Industry Sustainability
行业可持续性

Gordon Spronk DVM
October, 2024

What is Sustainability? 什么是可持续发展？

A continuous **Farm and Industry** improvement JOURNEY for:
一个持续的农场和工业改善的旅程：

1. PEOPLE – producers, employees, customers, consumers, and neighbors. 人——生产者、员工、客户、消费者和邻居。
2. PLANET – efficient use of natural resources while reducing the footprint of the industry. 地球-有效地利用自然资源，同时减少该行业的足迹。
3. PIGS – what's best for health and welfare. 猪–对健康和福利最好的东西。

PEOPLE. PIGS. PLANET.®

The US pork industry is on a mission to be the most sustainable meat.美国猪肉行业的使命是成为最可持续发展的肉类。

For America's pig farmers, sustainability means doing what's right for humans, animals and the environment. They do it by following their long-standing We Care® Ethical Principles and committing to continuous improvement in every area of pork production.
对美国的养猪户来说，可持续发展意味着为人类、动物和环境做正确的事情。他们遵循长期以来的“我们关心®”道德原则，并致力于在猪肉生产的各个领域进行持续改进。

Food Safety 食品安全

We are committed to producing the safest food in the world.

我们致力于生产世界上最安全的食品。

Animal Well-being 动物福利

We are committed to the highest level of care and well-being for the pigs we raise.

我们致力于为我们所饲养的猪提供最高水平的照顾和福祉。

Public Health 公共健康

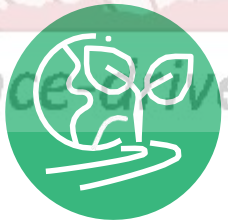
We are committed to producing the highest quality food possible while increasing the enjoyment of pork and the well-being of people around the world.

我们致力于生产尽可能高质量的食品，同时增加对猪肉的享受和世界各地人民的福祉。

Our ommunities 我们的社区

We are committed to growing and supporting strong communities for today and tomorrow.

我们致力于发展和支持今天和明天强大的社区。



Environment 环境

We are committed to safeguarding and nurturing natural resources for now and future generations.

我们致力于为现在和子孙后代保护和培育自然资源

Our People 我们的人

We are committed to providing meaningful, dignified work for the people who choose to dedicate their careers to raising the food we eat.

我们致力于为那些选择将其职业生涯奉献给提高我们所吃的食物的人们提供有意义的、有尊严的工作。

In The Past Six Decades,
US Pork Production Has Improved By Using:
在过去的60年里，
美国猪肉生产通过使用：

