# **Retrospective Soil Health Economic Calculator (R-SHEC) Questionnaire**

# **For “Soil Health Successful” Row Crop Farmers**

# **ROW CROPS:** *barley, canola, corn grain, corn silage, ensilage (green chop), forage, flaxseed, grain sorghum, hay (alfalfa and grass), mustard seed, oats, rapeseed, rye, safflower, soybeans, sugar beets, sunflowers, triticale, wheat*

# **SOIL HEALTH PRACTICES:** *conservation crop rotation, cover crops, no-till or reduced tillage, &/or nutrient management*

**Updated: May 30, 2024**

**TABLE OF CONTENTS**

1. [**Study Area Overview**](#_Study_Area_Overview)
   * [Table 1: Farm Crop Rotations & Timeline of Practices](#_Table_1:_Farm)
   * [Table 2: Study Area Crop Rotations](#_Table_2:_Study)
   * [Table 3: Study Area Benchmark & Current Management](#_Table_3:_Study)
   * [Farmer Provided Prices (Optional)](#_Farmer-Provided_Prices_(optional))

II. [**Soil Health Practices and Economic Impacts**](#_Soil_Health_Practices)

* [**Machinery**](#_MACHINERY)

[**Cash Crop Inputs**](#_CASH_CROP_INPUTS)

* [**Cover Crops**](#_COVER_CROPS)
  + [**Grazing and Haying Cover Crops**](#_GRAZING_&_HAYING)
* [**Yield**](#_YIELD)
* [**Other Costs**](#_OTHER_BENEFITS_AND) **& Benefits**

III. [**Additional Questions**](#_ADDITIONAL_QUESTIONS_(required)

# Study Area Overview

*This section can be completed on its own to first determine if the farmer’s crop rotation and soil health practices can be analyzed in the R-SHEC, and if the farmer has the necessary data. Review the R-SHEC User Manual and the Soil Health Economic Case Study “Introduction” document before completing this questionnaire. You can also complete an* [*online survey*](https://forms.office.com/Pages/ResponsePage.aspx?id=9DZ9usq8W0ODzin3qwZEyDBRL9a82pZJnZ8q_GzyXuxURElFOTZCVzRQWFBOV09BTkkwWEgzSjRDVi4u) *to quickly determine if the study area in question qualifies for a R-SHEC analysis. You can find these resources in our Tool Kit:* [*https://farmlandinfo.org/rshec-toolkit/*](https://farmlandinfo.org/rshec-toolkit/)

**Name of farm:**

**Name of farmer:**

**Total farm acres:**

**Crops grown:**

**Farm address**:

**County:**

**Watershed:**

**Annual precipitation:**

**Farmer Phone number:**

**Farmer Email**:

**Name of****Interviewer:**

1. **In order to determine if the row crop R-SHEC Tool will work for the farmer’s situation, answer the following bulleted questions (Y/N):**
   1. Does the farmer grow row crops and have a crop rotation limited to these crops: barley, canola, corn grain, corn silage, ensilage (green chop), forage, flaxseed, grain sorghum, hay (alfalfa &/or grass), mustard seed, oats, rapeseed, rye, safflower, soybeans, sugar beets, sunflower seed, triticale, &/or wheat?
   2. For the applicable row crop rotation, does the farmer implement one or more of the listed soil health practices: conservation crop rotation, cover crops, no-till or reduced tillage, &/or nutrient management?
   3. Has the farmer implemented one or more of these soil health practices for the select crops within 4 to 15 years ago to help ensure accurate data?
   4. Does the farmer have a study area where they can provide details on field operations before adoption of the soil health practice being analyzed (benchmark management scenario)?
   5. Does the farmer have good enough records to identify the field operations that changed due to soil health practices? Note, this could include tillage/planting/chemical/nutrient machinery type/frequency, nutrient application input rates (N, P, & K per acre), chemical application input rates and costs, average erosion rate and repair, and average yield.

If any of the answers to the above questions are “no,” the row crop R-SHEC may not be appropriate for your study area. Otherwise, continue with the questionnaire.

