

Sustainable U.S. Peanuts Initiative 2022 Year-One Impact Report



We have neglected the truth that a good farmer is a craftsman of the highest order, a kind of artist.

– Wendell Berry, The Gift of Good Land: Further Essays Cultural and Agricultural



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From American Peanut Council

• Richard Owen

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About the American Peanut Council

The American Peanut Council (APC) is the primary trade association representing all segments of the U.S. peanut industry:

- Growers
- Buying Points
- Shellers
- Warehouses
- Brokers
- Manufacturers
- Allied Companies, which provide products and services

APC's mission is to provide the industry with the means to address issues which may impact the trade and marketing of U.S. peanuts and peanut products. APC monitors developments in the domestic and international markets and responds with trade servicing, research, and issues management programs. In addition, APC maintains close working relationships with government agencies, research institutions, and related peanut and agricultural trade organizations.

Headquartered in Alexandria, Virginia, most full-time staff live in Virginia, with employees also located in Tifton, Georgia, and London, England. APC supplements expertise with contractors in the areas of communications, exports, food safety, IT, research, and crisis management support. In the international sphere, APC has incountry representatives in Canada, China, the European Union, Japan, and Mexico.

APC Mission Statement

The APC serves its members by supporting the general welfare of the peanut industry. Our charge is to:

- Grow and defend export markets for U.S. peanuts
- Provide leadership in crisis and risk management
- Lead and organize the industry on research, food safety, production, handling, and processing of peanuts
- Build a framework for sustainability
- Serve as the voice of the industry
- Provide a forum for all industry segments to exchange and process information

The peanut is a versatile food that can serve as a source of high-quality cooking oil or as the primary ingredient for peanut butter, nutrient-dense bars, confections, and a wide variety of finished products. The snack nut with the highest protein content, the peanut, also known as groundnut, is a staple worldwide due to its affordability, flavor, and nutritional profile [1].

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Background

In the late 2000s, the peanut industry started focusing on topics around sustainability. The APC Sustainability Task Force was formed in 2010 to understand what sustainability means for the peanut industry, ensure that any measure of sustainability is based on sound science, and provide support to industry members who wanted to incorporate sustainability practices in their operations. The Task Force commissioned several studies to understand the footprint of peanuts and peanut butter. These studies resulted in two peer-reviewed publications:

- 2014. Life cycle assessment of greenhouse gas emissions associated with production and consumption of peanut butter in the U.S. Published in the Transactions of the American Society of Agricultural and Biological Engineers.
- **2016.** A historical analysis of the environmental footprint of peanut production in the United States from 1980 to 2014. Published in Peanut Science.

The studies above helped APC start to understand the environmental impact of peanut production and identify areas of improvement. Long-term crop sustainability data is critical in understanding past environmental performance to chart a better future.

To advocate for its rightful place among other field crops, APC joined Field to Market: The Alliance for Sustainable Agriculture[™] in 2016 to request the addition of peanuts to its program. Field to Market incorporated peanuts into the Fieldprint Platform[™] in 2017, the 7th crop to be represented after corn, soybean, wheat, rice, potatoes, and cotton.



Field to Market: The Alliance for Sustainable Agriculture brings together a diverse group of grower organizations, agribusinesses, food, beverage, apparel, restaurants, retail companies, conservation groups, universities, and public sector partners to define, measure, and advance the sustainability of food, feed, fiber, and fuel production in the United States. Field to Market developed the Fieldprint Platform, a pioneering assessment framework that empowers brands, retailers, suppliers, and farmers at every stage in their sustainability journey, to measure the environmental impacts of eleven commodity crops, including peanuts, and identify opportunities for continuous improvement [2].

