score (found in cell AE57 and R73) for each rotation. The weighted average SWET score, which is to be used for category placement, is automatically calculated in cell E13. If only one rotation is offered then this worksheet is not needed.

SWET v.4 Guidance and Instructions

NRCS Contacts for SWET

A team of agency experts developed SWET. The tool was further reviewed and tested by NRCS employees from around the country, and end-user input was provided during farmer focus group sessions. Several university and ARS scientists have contributed to on-going validation of the tool.

If you have questions or comments regarding SWET, contact Dr. Susan S. Andrews, Soil Quality National Technology Development Team Leader at (336) 370-3337; Shaun P. McKinney, Water Quality and Quantity National Technology Development Team Leader at (503) 273-2413; or Norm Widman, National Agronomist at (202) 720-3783.