1. **Is the farm organic (Y/N)?**

1. **Detail below the crop rotations that qualify with the above bulleted list to help determine the study area.** This table is especially useful for farms with multiple crop rotations. Identify which crop rotation best qualifies to be the focus of this case study.*(See example in the first gray row for guidance.)*

# **Table 1: Farm Crop Rotations and Timeline of Soil Health Practice Use**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Row Crop Rotations** | | **Soil Health Practice Info**  *(conservation crop rotation, cover crops, no-till or reduced tillage, &/or NM)* | | **Mark “X” next to the crop rotation selected as study area** |
| **Crop and Years in Rotation** | **Average Acreage** | **SH Practices by Crop** | **Year Initiated each SH Practice** |
| Corn-1, Soy-1, Hay-3 | 1100 | * No-till - Soy * NM - All * Cover Crop – Corn, Soy | * 2010 * 2015 * 2014 | X |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1. **Study Area Benchmark and Current Crop Rotations:** List each crop grown in the Study Area, # years in the rotation, acres (per year on average), planting date, harvest date, tillage method, and select double crops\*. The rotation should differ between benchmark and current ONLY if you are analyzing a Conservation Crop Rotation soil health practice, otherwise enter identical information for the Benchmark and Current Rotations. Only enter a crop once per rotation and adjust the number of years and acres appropriately.

***Note:*** *To annualize the crop rotation, user can calculate average annual acres of each crop in the rotation by dividing the total acres in the rotation by the number of years in rotation, then multiply by the number of years that a specific crop is in rotation: e.g., if the Study Area is 400 acres with a 4-year crop rotation (2-corn, 1-wheat, 1-soybeans), then user enters 200 acres for corn [(400/4) \* 2], 100 acres in wheat, and 100 acres in soybeans [(400/4)\*1].*

# **Table 2: Study Area Crop Rotation** *(required)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Benchmark Rotation** | | | | | | |
| **Crop(s)** | **# Years in Rotation** | **Acres****per Year**  *(on average)* | **Planting Date** | **Harvest Date** | **Tillage Method** | **\*If double crop, mark “X”** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **Current Rotation** | | | | | | |
| **Crop(s)** | **# Years in Rotation** | **Acres****per Year**  *(on average)* | **Planting Date** | **Harvest Date** | **Tillage Method** | **If double crop, mark “X”** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**\*Double cropping** is the establishment and harvest of a second crop the same season that a first crop is harvested. Mark “X” next to the two crops harvested in the same year.

**Table 3: Cover Crop Information** *(required for cover crop analysis)*

If analyzing the adoption of cover crops, complete the table below as this information is used on the 'Cover Crops' tab of the tool. You may enter the same cover crop twice if it is used before/after different crops in the crop rotation. Enter the average acreage planted by cover crop species (e.g., if farmer only plants every other row in certain cover crop, enter half the cash crop acreage).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Cover Crop Information** | | | | | | |
| **Cash Crop Before** | **Cover crop following cash crop** | **Cash Crop After** | **Cover Crop Planting Date** | **Cover Crop Termination Method** | **Acres Planted** | **Notes** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1. **Complete the following table for the Study Area crop rotation identified above.** Detail the **benchmark** (conventional, before soil health practice adoption) and **current** (after soil health practice adoption) management **by crop** (split between columns) for that crop year (crop year generally begins in the fall – the first day after previous crop harvest – and ends the last day of crop harvest). Include as much detail as possible, and add more columns as needed, or add notes about other crops below the table.

# **Table 4: Study Area Benchmark and Current Field Operations Overview**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Soil Health Practices** | **Management**  **Scenarios** | **Crop 1:** | **Crop 2:** | **Crop 3:** | **Crop 4:** |
| **Conservation Crop Rotation** | **Benchmark** |  |  |  |  |
| **Current** |  |  |  |  |
| **Cover Crops** | **Benchmark** |  |  |  |  |
| **Current** |  |  |  |  |
| **Reduced Tillage** | **Benchmark** |  |  |  |  |
| **Current** |  |  |  |  |
| **Nutrient Management** | **Benchmark** |  |  |  |  |
| **Current** |  |  |  |  |