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In addition to developing the Fieldprint Platform, Field to Market also publishes the National Indicators Report every five years [3], which helps quantify the efficiency of U.S. peanut farmers (Figure 1) and highlights opportunities for improvement for five critical environmental indicators. For example, the results from the 2021 National Indicators Report and its ancillary data show the following:

- Total yearly U.S. peanut production has increased 166% without a significant increase in peanut acreage – from 1,151,381 farmer stock tons (FST) in 1980 to 3,066,950 FST in 2020.
- In the early 1980s, a peanut farmer could expect to produce 2,500 pounds of peanuts per acre. Due to improved peanut varieties and research and education efforts, among other advancements, peanut farmers can now grow over 4,000 pounds per acre on average, contributing substantially to the food security of millions of families in the U.S. and worldwide.
- The land area needed to produce one ton of peanuts has decreased by 46% from an average of one acre during the early 1980s to 0.54 acre in 2020.
- The water required to achieve an increase in yield compared to non-irrigated yield conditions has decreased by 43%.
- Energy use and GHG Emissions required to produce one pound of peanuts have decreased by 55% per pound of peanuts at the field level.
- For soil erosion, there was no change when comparing numbers from 1980 to 2020. However, there was a spike in soil erosion in the early 2000s. When comparing the latest soil erosion values against the numbers from 2000, soil erosion has been reduced by 31%.

Additional valuable environmental data about U.S. peanut production has been produced by experts from the University of Alabama, whose estimates show that peanut water usage has seen improvement [4]. The most recent assessment shows that only 3.2 gallons of water are required to produce one ounce (approx. 28 g) of shelled peanuts (hulls removed), while other snack nuts use 23 to 28 gallons of water per ounce of shelled nuts.



Indicator Index Chart For Peanuts



Summary chart of environmental indicators for peanuts during 1980-2020

Figure 1. Five indicators for peanuts are presented in index form and averaged across four decades. The smaller the pentagram, the smaller the environmental footprint. Graph from Field to Market: The Alliance for Sustainable Agriculture. 2021. Environmental Outcomes from On-Farm Agricultural Production in the United States.

A Glimpse at U.S. Peanut Production

Peanuts grow well in the soils and climatic conditions found in southern U.S. states. In the 2021 growing season, peanuts were grown in 307 counties in 13 states (Figure 2).

2021 Peanut-Producing Counties

Data Valid: January 12, 2022

Source: 2021 USDA FSA Crop Acreage

Figure 2. Peanut-producing counties during the 2021 growing season

Since the mid-2000s, production has significantly increased, surpassing 3 million farmer stock tons five times in the last ten years (Figure 3). Historically, USDA had a quota system that limited peanut acreage by state. USDA ended the quota system in 2002, and since then, the peanut acreage has fluctuated in response to market conditions, input costs, peanut demand, and rotational crop prices, among other factors.



Figure 3. Peanut million planted acres (left) and million farmer stock tons of production (right) from 1975 to 2021

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Introduction to the Sustainable U.S. Peanuts Initiative



In 2021, the U.S. peanut industry came together to fund an effort to document, track, and communicate the sustainability of U.S. peanut production, starting at the field level with farmers themselves. The Sustainable U.S. Peanuts Initiative, managed by the American Peanut Council, serves as the coordinating point for sustainability-related efforts. The goals of the Sustainable U.S. Peanuts Initiative are to:

 Create a platform that helps growers document and measure their environmental footprint on a journey toward improvement. Produce tools to help the industry tell the positive story about the sustainability of peanuts to their customers, government, trading partners, and other stakeholders. Address the interest of consumers in sustainably produced products.

The initiative's cornerstone is the grower platform, adapted for peanuts in collaboration with the cotton industry. This platform is a natural collaboration, as most peanut farmers grow cotton in rotation. The grower platform enables farmers to demonstrate all the good farm management practices they already implement and learn which additional practices might benefit them. It also collects information to calculate eight environmental metrics at the field level; these metrics, developed by Field to Market, are embedded into the grower platform. For example, producers will get estimates of field-level soil erosion based on their local conditions and crop rotations with other crops, which might help them to make changes to protect their soils.

This report describes the information obtained from the pilot year of the initiative, which enrolled sixtynine growers across the U.S., representing 2.5% of 2021 peanut acres. As consumers demand more information about the food they eat [5, 6], the peanut industry needs to provide transparent and documented messages backed by aggregated farmer data to offer insights into how efficient peanut production is. The Sustainable U.S. Peanuts Initiative will help the industry with those needs, ensuring a sustainable future where American peanut growers keep providing a safe, nutritious, and resource-efficient crop every season.

