



USER'S GUIDE

Calculator for SISC Working Metrics Version 1.0

October 2013

User’s Guide: SISC Calculator – Working Metrics Version 1.0

Table of Contents

- I. Introduction1**
- II. Overview & Tips for Use2**
 - SISC Calculator At-a-Glance 2
 - Calculator Layout..... 3
 - Tips 4
- III. Guidance on Boundaries and Timeframes5**
 - Definitions of Total Farmed Area and SISC Management Area 5
 - Reporting Timeframe 7
- IV. Step-by-Step Calculator Instructions10**
 - Section 1: General Information 10
 - Section 2: Management Area Information..... 10
 - Section 3 – Nutrients 11
 - Section 4 – Water Use 15
 - Section 5 – Soil Test Results 15
 - Section 6 – Farm Energy Use 17
 - Section 7 – Energy Allocation Worksheet 18
 - Section 8 – Energy Results..... 21
 - Section 9 – Metric Dashboard 21
- V. Additional Resources21**
- Acknowledgements.....23**

I. Introduction

About the Stewardship Index

SISC is a multi-stakeholder initiative to develop a system for measuring sustainable performance throughout the specialty crop supply chain. The project is an unprecedented collaboration amongst the nation's most influential grower organizations, Non-Governmental Organizations (NGOs), and buyers of specialty crop products. SISC aims to establish a common suite of outcomes-based metrics to enable operators at any point along the supply chain to benchmark, compare, and communicate their own performance in meeting sustainability goals.

About the SISC Metrics

This Guide assumes familiarity with SISC's Working Metrics Version 1.0, which include:

- Applied Water Use Efficiency
- Energy Use
- Nitrogen Use
- Phosphorus Use
- Soil Organic Matter

An overview of the metrics is available at http://www.stewardshipindex.org/working_metrics.php.

Detailed technical notes and supporting Guidelines (some of which are referenced below) can be found by login (with free registration) at www.stewardshipindex.org.

The site also offers information about metrics in development. For additional resources and how to access them, see page 22 (below).

Finally, SISC leadership is committed to refining the Version 1.0 metrics and to developing and piloting other sustainability metrics as appropriate. The metrics are a subset of a longer set that was piloted on farms across the country in 2010 and 2012. SISC used direct feedback from growers to hone the data inputs required for metric. **We welcome your feedback as you use the tool.** Let us know at info@stewardshipindex.org.

Note on Terminology

SISC is envisioned as a set of metrics that can be communicated among peer groups and along the supply chain. But the metrics can also be used independently to capture and understand performance within a single company or farm. In the Calculator and in this User's Guide, entering information—regardless of its intended use—is referred to as "reporting." **None of the information entered into the Calculator will be shared with anyone unless you choose to do so.** "Reporting" simply refers to data that must be captured to use the metrics.

II. Overview & Tips for Use

SISC Calculator At-a-Glance

The Stewardship Index for Specialty Crops (SISC) is pleased to offer the specialty crops industry the Calculator for SISC Working Metrics Version 1.0. This guide contains an overview of the Calculator tool as well as step-by-step guidelines for inputting data.

Detailed guidance for each entry field is provided in Section X of this Guide following these numbers

Guidelines for defining a management area are provided in Section X.

Menu tab helps you navigate

For values that are not known, default values are available

ABOUT THE INDEX **GENERAL INFO** **MANAGEMENT AREAS** **ENERGY USE** **METRIC DASHBOARD**

MANAGEMENT AREA 1 of 1

NUTRIENTS

Give FEEDBACK [Go to COMPOST REF](#) [Go to FERTILIZER REF](#)

Fertilizers

3.1 Prefer to enter data per acre or in total?*

Rate per acre

3.2

	Date Range	Product	Amount Applied Per Acre	Unit of Amount Applied	%N	%P ₂ O ₅	%K ₂ O	Crop Receiving Application	Embedded energy (MM BTU)
Product #1	10/15/11 - 03/25/12	Synthetic Blend	4	tons (US)	1.4%	1.4%	2.9%	Lettuce, Leaf	602.2
Product #2		Synthetic Blend	612	pounds	7.5%	8.0%	8.0%	Lettuce, Leaf	224.2
Product #3		Urea (46-0-0)	375	pounds	32.0%	0.0%	0.0%	Lettuce, Leaf	507.2
Product #4		Ammonium Nitrate (35-0-0)	400	pounds	15.0%	15.0%	15.0%	Broccoli	290.6
Product #5		Urea Ammonium Nitrate (30-0-0)	1100	pounds	35.0%	0.0%	0.0%	Broccoli	1617.4
Product #6									
Product #7									
Product #8									
Product #9									

Select Product Name
Select product name. If "synthetic blend," "compost" or "manure," enter N-P-K value in cells to the right. If product is not found in list, please list that product in comments in the Feedback section.

Each field in the calculator includes guidance. For detailed guidance, see Sections 3 and 4 of this User's Guide.

Drop down boxes make input easy

Information can be entered per acre or as a total

Color-coded boxes let you know where to input data

Allows for double and triple cropping on same field

Calculator Layout

Data for the Calculator is collected using a Microsoft Excel spreadsheet. The Calculator features the following tabs:

About the Index

This page has general information on the calculator. No data input is required on this page.

General Information

Complete this page with data that applies to the reporting farm enterprise. See “Definition of Total Farmed Area and SISC Management Area” above for more information on what to include for your farm.

Management Areas

Complete this page with data that applies to one or more specific SISC Management Areas within your farm operation. The calculator allows for reporting on up to three different SISC Management Areas, each on a separate tab.

Energy Use

Complete this page with data on your farm’s energy use.