**Add any notes below on benchmark versus current management activities:**

1. **Economic Benefits -** describe any economic benefits the farmers has observed from adopting soil health practices:
2. **Environmental Benefits –** describe any environmental and soil health benefits the farmer has observed from adopting soil health practices:

# **Farmer-Provided Prices** *(optional)*

Once you’ve selected the study area and are moving forward with the analysis, you can ask the farmer to provide their own prices, otherwise the default will be to use national average prices. If the farmer would like to use their own prices, enter them below for items that will be used in the analysis. If any are left blank, the R-SHEC Tool will use national average values for retrospective analysis. (Review the ‘Prices’ tab in the R-SHEC, or the 2023 Row Crop Machinery & Prices List PDF to determine if default values are appropriate or not.)

**Table 5: Farmer-Provided Fertilizer & Cash Crop Prices**

|  |  |  |
| --- | --- | --- |
| **Farmer-Provided Prices** *(optional)* | | |
| **Fertilizer** *(optional)* | **Unit** | **$/Unit** |
| Nitrogen | Lb |  |
| Phosphorous | Lb |  |
| Potassium | Lb |  |
| Manure | Ton |  |
| Compost | Ton |  |
| **Cash Crop Prices** *(optional)* | **Unit** | **$/Unit** |
| Barley | Bushels |  |
| Canola | Bushels |  |
| Corn Grain | Bushels |  |
| Corn Silage | Ton |  |
| Ensilage (green chop) | Ton |  |
| Flaxseed | Bushels |  |
| Forage (haylage) | Ton |  |
| Grain sorghum (milo) | Bushels |  |
| Hay, alfalfa | Ton |  |
| Hay, all other | Ton |  |
| Millet (proso) |  |  |
| Mustard Seed | Bushels |  |
| Oats | Bushels |  |
| Rapeseed | Bushels |  |
| Rye | Bushels |  |
| Safflower | Bushels |  |
| Soybeans | Bushels |  |
| Sugarbeets | Tons |  |
| Sunflower seeds | Bushels |  |
| Triticale (grain) | Bushels |  |
| Winter wheat | Bushels |  |
| Wheat, other spring | Bushels |  |
| **Cover Crop Value** *(optional)* | **Unit** | **$/Unit** |
| Forage Value | Ton |  |

**Table 6: Farmer Provided Custom-Hire Costs**

|  |  |
| --- | --- |
| **Farmer-Provided Custom-hire Costs** *(optional)* | |
| **Practice** | **$/Acre** |
| Cash Crop Planting |  |
| Cash Crop Fertilizer Application |  |
| Cash Crop Manure Application |  |
| Cash Crop Compost Application |  |
| Cash Crop Chemical Application |  |
| Cash Crop Harvest |  |
| Cover Crop Planting |  |
| Cover Crop Termination |  |

# Soil Health Practices and Economic Impacts

This part of the interview covers the economic changes – both costs and benefits – experienced with the adoption of soil health practices on the farm being analyzed in this case study. **The questions below are for the Study Area selected in Section I.** Information collected here will be input into the Excel-based R-SHEC to conduct a partial budget analysis. An economic partial budget analysis is a cost-benefit analysis that isolates the costs and benefits associated with the evaluated soil health practice(s). **Any changes that are not related to the soil health practices are not evaluated.**

# **MACHINERY**

**The ‘Machinery’ tab of the R-SHEC Tool calculates the increases and decreases in tillage, planting, chemical, nutrient, &/or harvest machinery usage – captured below.** If machinery activities &/or implements changed between the “benchmark” and “current” scenarios, or if you will be evaluating a change in crop rotation, complete the following tables by crop, listing **machinery/implements associated with field preparation, planting, nutrient & chemical application &/or harvest used before (benchmark)** and **after (current)** adopting new soil health practices in the Study Area. In the R-SHEC Tool, you will choose from the list of machinery included in the R-SHEC Tool, or from the custom-hire costs provided, or add new machinery and cost on the ‘Prices (2023)’ tab. **Download the 2023 Row Crop Machinery & Prices List PDF available in the Toolkit to complete the following tables.**

**If evaluating a change in tillage,** fill out the benchmark and current tillage machinery and planting sections of the tables by crop. **If analyzing a conservation crop rotation (CCR),** provide all benchmark and current machinery for all crops; however, if a *new* crop is being introduced as part of a conservation crop rotation, then just list the “current” machinery as there is no benchmark. **If analyzing the adoption of a cover crop,** do not include new machinery used to establish, manage, &/or terminate cover crops. That information is entered on the 'Cover Crops' tab. Be careful not to double-count.