Highlight of U.S. peanut industry activities in the sustainability space	Peanut growers along with organizations such as National Peanut Board, Georgia Peanut Commission, University of Georgia, and representatives from shellers and manufacturers have contributed significantly to the peanut sustainability story.
Creation of the Sustainability Task Force.	2010 (June)
2010 (August)	IHS Global (consultants) delivers a report about U.S. peanut resource efficiency measures to APC's Sustainability Task Force.
Publication of the article Life cycle assessment of greenhouse gas emissions associated with production and consumption of peanut butter in the U.S., by the University of Arkansas.	2014
2016 (February)	APC joins Field to Market and requests the addition of peanuts to their program.
Publication of the article A historical analysis of the environmental footprint of peanut production in the United States from 1980 to 2014, by the University of Arkansas and IHS Global.	2016 (July)
2016 (December)	Peanuts are included in the third edition of the National Indicators Report by Field to Market, titled Environmental and Socioeconomic Indicators for Measuring Outcomes of On-Farm Agricultural Production in the United States.
Peanuts are incorporated into the Fieldprint Platform.	2017
2018 to present	The University of Georgia begins the data collection project, capturing the environmental footprint of volunteer farmer participants in collaboration with the Georgia Peanut Commission, National Peanut Board, Cotton Incorporated, and APC.
The cotton industry approaches APC to adapt its sustainability platform for peanuts.	2020
2021 (June)	APC's Board of Directors votes to launch the Sustainable U.S. Peanuts Initiative, contingent on industry and public funding.
The industry secures the funding for the initiative's first three years. APC starts developing the program (documentation, website, communication strategy) and hired its first full-time Director of Sustainability.	2021 (September to December)
2021 (December)	Peanuts are included in the fourth edition of the National Indicators Report by Field to Market, titled Environmental Outcomes from On-Farm Agricultural Production in the United States.
The grower platform of the initiative opens for farmer enrollment for the 2021 crop season from January to April.	2022

Founding Sponsors

Founding Sponsors include those organizations and companies who stepped forward at the beginning of the initiative with the financial contributions required for launch. These supporters committed to funding the initiative for each of the first three years of the program. Without their support, the Sustainable U.S. Peanuts Initiative would not be possible!

Allied Organizations



Grower Organizations





















Shellers

American Peanut Shellers Association, on behalf of their member companies: Birdsong Peanuts, Coastal Growers, Golden Peanut and Tree Nuts, Olam Peanut Shelling Company, Premium Peanut, Trico Peanut, and Williston Peanuts. Premium Peanut made an additional contribution beyond the APSA commitment.



*USDA's Foreign Agricultural Service provided additional funding.



Allied Organizations



The Grower Platform

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The cornerstone of the Sustainable U.S. Peanuts Initiative is the grower platform (www.sustainableuspeanuts.org). The platform allows peanut farmers to enter information for three categories voluntarily:

- 1. Information about the farming operation, such as farm location, crops grown, and irrigation.
- **2. Self-assessment.** A comprehensive questionnaire about critical and recommended farming practices for soil health, crop protection, and worker well-being, among several other categories of interest to the industry and outside sustainability stakeholders (Figure 4).
- **3. Fieldprint Analysis.** A field-level questionnaire for peanuts (Figure 5), which provides the information necessary to calculate eight sustainability metrics from Field to Market: The Alliance for Sustainable Agriculture. The metrics are:
 - a. Biodiversity
 - b. Energy Use
 - c. Greenhouse Gas Emissions
 - d. Irrigation Water Use
 - e. Land Use
 - f. Soil Carbon
 - g. Soil Conservation
 - h. Water Quality

The grower platform is intuitive and relatively easy for farmers using various farm management software.