75%
less land

25%
less water

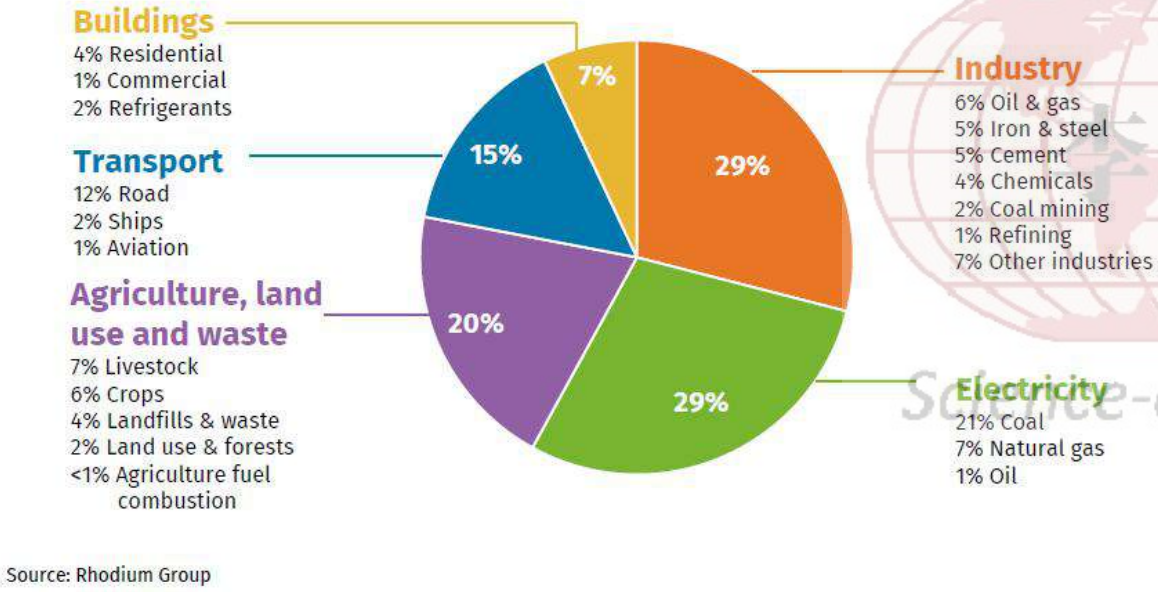
7%
less energy

8%
fewer carbon emissions

Global and U.S. GHG Emissions By Source
全球和美国温室气体排放来源

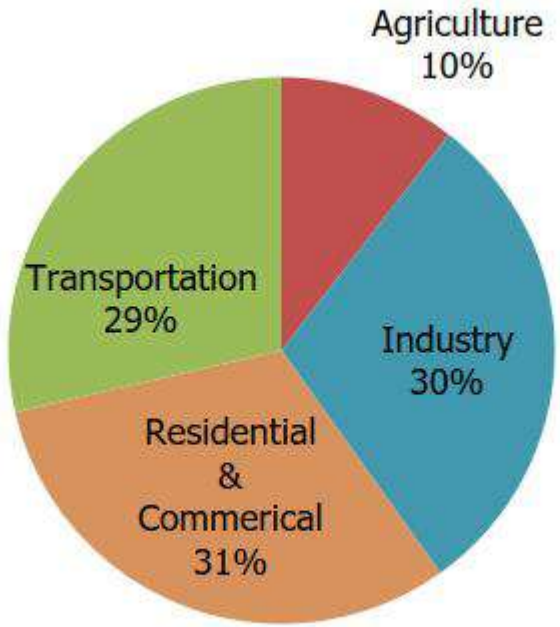
Global Emissions

FIGURE 6
Global emissions by sector
Percent share of 2021 net GHG emissions

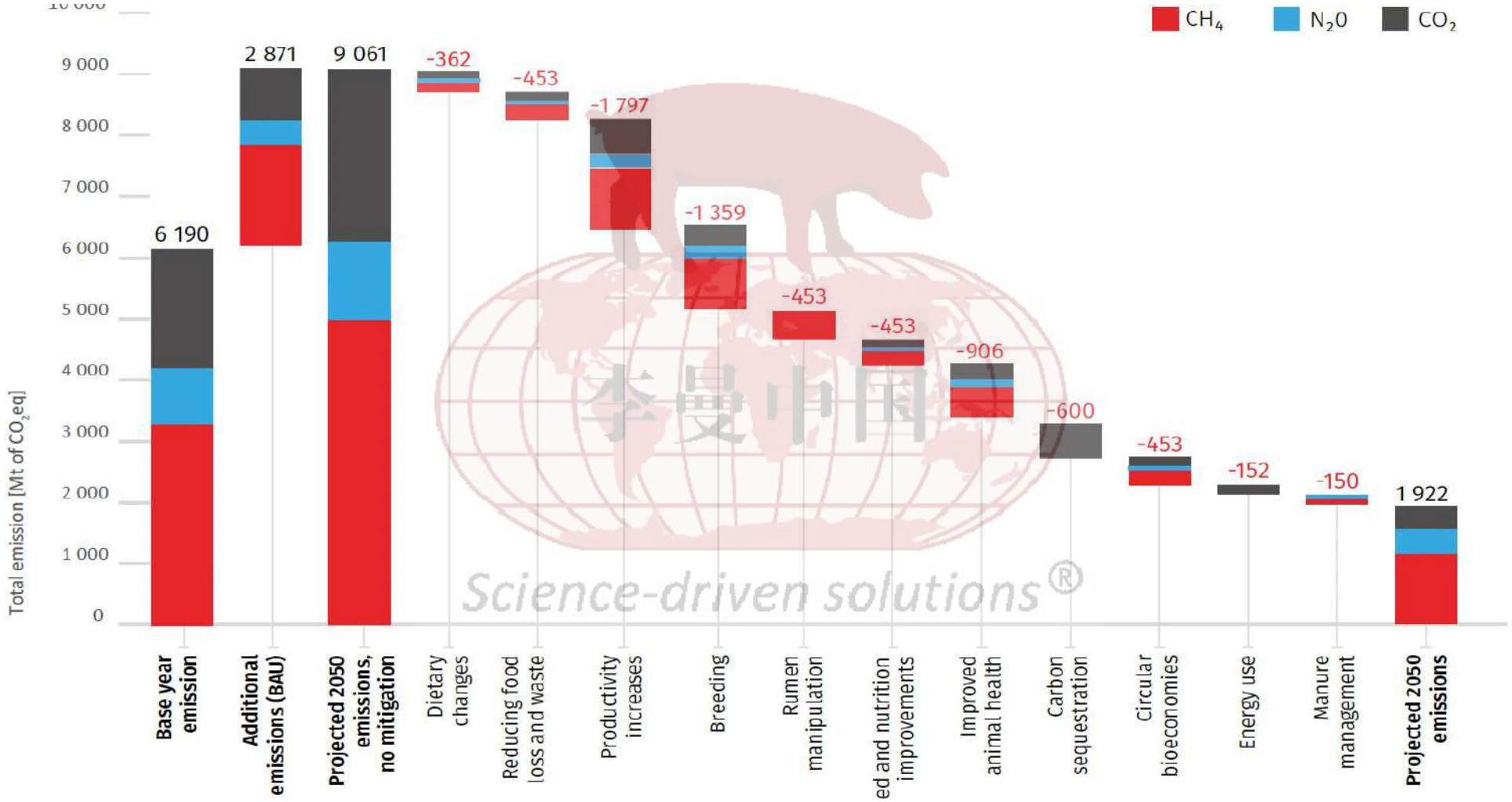


Source: Rhodium Group

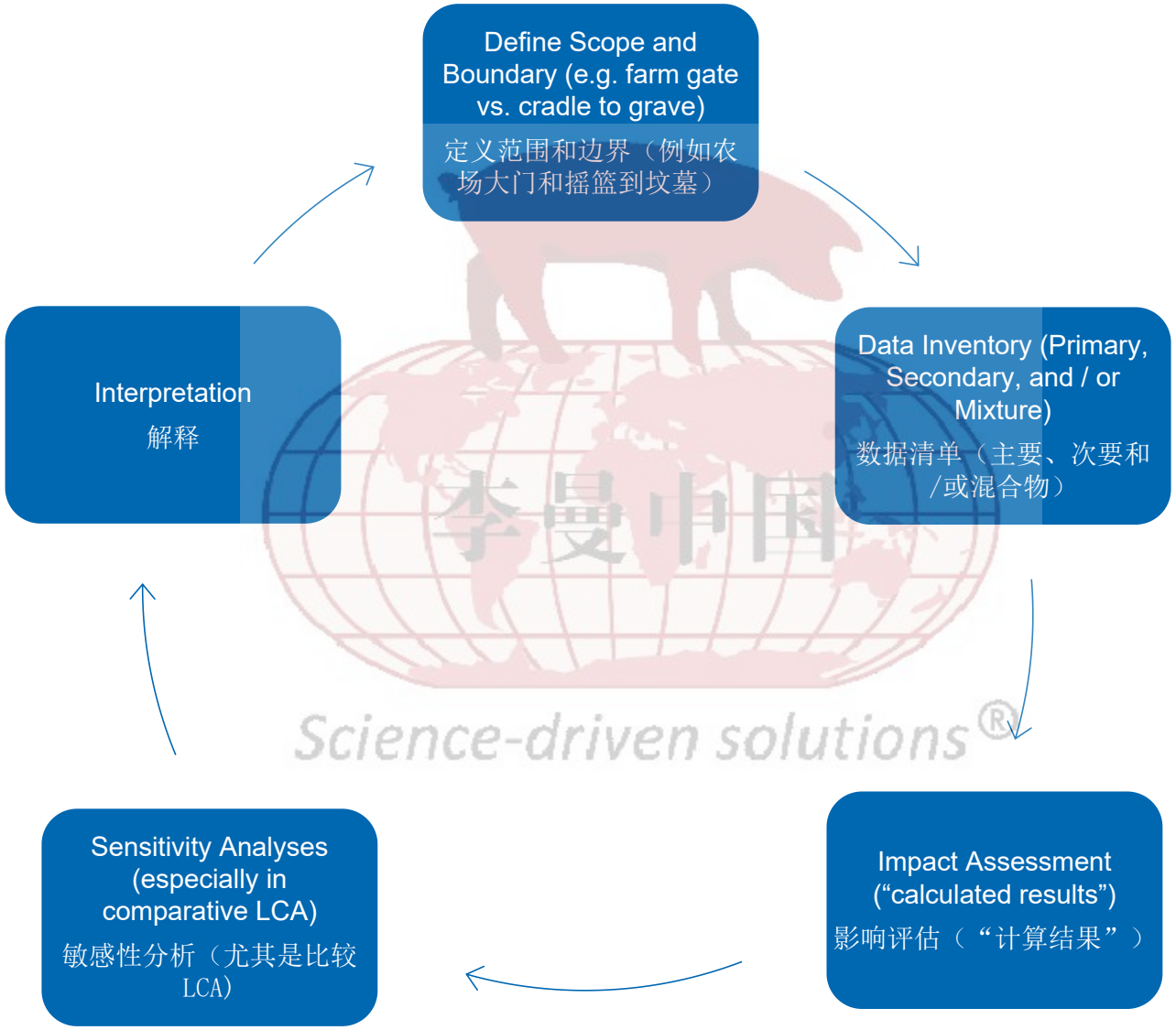
U.S. Emissions



UN - FAO “Pathways to Reduction”
联合国–粮农组织“减少粮食的途径”



Life Cycle Assessments (LCA) Process
生命周期评估（LCA）过程



Life Cycle Assessments (LCA) 生命周期评估（LCA）