**Note: “Passes/Yr"** refers to the number of passes the equipment takes over that crop in a growing season. Partial passes may be entered if that piece of equipment does not pass over every acre of that crop.

**Crop 1:** \_\_\_\_\_\_\_\_\_

**Table 7a: Benchmark & Current Machinery for Crop 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Benchmark Machinery** | |  | **Current Machinery** | |
| **Benchmark Tillage Machinery (if tillage and/or CCR)** | **# Passes per Year** |  | **Current Tillage Machinery (if tillage and/or CCR)** | **# Passes per Year** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Planting Machinery** | **# passes/yr** |  | **Current Planting Machinery** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Chemical & Nutrient Machinery** | **# passes/yr** |  | **Current Chemical & Nutrient Machinery** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Harvest Machinery *(only if analyzing CCR)*** | **# passes/yr** |  | **Current Harvest Machinery *(only if analyzing CCR)*** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Crop 2:** \_\_\_\_\_\_\_\_\_

**Table 7b: Benchmark & Current Machinery for Crop 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Benchmark Machinery** | |  | **Current Machinery** | |
| **Benchmark Tillage Machinery (if tillage and/or CCR)** | **# Passes per Year** |  | **Current Tillage Machinery (if tillage and/or CCR)** | **# Passes per Year** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Planting Machinery** | **# passes/yr** |  | **Current Planting Machinery** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Chemical & Nutrient Machinery** | **# passes/yr** |  | **Current Chemical & Nutrient Machinery** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Harvest Machinery *(only if analyzing CCR)*** | **# passes/yr** |  | **Current Harvest Machinery *(only if analyzing CCR)*** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Crop 3:** \_\_\_\_\_\_\_\_\_

**Table 7c: Benchmark & Current Machinery for Crop 3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Benchmark Machinery** | |  | **Current Machinery** | |
| **Benchmark Tillage Machinery (if tillage and/or CCR)** | **# Passes per Year** |  | **Current Tillage Machinery (if tillage and/or CCR)** | **# Passes per Year** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Planting Machinery** | **# passes/yr** |  | **Current Planting Machinery** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Chemical & Nutrient Machinery** | **# passes/yr** |  | **Current Chemical & Nutrient Machinery** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **Benchmark Harvest Machinery *(only if analyzing CCR)*** | **# passes/yr** |  | **Current Harvest Machinery *(only if analyzing CCR)*** | **# passes/yr** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**\*IF THERE ARE MORE CROPS BEING ASSESSED, COPY & PASTE MACHINERY TABLES HERE**

**Add any notes about changes in machinery due to adoption of soil health practices:**

# **CASH CROP INPUTS**

**The ‘Cash Crop Inputs’ tab of the R-SHEC Tool calculates the increases and decreases in seed, soil sampling, nitrogen, phosphorus, potassium, other fertilizer, manure, compost, herbicide, insecticide, & fungicide costs – captured in the tables below.** The number of columns completed should correspond to the number of crops in the crop rotation provided in the 'Study Area Overview' section. **If analyzing a conservation crop rotation (CCR),** you must provide all benchmark and current input costs - even if there is no difference. **If not analyzing a CCR,** only provide benchmark and current chemical costs if the cost changed due to the adoption of soil health practices.