Energy Allocation Worksheet

Use this worksheet to develop estimates of energy use unless you already know the specific fuel and electricity data for the reported crops. That is, use this worksheet if:

- You are reporting on more than one crop per SISC Management Area.
- You are not currently collecting electricity or fuel data at the resolution of your Management Area(s). (E.g., you know your whole farm’s electricity use, but not for the specific SISC Management Area).

Energy Results

The estimates of how much direct energy (fuel and electricity) should be allocated to each field, as well as total indirect energy, are displayed on this page. No data input is required.

Metrics Dashboard

Your metric results are displayed on this page using the data you have provided. No data input is required on this page.

Feedback

This page collects your feedback on each metric section. Please share; your feedback will help us improve the tool and understand how well it works for your situation.

Compost and Fertilizer Reference Sheets

These sheets are for reference to help you estimate if you do not know the N-P-K value of your compost or fertilizer.

Tips

- **Navigating the Tool:** The calculator is divided into several tabs. You can move among tabs by clicking on navigation buttons (“Go to...”), clicking on the sections at the top of the page, or clicking on tabs at the bottom of the page.
- **Required Fields:** An asterisk (*) denotes boxes that are required for the calculator to work appropriately.
- **Color-Coded Boxes:**
 - **Blue Boxes** - Indicate data entry fields.
 - **Gray Boxes** - Indicate calculated or default fields that are used to calculate the final metric. In some cases, if you have better data, the calculator allows you to overwrite these fields. Otherwise, you may use the defaults provided.
 - **Yellow Boxes** - Indicate help boxes or additional instructions. Yellow boxes are included next to certain sections and will pop up when you select data entry cells.
- **Results:** Go to the final page - “Metric Dashboard”- to see your results. For multiple crops, results from the energy allocation worksheet can be seen on the “Energy Results” page.
- **Feedback:** You can comment on any topic at any time by clicking on "Feedback" buttons or the "Feedback" tab.
- **Assistance:** If you have any questions while using the calculator, you can always contact us at info@stewardshipindex.org.

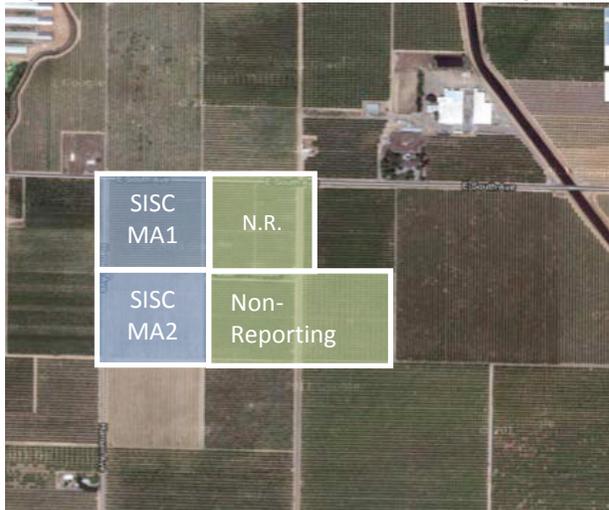
III. Guidance on Boundaries and Timeframes

Definitions of Total Farmed Area and SISC Management Area

Total Farmed Area

SISC defines the Total Farmed Area (TFA) as an area owned or rented by the farming business that shares resources such as machinery, water, or staff. The TFA can be comprised of one or more Management Areas, but does not include things like roads, creeks, and houses. Operations in different states or regions should be reported as separate farms. In Figure 1 below, the TFA includes two SISC Management Areas and two “non-reporting” areas.

Figure 1. Total Farmed Area (both blue and green boxes)



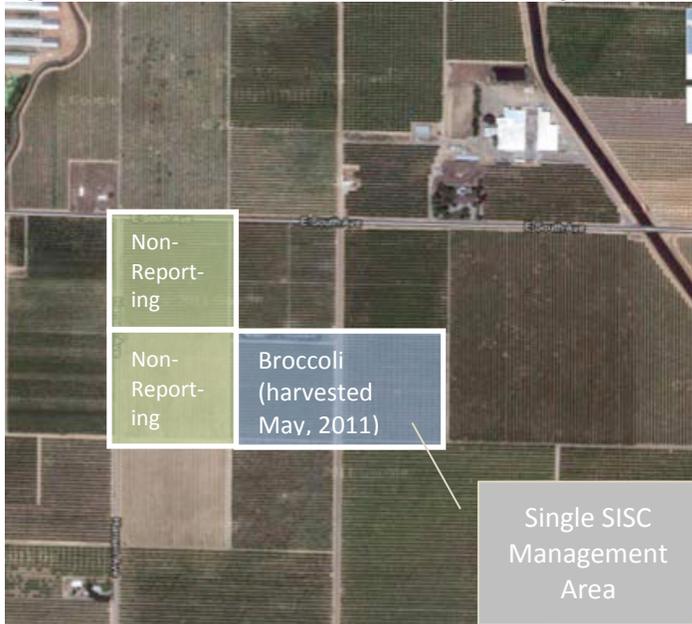
SISC Management Area

A SISC Management Area (M A) can be a collection of fields, a field, or a block within a field. The size and number of MA's is determined by the grower based on his or her needs and in consideration of the guidelines below:

- A field is considered a single MA when multiple crops are rotated in succession on the same ground and harvested in the reporting year.

Example: Broccoli and lettuce are harvested in the same field in 2013. This field should be considered a single MA because both crops are grown on the same ground in the same reporting year. See Figure 2.