- Different Methodologies – 不同的方法
  - Model data vs. primary (on farm) data.
  - 模型数据与主（场）数据。
  - Each update to the US LCA has incorporated more on farm data and less modeled data.
  - 美国LCA的每次更新都包含了更多的农场数据和更少的模型数据。
- Different Impact Categories – 不同的影响类别
  - Previous US Pork LCA's have evaluated land, air, water, and carbon footprints.
  - 之前的美国猪肉LCA已经评估了土地、空气、水和碳足迹。
  - European methodologies have included as many as seven (PM, carbon, water quality, water quantity, terrestrial acidification, and land use).
  - 欧洲的方法包括多达7种方法（PM、碳、水质、水量、陆地酸化和土地利用）。
  - There are as many as 17 impact categories that can be evaluated.
  - 可以评估多达17个影响类别。

Spronk Brothers 2023 Report
斯普罗克兄弟2023年报告

SUSTAINABILITY ANALYSIS

2023 PORK CARES FARM IMPACT REPORT

About Spronk Brothers III LLP

Randy and Gordon Spronk, DVM are managing partners of Spronk Brothers, a pork operation near Edgerton, Minnesota. Spronk Brothers was formed in 1991. The brothers also manage Ranger Farms, a grain farming entity. The operation has continued to expand over the years. Randy has served within the National Pork Producers Council and the Minnesota Pork Producers Association.