Table 8: Study Area Cash Crop Seed, Soil Sampling, Fertilizer & Soil Amendment Inputs

*Do not include the machinery costs*for applying fertilizer, manure, or compost, as that is captured in the 'Machinery' or 'Cover Crops' sections. If you want to capture a change in soil sampling costs, you must enter the average cost per sample(s) and average cost per acre. These values can be calculated outside of the tool if you know your $/yr soil sampling cost and # samples. *If analyzing the adoption of cover crops,* do not include additions of fertilizer inputs applied to cover crops here, as that information is collected in the 'Cover Crops' section. Be careful not to double-count fertilizer inputs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Crop 1** | **Crop 2** | | **Crop 3** | |
| Cash Crop Type |  |  | |  | |
| **Cash Crop Seed Cost** *(only required if analyzing CCR)* | | | | | |
| Benchmark Seed Cost ($/ac) |  |  | |  | |
| Current Seed Cost ($/ac) |  |  | |  | |
| **Soil Sampling Costs by Crop** | | | | | |
| Benchmark Soil Sampling Method *(Optional)* |  |  | |  | |
| Avg Cost Per Soil Sampling ($/sample) |  |  | |  | |
| Avg # of Samples Per Acre (#/ac) |  |  | |  | |
| Current Soil Sampling Method *(Optional)* |  |  | |  | |
| Avg Cost Per Soil Sampling ($/sample) |  |  | |  | |
| Avg # of Samples Per Acre (#/ac) |  |  | |  | |
| **Nutrient Inputs by Crop** | | | | | |
| **Benchmark** | | | | | |
| N Applied (lb/ac) |  |  | |  | |
| P Applied (lb/ac) |  |  | |  | |
| K Applied (lb/ac) |  |  | |  | |
| Micronutrients/Other fertilizers ($/Ac) |  |  | |  | |
| Fertilizer forms used *(optional)* |  |  | |  | |
| **Current** | | | | | |
| N Applied (lb/ac) |  |  | |  | |
| P Applied (lb/ac) |  |  | |  | |
| K Applied (lb/ac) |  |  | |  | |
| Micronutrients/Other fertilizers ($/Ac) |  |  | |  | |
| Fertilizer forms used *(optional)* |  |  | |  | |
| **Manure/Compost Applied by Crop\*** | | | | | |
| **Benchmark** | | | | | |
| Manure Type |  |  | |  | |
| Manure Applied (tons/ac) |  |  | |  | |
| Compost Type |  |  | |  | |
| Compost Applied (tons/ac) |  |  | |  | |
| **Current** | | | | | |
| Manure Type |  |  | |  | |
| Manure Applied (tons/ac) |  | |  | |  | |
| Compost Type |  | |  | |  | |
| Compost Applied (tons/ac) |  | |  | |  | |

**\***If analyzing manure &/or compost applied, you must provide the $/ton price of the material in the farmer-provided prices table in Section I of this questionnaire, which corresponds to the ‘Study Area Overview’ tab in the R-SHEC.

**\*\*IF THERE ARE MORE CROPS BEING ASSESSED, COPY & PASTE TABLE 8 HERE**

**What does the producer attribute the changes in inputs detailed in Table 8 to (if applicable)?**

**Add any notes about changes in cash crop inputs due to adoption of soil health practices:**

**Table 9: Chemical Inputs**

*Do not include the machinery cost* for applying herbicide, fungicide, or insecticide, as that is captured in the 'Machinery' or 'Cover Crops' sections. If analyzing the adoption of cover crops, do not include any additions of chemical inputs applied to cover crops here, as that information is collected in the 'Cover Crops' section. Be careful not to double-count chemical inputs.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Crop 1** | **Crop 2** | **Crop 3** |
| Cash Crop Type |  |  |  |
| **Chemical Inputs by Crop** | | | | |
| **Benchmark** | | | | |
| Herbicide ($/ac) |  |  |  |
| Insecticide ($/ac) |  |  |  |
| Fungicide ($/ac) |  |  |  |
| Other Chemical ($/ac) |  |  |  |
| **Current** | | | | |
| Herbicide ($/ac) |  |  |  |
| Insecticide ($/ac) |  |  |  |
| Fungicide ($/ac) |  |  |  |
| Other Chemical ($/ac) |  |  |  |
| **Optional Information\*** | | | | |
| *(Describe Benchmark & Current by Crop)* | | | | |
| Herbicide Used &/or Purpose |  |  |  |
| Herbicide Amount Applied Per Acre |  |  |  |
| Insecticide Used &/or Purpose |  |  |  |
| Insecticide Amount Applied Per Acre |  |  |  |
| Fungicide Used &/or Purpose |  |  |  |
| Fungicide Amount Applied Per Acre |  |  |  |
| Other Chemical Used &/or Purpose |  |  |  |
| Other Chemical Amount Applied Per Acre |  |  |  |

**\***The chemical used and amount applied is not required by the R-SHEC Tool. This information is useful to explain the results if you are writing up your results in a case study or report of some sort.