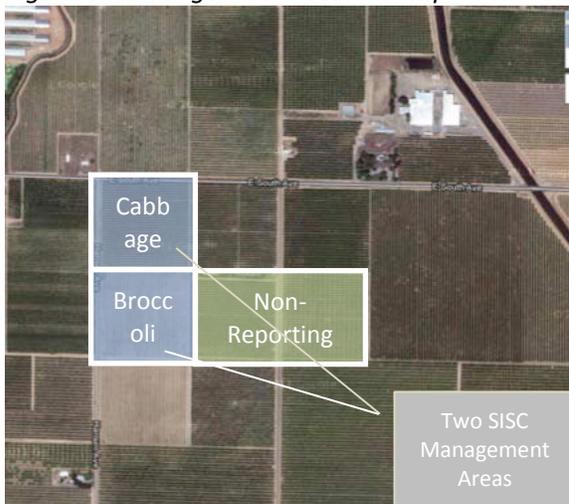
Figure 2: Broccoli and Lettuce in a Single Management Area



- Different crops grown concurrently on different ground are considered different MA's.

Example: Cabbage is grown on one field and broccoli is grown on an adjacent field during the same season. Both crops are harvested in 2013. As indicated in Figure 3 (below), each field is considered a separate MA.

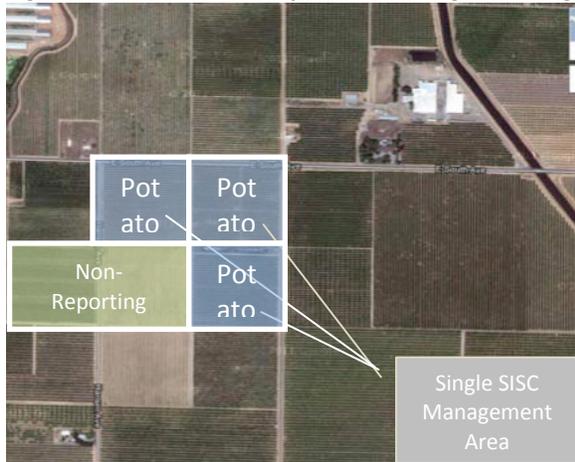
Figure 3: Cabbage and Broccoli in Separate Management Areas



- Several blocks or fields may be considered a single MA when the same crops are grown, managed together, and harvested in the same reporting year. If a grower chooses to aggregate multiple fields growing the same crop into a single MA, the SISC metrics will provide data about those fields in aggregate.

Example: A grower has three separate fields where potatoes were harvested in 2013. The fields were under the same general management routine and the grower doesn't need field-specific metric results. As shown in Figure 4 (below), all three fields may be aggregated and considered as a single MA.

Figure 4: Three Fields Defined as a Single Management Area



- Growers producing multiple crops may choose to use SISC metrics on one or more of those crops.

Reporting Timeframe

To facilitate consistent and comparable use of the SISC metrics, specific periods are prescribed for collecting the data needed for each metric. The section below describes the reporting intervals for each metric, explains terms used in the SISC Calculator and provides examples for reporting intervals in different scenarios. Note that the reporting intervals are automatically provided by the SISC Calculator so it is not essential for the user to learn all the details described below.

Reporting Year

The reporting year for a SISC-measured crop is the calendar year in which a crop is harvested, regardless of when the crop was planted or when the data are reported.

Example One: Crop A is harvested in October 2013 but the grower reports it to SISC or another party in 2014. The reporting year for this crop is 2013 because that is when it was harvested.

Example Two: Crop B is planted in November 2012 and harvested in April 2013. The reporting year for this crop is 2013 because that is when it was harvested.

Start and End Dates for Data Collection

The data collection interval is different for different metrics, as described in Table 1 below. The calculator automatically calculates the correct reporting intervals based on the harvest dates provided by the user.

Table 1. When to collect data for SISC Metrics

Metric	When Data are Collected
Applied Water Use Efficiency	Harvest-to-harvest
Energy Use	Harvest-to-harvest
Nitrogen Use	Harvest-to-harvest
Phosphorus Use	Harvest-to-harvest, with P soil tests annually
Soil Organic Matter	Soil Organic Matter tested every 3 to 5 years

Harvest-to-harvest Timeframe

SISC uses a harvest-to-harvest timeframe for collecting water, energy, and nutrient application data. While the realities of farming often include post-harvest activities and applications, we have selected a harvest-to-harvest timeframe with the aim of capturing all relevant cropping activities and following the growing cycle while still providing clear timeframes for consistent data collection.

When using a harvest-to-harvest timeframe, data collection for a given crop begins directly after the previous crop *in that location* (i.e., on the same ground) was last harvested. It ends on the last date that the crop is harvested. This means that all inputs of water, energy, and nutrients applied after a previous crop was harvested are included in evaluating the crop in the current reporting year, even if those applications were made in a prior calendar year. Where multiple crops are grown in one year, there may be more than one harvest-to-harvest interval. The last harvest date in the reporting year marks the end of data collection for that year. Inputs applied after that date should be reported in the following reporting year.

Inputs applied to a non-commercial cover crop are included as part of the cash crop that follows. If the cover crop is harvested for sale it should be treated as a separate cash crop. If no crop was harvested in the prior reporting year, then the harvest-to-harvest timeframe is considered to be the 12 months prior to the last harvest date.

Example One: Crop A is harvested in September and October, with the last date of harvest on October 31, 2013. No other crops are grown on this ground in 2013.

- Water, energy, and nutrient data: All applications beginning after the last date the same ground was harvested in 2012 should be included. If no crop was harvested in 2012, inputs applied from October 31, 2012 through October 31, 2013 should be included.
- Soil data: The most recent soil test should be used to calculate the soil metric.