Quantifying the Impact of Actual Farm Practices

The EcoPractices® platform determines environmental benefits through its unique process that can pinpoint specific influences of individual agricultural practices. While agricultural practices have progressed to better care for natural resources, the ability to quantify the influence these practices have on sustainability has not kept pace. Spronk Brothers seeks to put evidence-based measurements to its farm practices. Having such data brings more depth to decision-making. Short- and long-term goals can be based upon more meaningful information.

Conservation Practice	Fields	Acres
Buffer	1	2
Grassed Waterway	12	51

Crop	Yield
Corn Grain	165 bu/ac
Soybean	46 bu/ac

3,367 acres from **25** fields

Swine Inventory: 16,800

Defined as Sow and/or Finished Pigs per Year

WE CARE® ETHICAL PRINCIPLES

The We Care initiative was launched in 2008 as a joint effort of the National Pork Board, the National Pork Producers Council (NPPC), and state organizations representing farmers. Through the We Care initiative, they hope to earn the public's trust by making this industry better for all concerned — animals, farmers, food industry partners, and consumers worldwide.

- Food Safety
- Animal Well-Being
- Environment
- Public Health
- Our People
- Our Communities

NATIONAL PORK BOARD'S ENVIRONMENTAL INITIATIVE

One pillar of the We Care Ethical Principles is Environment. This includes the use of manure as a valuable resource in a manner that safeguards air and water quality, includes air quality from production facilities to minimize the impact on neighbors and the community, and includes managing operations to protect the quality of natural resources.

- Air Quality
- Carbon Footprint
- Emergency Action Plan
- Manure & Site Management
- Food Management
- Mortality Management
- Water Conservation

Conservation Practice	Fields	Acres
Buffer	1	2
Grassed Waterway	12	51

Spronk Brothers 2023 Report
斯普罗克兄弟2023年报告

IN-FIELD ENVIRONMENTAL OUTCOMES

*The data is reflective of weather and soils influence in addition to implemented in-field management practices for the project year.**

	Overall Farm
Net GHG Emissions	-0.10 T CO_2e/ac
Soil Carbon Sequestered	0.17 T C/ac
Soil Erosion Rate	0.60 T/ac

IN-FIELD PRACTICE COMPARISON IMPACTS

When compared to conventional practices (i.e. conventional tillage, no cover crop scenario), in-field farm practices generated:‡

- **1,849 fewer tons of CO_2e**, *which is the same as*
- **359 average passenger cars** off the road for a year
- **509 tons of soil carbon sequestered**
- **677 tons of soil saved** instead of being lost to erosion, *which is the same as*
- **42 dump trucks of soil**

MANURE APPLICATION & SAVINGS

26% of acres received liquid manure fertilizer.

The *average* **cost savings** from manure applied to **868 acres** was estimated to be **$128 per acre** based on a reduced need for commercial N, P & K resulting in **a total savings** of **$111,545.**

Weather, Soils, and In-Field Management Practices influence the following environmental metrics

IN-FIELD ENVIRONMENTAL OUTCOMES

The data is reflective of weather and soils influence in addition to implemented in-field management practices for the project year.‡

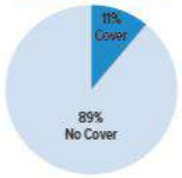
	Overall Farm
Net GHG Emissions	-0.10 T CO_2e/ac
Soil Carbon Sequestered	0.17 T C/ac
Soil Erosion Rate	0.60 T/ac

EROSION AVERAGE

*The USDA National Resources Inventory provides estimates on average erosion for different systems across the U.S.**

Minnesota Cropland	National Average
7.0 T/ac	4.6 T/ac

COVER CROPS



TILLAGE

According to the 2017 U.S. Ag Census, the national average is **4% cover crop adoption, 37% no-till adoption** and **35% reduced till adoption.**

SOIL CONDITIONING INDEX (SCI)

SCI is an NRCS tool that shows soil health trajectory. A positive SCI means a positive trajectory of soil health and vice versa.