**\*\*IF THERE ARE MORE CROPS BEING ASSESSED, COPY & PASTE TABLE 9 HERE**

**What does the producer attribute the changes in herbicide/insecticide/fungicide to (if applicable)?**

**Add any notes about the changes in chemical inputs due to adoption of soil health practices:**

# **COVER CROPS**

**The ‘Cover Crops’ tab of the R-SHEC Tool calculates the costs and benefits due to adopting cover crops in the Study Area.** Costs can include cover crop seed, additional nutrient &/or termination inputs, additional machinery operations costs, and grazing &/or haying costs. Benefits can include the added value of haying &/or grazing.

The R-SHEC tool can only analyze the adoption of cover crops (assumes no cover crop in benchmark); the tool cannot analyze changes to cover crop management, including switching of cover crop species, establishment methods, termination methods, etc.

**Table 10: Cover Crops Costs**

**“Type” should match the cover crop information given in Table 3, Section I.** Make sure to only include **additional costs** (e.g., if the farmer previously sprayed herbicide before cash crop planting, and now that spray kills the cover crop, do not include the cost.) The cost of grazing &/or haying of cover crops is captured separately in Table 11. **"Passes/Yr"** refers to the number of passes the equipment takes over that crop in a growing season. Partial passes may be entered if that piece of equipment does not pass over every acre of that crop.

|  |  |  |  |
| --- | --- | --- | --- |
| **Cover Crops** | **Cover Crop 1** | **Cover Crop 2** | **Cover Crop 3** |
| Type (list all species in mix) |  |  |  |
| Cover Crop Seed ($/Ac) |  |  |  |
| *The following variables are only NEW, additional costs compared to benchmark field operations (be careful not to double count with machinery or input tables in the sections above):* | | | |
| Additional Fertilizer ($/Ac) |  |  |  |
| Additional Chemicals ($/Ac) |  |  |  |
| Other Additional Costs ($/Ac) |  |  |  |
| Cover Crop Machinery Section | | | |
| Planting Machinery |  |  |  |
| Planting Passes/Yr |  |  |  |
| Termination Machinery |  |  |  |
| Termination Passes/Yr |  |  |  |

**\*IF THERE ARE MORE COVER CROPS BEING ASSESSED, COPY & PASTE TABLE 10 HERE**

**Add any notes about adoption of cover crops:**

# **GRAZING & HAYING OF COVER CROPS**

Please complete Table 11 and answer the following questions if the adopted cover crops detailed above grazed or harvested as forage.

**Table 11: Grazing Cover Crops Data**

Complete the following table considering all cover crops grazed &/or hayed. Make sure to *only include additional costs* (e.g., new fencing for grazing.) Also, *make sure to not double count* inputs or machinery with the previous tables. **Per acre grazing benefit** is calculated by multiplying # days grazed per year, stocking rate (animal unit per acre), and daily forage demand (pounds per animal unit), then dividing by 2,000lbs to estimate tons per acre grazed, which can then be multiplied by the value per ton. Alternatively, you can enter an estimated $/ac grazing benefit (e.g., if the farmer charges others to graze.) **Per acre hay cost** is the estimated cost to harvest the cover crop. Reference the 'Machinery Costs' tab in the R-SHEC Tool or 2023 Row Crop Machinery & Prices List PDF for a list of harvest equipment per acre costs. **The value of cover crop as hay is either farmer-provided in Section I prices table or using the default national average price of grass hay.**