Example Two: Crop A was planted in November 2012 and last harvested on April 20, 2013. Crop B is planted on the same ground in June 2013 and harvested over several weeks from August through October 31, 2013. Prior to these crops, this ground was last harvested in September 2012.

- The reporting year for both Crops A and B is 2013.
- Water, nutrient, and energy data: All inputs applied from September 2012 through April 2013 should be attributed to Crop A. All inputs applied from the time after Crop A’s harvest in April until Crop B’s harvest is finished in October should be attributed to Crop B. (Anything applied after harvesting Crop B should be reported with the first crop harvested in 2014).
- Soil data: The most recent soil test should be used to calculate the soil metric.

Three-year Rolling Average

SISC recognizes that fluctuations in weather, pest pressure, climate, markets, and other variables will change metric results from year to year. To better reflect the on-going sustainability performance of an operation, it is recommended that SISC metrics be considered on a three-year rolling average for each metric. For perennials, this should be the last three reporting years. For crops which are rotated, the last three harvests of the same crop should be used for this average (regardless of when they were harvested). It may take more or fewer than three years to collect three data points for specific crops, depending on how often they are rotated.

Although this is the recommended usage, the calculator itself only represents a single year of harvests. Rolling averages should be calculated separately using the results of the calculator.

IV. Step-by-Step Calculator Instructions

The instructions below use item numbers corresponding to those in the calculator.

Section 1: General Information

1.1: Company Name

Provide information for the reporting business.

1.2-1.9: Contact Information

Provide contact information for the individual overseeing the calculator work.

1.10: Reporting Year *(Required Field)*

Enter the calendar year for which you are reporting. This designates your reporting year. Only crops harvested during the reporting year will be analyzed in the calculator. For reporting on crops harvested in a different year, create a new calculator file or save an existing calculator file as a different file using Excel's 'Save As' function. (See Section III. Reporting Timeframe, above, for more detail.)

1.11: Date of Last Harvest in Reporting Year *(Required Field)*

Enter the date when the last harvest was completed for this reporting year. If reporting on multiple SISC Management Areas, enter the date of whichever harvest was latest.

1.12-1.19: Farm Information

Provide the name and location for the farm addressed in this report. In this section, provide the total cropped area of the farm, including cropped areas for which you are not reporting. If you are not reporting on some cropped areas, we hope you will share your reasons for excluding them. (See Section III. Definition of Total Farmed Area and SISC Management Area, above, for more information about what to include in your farm and SISC Management Areas.)

Section 2: Management Area Information

2.1: SISC Management Area Name

Enter a name for this Management Area.

2.2: Total Acres in SISC Management Area

Enter total acreage of cropped land in this Management Area. See the section above entitled "Definitions of Total Farmed Area and SISC Management Area" for directions on how to define your Management Area.

2.3: Number of Crop Rotations in SISC Management Area *(Required Field)*

Enter the number of crops which were harvested during the reporting year on this Management Area. Do not include crops planted during the reporting year but harvested in a subsequent year. Non-commercial cover crops grown in between cash crops are attributed to the subsequent cash crop and should not be included here as a separate crop. If the cover crop itself is sold, it should be reported as a separate crop.

2.4: Date of Last Harvest in Previous Reporting Year *(Required Field)*

Enter the date harvest ended during the previous reporting year (e.g., last harvest in 2012 if the reporting year is 2013). All inputs applied after this date count towards this reporting year and should be included in data entered in the calculator.

If no crop was harvested in the prior year then enter the date that corresponds to one year before the current year harvest.

2.5: Cropping Information *(Required Field)*

Provide area planted, date of completion, and tons harvested for the crop grown on this Management Area. If more than one crop was planted during the year, you must enter the crops in chronological order with the earliest crop being Crop 1.

Crops: Select your crop from the drop-down menu. If your crop is not on the list, select “other” and enter your crop on the feedback page.

Acres planted: Enter the acres planted in this SISC Management Area for each crop.

Date harvest completed: Enter the last date of harvest for each crop in mm/dd/yy format. These should all be in the reporting year.

Tons harvested: Enter the number of tons harvested and sold from this SISC Management Area for each crop (U.S. short tons).

Grown from Seed or Transplant: Enter whether this crop was grown from seed or from transplant.

Section 3 – Nutrients

SYNTHETIC FERTILIZERS

3.1: Total amounts or per acre rate *(Required Field)*

Choose whether you’d like to enter nutrient product data as a total quantity applied to entire SISC Management Area or as a rate per acre.

3.2: Synthetic Nutrient Product Information

Enter information for each nutrient product applied during the reporting timeframe for the crop(s) harvested in this SISC Management Area, as indicated by the calculator. The calculator will specify the correct reporting interval for the crop(s) based on the current and previous harvest dates (or will start 12 months prior to the current harvest if no crop was harvested in the previous year).

Complete each row with the information below, entering data for each product in a separate row. Multiple applications of the same product in the same reporting interval can be combined to reduce data entry. However, applications of the same product in different reporting intervals must be entered on separate rows.

Date Range: Select the date range during which the product was applied. If applied during multiple date ranges, enter the product on a separate row for each period.

3.2: Synthetic Nutrient Product Information (continued)

Product: Select the fertilizer product applied for each application. Enter blends as described here. If you are unable to find your product, please help us to improve this tool by listing that product in the Nutrient Feedback section.

Synthetic Blends: If the product is a blend, choose “Synthetic Blend” from the drop-down list and enter the N-P-K values in the section below. A list of N-P-K values for most commercial fertilizer products is provided in Appendix B. If the product is in the drop-down list, simply select the product and enter the units and amount applied.