The fields in the project are an overall **positive (+) trajectory** for **SCI.**

CROPLAND

100%

IN-FIELD PRACTICE COMPARISON IMPACTS

When compared to conventional practices (i.e. conventional tillage, no cover crop scenario), in-field farm practices generated:‡

- **1,849 fewer tons of CO_2e**, *which is the same as*
- **359 average passenger cars** off the road for a year
- **509 tons of soil carbon sequestered**
- **677 tons of soil saved** instead of being lost to erosion, *which is the same as*
- **42 dump trucks of soil**

Eocene℠ Environmental Group

Data provided by Spronk Brothers III LLP through a program funded by the Park Checkoff.

*Eocene Environmental Group, through its EcoPractices platform, estimates an environmental impact value for reducing greenhouse gas emissions, reducing soil erosion, and reducing nutrient loss due to reduced leaching. These estimates adhere to processes that are documented by the NRCS Technical Guides and publications from the EPA. These values are tailored to a specific location and participant's operation. Models used are supported by USDA, NRCS, other government agencies, and major universities. Modeled results include input data from public resources for weather, soils, and historical crop rotation. Greenhouse gas simulations were produced from the Greenhouse Gas Inventory (GGIT) tool developed by Soil Metrics, LLC (2021) https://soilmetrics.eco. The GGIT tool implements the USDA-sanctioned greenhouse gas inventory methods described in Eve et al. (2014) 'Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory'. The GGIT tool utilizes greenhouse gas modeling technology developed for the COMET-Farm tool, licensed by Colorado State University to Soil Metrics, LLC.

‡USDA, NRCS 2017 National Resource Inventory

US Pork Industry Examples
Certification, Training, and Assurance Programs
美国猪肉行业示例认证、培训和保证计划

PQAPLUS®
Our Responsibility. Our Promise.

PQAPLUS®
Our Responsibility. Our Promise.
Site Assessment

pork checkoff®

Transport Quality Assurance®

COMMON SWINE INDUSTRY AUDIT

PAACO
CERTIFIED AUDIT

ISO Compliance

- **Effective January 24, 2023**
- PQA+ version 5.0; PQA+ Site Assessment version 5.0; TQA version 8; Youth for the Quality Care of Animals (YQCA)
- Programs meet the requirements of the USDA ISO Technical Specification 34700 Animal Welfare Assessment Program
- World Organization for Animal Health (WOAH), Terrestrial Animal Health Code, Section 7 Animal Welfare, Chapter 7

What's Next?

Research Focus

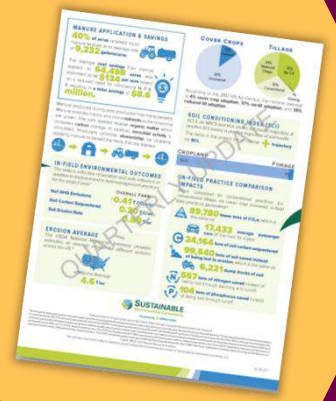
- Air, water, & soil health
- Nutrient cycling
- Primary (on farm data) for industry Life Cycle Analyses (LCA)
- Comparison of other country's LCA's
- Sow housing
- Carbon monetization
- Public health
- Livability

Other Tools

Common Swine Industry Audit

U.S. SWINE HEALTH IMPROVEMENT PLAN

AgView powered by pork checkoff



SPS SECURE PORK SUPPLY

PQA PLUS® Our Responsibility. Our Promise.