|  |  |
| --- | --- |
| **Grazing Cover Crops** | |
| Number of Acres Grazed Per Year |  |
| Number of Days Grazed Per Year |  |
| Stocking Rate (AU/Ac) |  |
| Forage Demand (Lb/AU/Day) |  |
| OR: Farmer-provided Per Acre Grazing Benefit ($/Ac) |  |
| **Grazing Infrastructure and Annual Costs** | |
| Planning Horizon (Years) | 15 (default) |
| Interest Rate | 3% (default) |
| Fence ($/Ac) |  |
| Watering Facilities ($/Ac) |  |
| Additional Labor and Management ($/Ac/Yr) |  |
| Other Annual Grazing Costs ($/Ac/Yr) |  |
| **Haying Cover Crops** | |
| Number of Acres Hayed Per Year |  |
| Hay Yield (Tons/Ac) |  |
| Per Acre Haying Cost ($/Ac/Yr) |  |

Add any notes related to the **benefits or costs of grazing cover crops** (e*.g., number days of fall grazing were extended or ability to start spring grazing earlier by a number of days):*

# **OTHER COSTS & BENEFITS**

**The ‘Other Costs & Benefits’ tab of the R-SHEC Tool** calculates the value of decreased erosion, cost of educational activities, annual financial assistance payments, and any other benefits and costs not otherwise accounted for on the previous tabs of the Tool – all collected in the tables below.

**Table 12: Soil Erosion & Organic Matter**

**Number of Acres** is the area where the reduction in erosion was observed. This could be the entire area where the farmer switched to no-till or reduced tillage in cases where slopes are relatively uniform throughout. If the area is comprised of a combination of relatively flat areas and steeper ground, the acreage could be the portion encompassed by only the steeper ground. Do not enter a number greater than the total number of acres in the Study Area. Enter **tons of reduced erosion** (Tons/Acre/Year) results modeled using any sediment reduction tool, such as the Nutrient Tracking Tool, the erosion reduction value from RUSLE-2 analysis, or any reasonable value based on soil type. If the user does not wish to ascribe an economic value to the reduction in erosion, simply leave these fields blank. **Total Annual Change in Repair Cost** should only include changes in costs for repairs (e.g., fixing gullies) that occur within the Study Area due to the adoption of soil health practices.

|  |  |
| --- | --- |
| **Soil Erosion and Organic Matter** | |
| **RUSLE2/WEPs/NTT Results** | **Amounts** |
| Number of Acres |  |
| Tons Reduced Erosion (Tons/Ac/Yr) |  |
| Reduced Mechanical Erosion Repair due to SH practices | |
| Total Annual Change in Repair Cost ($/Year) |  |
| Organic Matter Test Results\* | |
| Year of Soil Test | Soil Organic Matter Value (%) |
|  |  |
|  |  |
|  |  |

\***Note:** We do note assign a monetary value to change in Soil Organic Matter but find it helpful in backing up experienced changes in costs and benefits, particularly in the case study storytelling.

If the farmer observed a **reduction in soil erosion** due to the combination of soil health practices adopted in the Study Area, please:

* 1. Describe any changes producer may have visually observed in erosion on their farm:
  2. Describe the mechanical erosion repair activities within the Study Area that used to be carried out , how frequently these tasks were performed, and how/why the activities changed with adoption of the soil health practices:

**Table 13: Educational Activities**

Educational activities should reflect the average yearly amount of time spent learning the soil health practices, such as attending conferences and farmer meetings, reading magazines, etc. Do not enter hours for individual soil health practices if using Combined Practice Learning Activities. Use Combined Practice Learning Activities when the farmer cannot separate hours spent by practice. The default hourly rate used to calculate the total education expense per year can be found on the 'Prices' tab within the R-SHEC tool; if the farmer wishes to use a different hourly rate, provide one below.

|  |  |
| --- | --- |
| **Educational Activities** | |
| **Conservation Practice** | **Hours/Year** |
| Residue and Tillage Mgt. |  |
| Cover Crops |  |
| Nutrient Mgt. |  |
| Conservation Crop Rotation |  |
| **OR** Combined Practices Learning Activities |  |
| Farmer's Reported Labor Hourly Rate *(optional)* |  |