Amount Applied: (Required Field) Enter the amount of product applied to this SISC Management Area, either as total or rate per acre, according to what you selected in 3.1 above. You may enter the amount in any of the units provided in the list in the next column. **IMPORTANT:** Be sure to enter information that is consistent with your selection above at 3.1.

Unit of Amount Applied: (Required Field) Select the units used to express the amount of fertilizer applied. Units are provided for both liquid and dry applications.

N, P₂O₅, and K₂O: (Required Field) Enter the % N, % P₂O₅, and % K₂O for blended fertilizer products. This is commonly known as the “N-P-K ratio” and can be found on the fertilizer label expressed as “XX-XX-XX.” It is not necessary to enter an N-P-K value if you select the product from the product drop down list. For your reference a table of many commercial fertilizers is found in Appendix B, organized by company name. (Note: the “P” and “K” in the N-P-K ratio on the label in fact represent P₂O₅ and K₂O.)

Crop Receiving Application: The crop “receiving” this application will be identified by the calculator according to the date range you have selected.

Embedded Energy: An estimate of the energy required to produce the total amount of fertilizer used (for all acres) is calculated and shown here in millions of BtUs.

ORGANIC FERTILIZERS

3.3: Total amounts or per acre rate

Choose whether you’d like to enter organic fertilizer data as a total quantity applied to entire SISC Management Area or as a rate per acre.

3.4: Organic Nutrient Product Information

Complete each row with the information below, entering data for each product in a separate row.

Date Range: Select the date range during which the product was applied. If applied during multiple date ranges, enter the product on a separate row for each period.

Amount Applied: Enter the amount of product applied to this SISC Management Area, either as total or rate per acre, according to what you selected in 3.3 above. You may enter the amount in any of the units provided in the list in the next column. **IMPORTANT:** Be sure to enter information that is consistent with your selection above at 3.3.

3.4: Organic Nutrient Product Information (continued)

Unit of Amount Applied: Select either tons or cubic yards used to express the amount of fertilizer applied.

Unit of Nutrient Content: Select how you'd like to enter the nutrient content – as a percentage or by pounds per unit. **IMPORTANT:** If you select the percentage option and are entering information in cubic yards, the calculator will prompt you to enter the weight of one cubic yard. If you do not know this information, a default value of 1400 pounds per ton will be used.

>> *NOTE: Further instruction on how to estimate N and P content can be found on the SISC Web site. See Section V. Additional Resources, below.*

N and P₂O₅: Enter N and either P or P₂O₅ (in the units that you indicated in the previous column) from a compost analysis, if known. If N and P are not known, select values according to the appropriate feedstock from the table in Appendix A, or by clicking on the “Go To Compost Reference” button in the calculator. Enter percentages as whole number (e.g., enter 25% as 25). For decimals less than 1, enter zero before decimal (e.g., enter .5 as 0.5).

Crop Receiving Application: The crop “receiving” this application will be identified by the calculator according to the date range you have selected.

Pounds N per acre: Using the information provided, the calculator will estimate the total pounds of N per acre for each product

Pounds P per acre: Using the information provided, the calculator will estimate the total pounds of P per acre for each product

NITRATES IN IRRIGATION WATER

>>*NOTE: Further instruction on sampling nitrate concentrations can be found on the SISC Web site. See Section V. Additional Resources, below.*

3.5: Nitrate Concentration Information

Complete each row with the information below, entering data for each irrigation source in a separate row.

Name: Enter a name you would like to use for each water source.

Average NO₃ Concentration: Enter an average NO₃ concentration for each water source in ppm or mg/l. If multiple tests were performed over the season, enter an average of the test results. If using test strips, enter the highest value of the range. For example, if results fall into a 3-6ppm range, enter 6ppm.

Most Recent Test: Enter the date of the most recent NO₃ test conducted.

Test Method: Select the method used to determine the results.

NITROGEN FIXED FROM COVER CROP OR PREVIOUS LEGUME CROP

>> *NOTE: Further instruction on how to estimate N fixation from leguminous crops can be found on the SISC Web site. See Section V. Additional Resources, below.*

3.6: Leguminous Crop a Cash Crop?

This section helps you to estimate nitrogen from a leguminous crop that was planted prior to the current crop. It could be a cover crop intended only to be returned to the soil or a leguminous cash crop such as alfalfa or peas. If it was grown as a cash crop, enter “yes” here. Otherwise, enter “no.”

3.7: Leguminous Crop Information

Complete this section with the information below.

Crop receiving fixed N: Select the crop that directly followed the leguminous crop.

Percent of Area Planted with N Fixing Crop: Enter percent of management area that was planted with N fixing crop. Enter as whole number (enter 25% as 25).

Crop Description:

- *Crop Maturity at Tillage:* Describe the maturity of N-fixing crop at time of tillage or harvest
- *Stem Description:* Describe whether stems of N fixing crop were woody/fibrous or not.
- *% of Mix that is Leguminous:* Select approximate percentage of legumes in the crop mix

Crop Height: Enter the crop height (in inches) when it was turned into the ground. This can be approximate.

Average Fixed lbs N/acre: The calculator will estimate how much nitrogen was fixed per acre by the leguminous crop. **NOTE:** If you indicated this was a cash crop, only the below ground portion of nitrogen will be considered added to the system. If you indicated it was not a cash crop, both above and belowground nitrogen will be included.

Percent N in Plant Tissue: The calculator will estimate the percentage of nitrogen in the full plant’s tissue. If you have better data through lab tests or other sources, you can override this information in the blue box directly below.

Aboveground Biomass (lbs dry wt/acre): The calculator will estimate the total mass of nitrogen in the portion of the plant that is above ground. If you have better data through lab tests or other sources, you can override this information in the blue box directly below.