Figure 4. Topics covered by the self-assessment in the grower platform

Figure 5. Topics covered by the Fieldprint Analysis in the grower platform

Steps for Voluntary Farmer Participation

A peanut producer who wishes to enroll in the grower platform must take the following steps:

- Go to www.sustainableuspeanuts.org and click on Growers Sign Up Now
- Register by following the steps prompted by the platform. The steps include:
 - 1. Contact information
 - 2. Farming practice

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- 3. Location of the farm
- 4. Accept the program's policies
- 5. Create a username and password. A grower participating in the U.S. Cotton Trust Protocol can use the same username and password for both the cotton and peanut platforms.
- Once an account is created, a farmer logs in via www.sustainableuspeanuts.org to complete six enrollment steps visible on their dashboard (Figure 6):
 - 1. Privacy statement. This step is completed during the initial account registration process.
 - 2. Buying point selection. A farmer indicates at least one buying point.
 - 3. Farming profile. This step has five sections: farming practice, contact information, entities and partners, field identification, and farm management provider.
 - 4. Self-assessment. A comprehensive questionnaire that covers topics such as soil health, water management, and worker well-being.
 - 5. Statement of commitment. This step is for a farmer to commit to the journey of continuous improvement.
 - 6. Fieldprint Analysis. A questionnaire for each field boundary in the platform. Information necessary for the analysis includes residue and rotation practices, field operations, and water management. These inputs are used to calculate eight sustainability metric scores (seven if non-irrigated) by the Fieldprint Platform.

SUSTAINABLE			Help Desk
=	Databoard	And the second	
Dashboard			
Enrollment K	a 2022 Enrollment	U.S. Cotton Trust Protocol	Drought Monitor
Buying Points	Please review items with 🔿 to complete your 2022 enrollment.		Click image to enlarge Dought Montor in Promit Producing Countries
Trusted Representatives	1. Acknowledged on 2022-11-18-5:02 PM	You can now share your enrollment data with the U.S. Cotton Trust Protocol. Click the link below for more information.	
Documents	2. Suying Point Selection	et started now	
Messages	3. h Farming Profile	Learn More	
	4. ₹≣ Self-Assessment 0% complete		a regulation
	5. Statement of Commissioner	Buying Points	Drought monitor report
	6. M 2022 Fieldprint Analysis p fields, p acres (MV)	No records found	
	Complete the dams issted above	Total Buying Points: 0	Did you know?
	9 2022 Statement of Commitment	🙀 Fieldprint® Analysis	The Sustainable U.S. Peanuts Initiative was developed by and for U.S. peanut growers. Led and managed by America Peanut Council, the initiative is directed by professional sta
	Please complete the enrollment process to receive your commitment certificate.	Get started now	and a task force of volunteer leaders who hall from across the peanut supply chain.
		Total fields: d	Learn More
	Completed Enrollments		
	No historic enrollment documents are available.	Trusted Representatives	B Documents
	Copyright © 2022 The Server LLC		Pricy Am

Figure 6. View of the grower dashboard

Participation Benefits for Farmers

The grower platform will provide two tangible benefits and one intangible but consequential benefit of participation:

• **Self-assessment aggregated responses.** For each question of the self-assessment, a farmer who has completed all enrollment steps will be able to see, in an aggregated form, how all participants responded to a question. Figure 7 provides an example.



Figure 7. Example of an aggregated view of responses for a self-assessment question

- **Fieldprint Analysis.** Each field entered into the grower platform will receive eight metric scores (seven if non-irrigated). These metrics are science-based tools developed or adopted by Field to Market through a multi-stakeholder process over the past decade and measure environmental outcomes at the field level. The metrics are also responsive to changes in farm management practices. Figure 8 provides an example of the information obtained via the Fieldprint Analysis.
- **Market needs.** A significant benefit for peanut farmers is producing messages from the initiative to satisfy the interest and requirements of domestic and international customers. Although U.S. peanut consumption per capita reached record levels in 2021, peanut production annually exceeds domestic needs, and exports are a crucial part of the U.S. peanut industry. The Sustainable U.S. Peanuts Initiative aims to collect the necessary data the industry needs to promote U.S.-grown peanuts as a resource-efficient crop produced by dedicated farmers.