Table 14: Other Benefits and Costs

Be sure these benefits and costs are not being captured anywhere else already. Descriptions should detail the benefits, costs, or changes in activities experienced. The “Change in $/acre” should be entered in the R-SHEC as positive values. The “# Acres Affected” should not exceed study area acreage. You can enter the full study area, or a portion of the study area.

|  |  |  |  |
| --- | --- | --- | --- |
| **Description of Other Benefit(s)** | **Change in $/acre** | **# Acres Affected** | **Note which soil health practice caused this change** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| **Description of Other Cost(s)** | **Change in $/acre** | **# Acres Affected** |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Table 15: Financial Assistance History**

If the farmer previously received or is currently receiving **financial assistance** for any soil health practice, please complete the table below. (See example in the first gray row for guidance.) This information is only relevant if writing a case study, as financial assistance payments are not included in the partial budget analysis because cost-share is temporary and not received by all, but it could be noted in the footnote of PBA table if the results are presented in a case study or report (see [AFT soil health economic case studies](https://farmlandinfo.org/publications/soil-health-case-studies/) for examples).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Associated Practice** | **Start Year and Ending Year** | **Source of Funding** | **Payment per Acre** | **Acres Enrolled** |
| *E.g., Cover Crops* | *2017 - 2020* | *NRCS - EQIP* | *$5* | *500* |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

# **YIELDS**

**The ‘Yields’ tab of the R-SHEC Tool** calculates revenue effects attributed to crop yield changes from adopting soil health practices– captured below.

**If there is a yield increase or decrease, the user has the option to attribute a portion of that yield change to adoption of soil health practices.** For reference, soil health successful farmers featured in AFT’s soil health economic case studies have attributed between 1% and 60% of yield increases (19% average) to soil health practices. **It is up to the farmer to estimate what portion of their yield change can be attributed to improved soil health.** To guide this decision, we encourage users to compare the farmers benchmark and current average yields to their county average yields for the same benchmark and current time frame. While these county averages are not necessary for the partial budget analysis, we think they can help reveal what yield changes may be due to other things beyond soil health practices, such as technological or time management improvements.

**If analyzing a conservation crop rotation (CCR),** you must provide benchmark and current yields for all crops – even if there is no difference between benchmark and current yields. **If NOT analyzing a CCR,** you only need to provide benchmark and current yields that changed due to the adoption of soil health practices.

**Table 16: Observed Change in Average Yield by Crop**

|  |  |  |  |
| --- | --- | --- | --- |
| Threshold Year (first adoption year): | |  | |
|  | **Crop 1** | **Crop 2** | **Crop 3** |
| Cash Crop Type |  |  |  |
| **County Yield Averages***(optional; for reference only)* | | | |
| **Benchmark County** Average Yield per Acre *(optional)* |  |  |  |
| **Current County** Average Yield per Acre (*optional)* |  |  |  |
| **Farmer-Provided Yield Averages** | | | |
| **Farmer-provided:** Benchmark Crop Average Yield per Acre (PRIOR to threshold year) |  |  |  |
| **Farmer-provided:** Current Crop Average Yield per Acre (AFTER to threshold year) |  |  |  |
| **Farmer-provided:** % of Change in Average Yield Attributed to Soil Health Practices |  |  |  |

# **ADDITIONAL QUESTIONS** *(optional)*

This section includes ten additional questions that will help you gather the story aspect of a case study to pair with the quantitative results of the partial budget analysis.

* + 1. **Describe what motivated the farmer’s adoption of each soil health practice, how producer initially learned about each practice, and when began each practice was begun.**

1. **What challenges has producer experienced during the adoption of soil health practices?**
2. **What else does the producer like about the soil health practices they have adopted that you have not mentioned above?**
3. **How many years has producer been involved with agriculture?**
4. **How many people are involved in the farm’s operation? What is the producer’s role?**
5. **Please describe the farm’s topography** (e.g., rolling hills, flat, flood plain, etc.):
6. **What is the producer’s predominant soil types?**
7. **Who does the producer generally talk to about soil health practices? Where do they get information** (e.g., NRCS, SWCDs, Extension, ag retailer, crop consultant, farm magazine articles, state, or regional SH practice farmer group)?
8. **How does the farmer share their success story with others? Are they part of local farmer groups?**