Belowground Biomass (lbs dry wt/acre): The calculator will estimate the total mass of nitrogen in the portion of the plant that is below ground. If you have better data through lab tests or other sources, you can override this information in the blue box directly below.

User Over-rides for Estimates Above: These boxes are provided to allow you to enter better values for the %N in the plant tissue, or above or below ground nitrogen totals if you know them.

Section 4 – Water Use

4.1: Method for measuring applied water

Select the method used to measure applied water. Include all irrigation events from the end of the previous harvest to the current harvest (i.e., harvest-to-harvest timeframe specified above). Approved methods for measuring applied water are listed in the drop down menu, with more detail on each provided in the *Applied Water Efficiency Metric Description* at www.stewardshipindex.org.

4.2: Unit of Applied Water

Select the unit you will use to enter your applied water information.

4.3: Applied water quantity

For each water source, enter the per-acre volume of applied water for all irrigation events that occurred during the reporting interval specified above in gray by the calculator for each crop.

Total Applied Water: The calculator will sum applied water amounts for each source to provide a total for each crop.

Total N in Irrigation Water: The calculator will sum the estimated total of nitrogen applied via nitrate concentrations in the irrigation water, using the information entered in section 3.5.

Section 5 – Soil Test Results

The soil metric requires that a soil sample be sent to a lab in order to evaluate Total Organic Carbon (TOC). Follow your lab's instructions for collecting a soil sample. Lab results for TOC should be obtained at least every 5 years. USDA has a helpful factsheet about Total Organic Carbon and its importance as an indicator at http://soils.usda.gov/sqi/assessment/files/toc_sq_biological_indicator_sheet.pdf.

5.1: Soil Test Dates

Enter the date of the most recent soil test conducted for both soil organic matter and phosphorus.

5.2: Lab Test Method

Select the method used by the laboratory to determine the results for soil organic matter/total organic content(TOC). The lab should use the dry combustion method to determine TOC. In Western states, this may include a testing method that accounts for soil carbonates.

If you already have a lab test for Soil Organic Matter (SOM) using a Weight Loss on Ignition lab method, your lab may be able to convert this to TOC if it has a correction curve for your soil type. If this is the case, you should ask your lab to calculate this conversion.

Several new soil carbon tests enable growers to measure change in soil organic carbon over a shorter time span, making this measurement more useful for gauging the benefit of land management practices. One is microbial biomass carbon, measured with a fumigation-extraction technique. Another method estimates carbon by measuring beta-glycosidase. While these methods are typically not available in commercial labs, they are often used by researchers and will also work for the soil metric.

5.3: Soil Test Result information

NOTE: Further instruction on soil sampling can be found on the SISC Web site. See Section V. Additional Resources, below.

Complete each row with the information below, entering data for each area that was sampled separately in a separate row. SISC Guidelines recommend a maximum of 40 acres per sample area.

Sample Area: Enter the number of acres for each sample area.

TOC Reported by Lab*: Enter the TOC results. TOC should be reported as a percent of carbon and entered in the calculator as a number between 0 and 100.

Soil Series Name*: Select the soil series name that represents the dominant soil for that area. If not known, soil series can be determined by locating your farm soil maps via the USDA's Web Soil Survey. Follow these steps to determine the dominant soil series for your site. If tests are conducted in different locations, different soil series names may apply.

1. Visit NRCS's Web Soil Survey at: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm> .
2. Click on the green button that says "Start WSS".
3. Click on the map near your farm. Keep clicking until you have zoomed into the particular field where you took your soil sample. The map may load slowly.
4. Once the map is at the scale where you can select your field, click on the "AOI" (Area of Interest) button and draw a rectangle or other shape around your field. (The rectangle button requires your field to be horizontal on the map. If this is not the case, choose the AOI button with a polygon shape, which will allow you to draw your own shape. Double click on the last corner of the shape to tell the program you are done drawing.)
5. Once your field is outlined, click on the "Soil Map" tab almost at the top of the screen, next to the "Area of Interest" tab.
6. Your soil series name can be found in the "Map Unit Legend" section on the left side of the screen, under "Map Unit Name." Click on the name to see more information on this specific field.
7. Select the soil series name in the appropriate place in the Stewardship Index calculator. If a field contains multiple series, choose a dominant series to use.

Soil Texture*: Select the dominant soil texture type for each sample area. If not known, you may refer to information from the Web Soil Survey map above or use the NRCS Soil Texture Calculator at <http://soils.usda.gov/technical/aids/investigations/texture/>.

Recommended P application: Enter the lab recommendation of how much phosphorus should be applied to this area, in pounds per acre.

SOM Potential: The calculator will estimate the SOM potential for that area using the soil information provided.

Section 6 – Farm Energy Use

This section is intended to provide flexibility in how you enter your fuel and electricity data. If you only know your data for your whole farm, you may select to enter it for the whole farm. If you know it by management area, you may enter it at that level as well. If you are growing multiple crops, you must use the Energy Allocation Worksheet to determine the right amount of electricity and fuel to attribute to a specific management area and crop rotations within each management area. All data should be entered for the 12-month period ending when your last crop was harvested for this reporting year (indicated in the gray box below). It will be attributed to harvest-to-harvest timeframe by using the allocation worksheet. If you have only one crop on a different harvest-to-harvest timeframe, you may use that date range instead.

6.1: Total Annual Electricity Use

Select whether you would like to enter data for the Total Farmed Area or for the individual SISC Management Area(s). Enter total annual electricity use for the dates specified above the data entry table (the field where this data should go will turn blue once you make your selection). If your electricity bills do not coincide with these dates, prorate the electricity for the period of time included in the reporting year.

Example: Your electric bill covers the period from October 15 through November 15, 2013 but your last date of harvest that year is October 25, 2013. The electricity should be prorated to include 10 of the 30 days in the billing period, which is 30% of the bill. If the bill is for 1000 kWh, 300 should be included in reporting year 2013 and the rest would be included in electricity for the 2014 reporting year.

6.2-6.5: Total Fuel Use

For each fuel, select whether you would like to enter data for the Total Farmed Area or for the individual SISC Management Area(s). Enter total annual fuel use for the dates specified above the data entry table for diesel and gasoline fuels. Include both stationary sources (e.g. irrigation pumps) and mobile sources (e.g. farm equipment). On-road vehicles should not be included.

If you use other fuels on your farm for either stationary or mobile equipment, please select the fuel type and enter the total annual usage. If you are unable to find the fuel on the drop down list, please indicate this in the feedback section.

6.6: Do you need to use the energy allocation calculator?

The Energy Allocation Worksheet helps determine how much of your total fuel and/or electricity should be attributed to each crop. You should use this calculator unless you meet one of the following conditions:

1. You are reporting on one crop and one management area only, and that crop is the main user of electricity and fuel at your site.
2. You are reporting on multiple management areas, know the electricity and fuel use of each management area, and are growing only one crop per management area (i.e., no rotation during reporting year).

If you meet one of these conditions, you may skip the Energy Allocation Worksheet and continue to the Contracted Service selection below.

6.6: Do you need to use the energy allocation calculator? (continued)

If you have more than one crop rotation in the year but feel you have good estimates of fuel and electricity use for each crop, you may enter those estimates in sections 7.6 and 7.7 on the Energy Allocation Worksheet.

Contracted Services (NOTE: This section will only appear if you have selected “No” in 6.6 above)

Fuel from contracted services is included in the total fuel for the energy use metric. If you are completing the calculator for only one crop on one SISC Management Area AND know your data at the level of that Management Area, a section will appear on this worksheet asking you for data on contracted services. Otherwise, you will be asked to complete this information as part of the Energy Allocation Worksheet and Sections 6.7 and 6.8 will not appear.

6.7: Aerial Applications

Enter the total number of aerial applications conducted during the reporting year.

6.8: Other Contracted Activities

Complete a row for each activity contracted to a third party. If you have requested fuel data from the contractor, you may enter that directly into the gray box in the “Estimated Diesel Use” column. Otherwise, enter your best guess as to the number of operations and machinery horsepower used each activity.

Activity: Select the activity category that best describes the contracted service. If not found, select “other” and enter in the box to the right.

Number of Operations: Enter the number of operations of this activity conducted in the SISC Management Area. If you have requested fuel data from the contractor, you may skip this box.

Horsepower: Enter you best estimate of the horsepower for the machinery used to conduct this operation. If you have requested fuel data from the contractor, you may skip this box.

Estimated Diesel Use: This box will be calculated using the information entered in the previous two columns. If you’ve requested data from your contractor, you may override the calculation and enter that data here.

Activity Description: If “other” was selected for the activity, please enter a short activity description here.

Section 7 – Energy Allocation Worksheet

NOTE: You should only complete this section if your total fuel and electricity use was used to grow multiple crops.

This worksheet is designed to help you estimate how much fuel and electricity went to each crop in the event data is only known at the level of the Total Farmed Area (or SISC Management Area for multiple crop rotations).

The worksheet asks for data on your farm machinery and how much it was used for each general farm management activity. This information is used to estimate diesel use for each crop. Similarly, the worksheet also asks for information on your main irrigation pumps in order to estimate electricity and/or fuel use from those sources.

Again, this information is used to estimate how much of your total energy use (fuel and electricity) should be attributed to a particular crop. If your fuel and electricity use is also used for non-reported crops (crops not being reported on calculator), you will be asked to describe some activities on the non-reported crops as well so that total energy use can be allocated to the reported crops.

7.1: Non-Reported Crop Area

If your Total Farmed Area fuel or energy data includes crops that are not part of what you are reporting on the calculator, please enter the planted acreage and water applied for each non-reported area that shared in your total fuel and electricity use. This information can be estimated, rather than measured. If two or more non-reporting fields are managed similarly, they can be entered as a single field (i.e. one column) with the acreage of both fields added together. If space provided is inadequate, please note this in the feedback section.

Example: You are reporting on one management area in this calculator, but there are three management areas on the farm. The only electricity data you have is your utility bill, which covers all three management areas. In this section, you would list the acreage of the two non-reporting areas and an estimate of how much water was applied to each area (can be a general estimate).

7.2: Farm Machinery

Complete a row for each tractor or other farm machinery that is a major component of your fuel use. Though the lines say "Tractor", you may enter other farm machinery in those rows—just select "Other machinery" from the list. If you operate more machinery than can be entered in the space provided, enter the largest and/or most frequently used. Default values are provided for horsepower, efficiency, and specific fuel consumption, but they may be overridden by entering data manually.

Tractor: Select the type of tractor that most closely describes yours. If the horsepower is not exactly right, it can be adjusted in the next column. For machinery other than tractors, select "Other machinery".

Horsepower: Default values are provided for horsepower, but may be overridden by entering data manually. Therefore, if you have a 140HP 2WD tractor, select the 130 HP 2WD tractor from the list in the tractor column, and then enter 140 in the horsepower column.

Fuel Consumption: Default values are provided for fuel efficiency in gallons per hour, but may be overridden by entering data manually if you know your fuel efficiency more specifically.

Fuel Type: Diesel is the default fuel type, but other fuel types may be selected from the drop down list.

Specific Fuel Consumption: Default values are provided for specific fuel consumption in gallons per horsepower-hour, but may be overridden by entering data manually if you know your data more specifically.

7.3 Farm Irrigation Equipment

Complete a row for each irrigation pump or booster used within the area for which you reported fuel and electricity (e.g., if you reported electricity at the Total Farmed Area level, include this information for all pumps on the farm). Though the rows say “Pump”, you may enter boosters here as well. Later, you will select the pump and booster used on each SISC Management Area.

Power Source: Select the power source used by the pump.

Well Lift: Enter the depth (total vertical distance that the pump moves water to the surface) in feet.

Pressure: Enter the pressure at the well head in PSI (pounds per square inch).

Total Dynamic Head: This field is calculated using the well lift and pressure information provided to estimate the “total dynamic head” of the pump. You may override this and enter data manually if you know this information.

7.4: Other Electrical Equipment

The SISC on-farm metrics are not meant to include packing, shipping, or processing activities in the metric results. However, you may only receive one electrical bill with total electricity usage for your whole facility. In this section, please enter any major electricity users that are not directly associated with your farming operation. This includes cold storage and refrigeration, sorting and packing facilities, drying facilities, etc. Please describe the facility and estimate its electricity use. This will be subtracted from the total electricity you entered on the Energy Use page if you listed that energy use as “Total Farmed Area.”

In the future, we hope to provide a more accurate way to estimate electricity use for these types of facilities as well. Feedback on the description of the facility will help us improve the tool.

7.5: Estimated Use of Machinery, Irrigation and Contracted Services

Information about machinery use and water applications is needed for both SISC-reported crops and fields where energy was used to produce crops that are not part of the crops you are reporting. This information can be estimated, rather than measured. Information about contracted services for non-reporting fields is not required.

If two or more non-reporting fields are managed similarly, they can be entered as a single field (i.e. one column) with the acreage of both fields added together.

Irrigation: For each SISC Management Area, select the pump and booster used on that area that corresponds to the information you entered in the previous “Farm Irrigation Equipment” section above. You may select up to two pieces of equipment.

Tractor Passes: In each category of farm management activities, select the main tractors and machinery used from the list of machinery that you entered in the previous section. Then enter the approximate number of passes conducted by each tractor type used. Repeat for each SISC Management Area.

Enter approximate passes for contracted services separately and estimate tractor type used.

7.5: Estimated Use of Machinery, Irrigation and Contracted Services (continued)

Aerial Application: Enter the total number of aerial applications for each crop.

When finished, go to the “Energy Results” page to see the breakdown of your fuel and electricity.

7.6: Diesel and Electricity Breakdown Results

This section will show the allocation of your total electricity and diesel use, given the information you entered above. You may override these allocation percentages with your own estimates if you have better information by crop.

7.7 Gasoline and Other Fuels Breakdown Results

The allocation tool does not currently work for gasoline and other fuels. Enter your own estimates for how those fuels should be allocated here. If you don’t know, they will be allocated equally across crops.

Section 8 – Energy Results

This page provides the results from the Energy Allocation Worksheet. You will find total energy use by crop and how that energy is broken down by source. The weighting factors created from the information you provided are included here. For fuels, weighting factors for diesel are assumed for all other fuel types. If you feel these weighting factors are inaccurate for the other fuels, you may change the numbers on this sheet, and the factors you enter will be used in the final results.

Section 9 – Metric Dashboard

Click on the Metric Dashboard to see your results! Remember, you may choose to display results by acre or by yield by using the blue box at the top.

PER UNIT OF PRODUCTION		Yield	Energy	Nutrients		Water	Soil
Metric		Harvested tons/acre	Energy Use / Harvested Yield	N Added to System/ Harvested Yield	P Applied - P Rec'd / Harvested Yield	Applied Water/ Harvested Yield	SOM/ SOM Potential
Unit of Measurement		(short tons/acre)	(MM Btu/short ton)	(lbs/short ton)	(lbs/short ton)	(acre-inch/short ton)	(% score)
Romaine Field 1							
Whole Management Area							47%
Lettuce, Leaf	grown from transplant	10.0	1.21	29.9	5.5	3.0	
Broccoli	grown from seed	6.6	2.28	73.9	4.1	4.5	
Crop 3							

Results are displayed instantly on the Metric Dashboard

Results can be displayed by yield or by acre

V. Additional Resources

An overview of the metrics is available at http://www.stewardshipindex.org/working_metrics.php.

Full descriptions of SISC Working Metrics Version 1.0 are located at on the Metrics pages, which are available via login. Free registration is required. To access the Metrics pages:

- Register
- Login on left side of home page.
- Click on the “Metrics” tab.
- See “Metrics & General Information” on the left side of the page

To find what you’re looking for, use this chart (also available under “General Info: Start Here!”):

- Visit "Water Use (farm)" page for:
 - **Applied Water Use Efficiency** metric
- Visit "Energy & GHG Emissions" page for:
 - **Energy Use** metric
- Visit "Soil Quality, Plant Nutrition & Water Quality (farm)" for:
 - **Phosphorus Use** metric
 - **Nitrogen Use** metric
 - **Soil Organic Matter** metric
 - SISC Guidelines: Protocol for Estimating N Fixation from Leguminous Crops
 - SISC Guidelines: Soil Sampling
 - SISC Guidelines: Estimating N and P Content for Organic Fertilizers
 - SISC Guidelines: Protocol for Sampling and Testing N Concentration in Irrigation Water

All documents are located on the right side of the respective metric page.

Questions or feedback? Let us know at info@stewardshipindex.org.

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