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Fieldprint Analysis Report | 2022 Peanuts

Fieldprint Result

Fieldprint results are shown on the spidergram as relative indices on a scale of 1-100 that represent your metric scores. The indices are calculated so that smaller values indicate less resource use or environmental impact from your field. This illustration can be used to identify where the greatest opportunities for improvement are for your field, and over time can be used to evaluate progress and trade-offs between different sustainability metrics for your field.



Metric	🔵 Your Result	State Benchmark	🔺 National Benchmark
Land Use (acre / lb)	0.0002	0.0002	0.0002
Soil Conservation (ton / acre / year)	1.1	9.9	10.9
Soil Carbon	0.29	N/A	0
Irrigation Water Use (ac-in / lb)	0.001	0.008	0.018
Energy Use (btu / lb)	865	1,694	1,867
Greenhouse Gas (lbs-CO ₂ e / lb)	0.1	0.3	0.3
Water Quality	3	N/A	N/A
Biodiversity	89%	N/A	N/A

Figure 8. Example of the Fieldprint Analysis for a peanut field



Limitations

This report presents the information entered by volunteer peanut farmers during the first pilot year of the initiative. APC is developing a third-party verification protocol in collaboration with an internationally recognized verifying organization and will implement the verification protocol starting with the 2022 growing season.

For some growers participants, this was the first time facing such a comprehensive data collection system. APC strives to provide educational resources to help grower answer platform questions. We react as quickly as possible when receiving feedback about improving the platform, for example, by rewording several questions to clarify their meaning. Improving the data collection platform will be a permanent effort.

Data Quality

APC reviewed the data internally before closing enrollment for the 2021 crop season. Qualitative and quantitative survey answers were reviewed using summary tables and graphical methods like boxplots, scatterplots, and bar charts. When potentially erroneous information was found, APC staff contacted the grower to confirm the data input. Detected errors were due to mistypes or misunderstandings. Several inputs were fixed before enrollment closed in May 2022, after which date all information entered became final and not subject to modification.

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Farmer Data Privacy

Farmers' data privacy is a primary concern of the initiative. Our pledge to farmers is that results from the initiative will only be shared in aggregated form and not at the farm or field level. Results will only be shared at the national level until sufficient representation can be obtained from all peanut production regions.

What's Next?

The following are the future steps APC envisions for the sustainability initiative:

- **Completed:** Development of a framework
- **Started:** Measure and document the peanut footprint of grower participants
- **Ongoing:** Establish a baseline for 2 3 crop seasons
- Near-term: Set goals with industry input
- **Long-term:** Continuous improvement. Connect the peanut supply chain to improve where needed and share the risk, cost, and rewards to deliver change



Results for the 2021 Crop Season

Farmer and Geography Representation

Across the peanut belt, 69 farmers from 10 states completed enrollment in the pilot program from January to April 2022.

2021 pilot enrollment highlights



Figure 9. Counties represented by the farmer participants in the pilot year of the sustainability initiative

State	Number of Growers
AL	9
AR	14
FL	2
GA	18
LA	1
МО	16
MS	1
NC	1
ОК	3
ТХ	4
Total	69

Table 1 Grower participant representation by state	Table 2 States included in each of the four peanut regions
Tuble 1. Grower purcherpunctepresentation by state	rable 2. States metaded in each of the jour peanat regions

Delta	Southeast	Southwest	Virginia-Carolinas
Arkansas	Alabama	New Mexico	North Carolina
Louisiana	Florida	Oklahoma	South Carolina
Missouri	Georgia	Texas	Virginia
Mississippi			
Tennessee			

Rotational crops were reported but the specific acreage of cotton, corn, soybeans, wheat, sorghum, and others were not captured by the platform.

Table 3. Representation of rotat	tional crops as reported by
grower participants	

CROP	Grower Representation	Percent
Cotton	62	90
Corn	43	62
Soybeans	31	45
Others	20	29
Wheat	17	25
Sorghum	6	9

At the farm level, 81% of growers indicated that they grow at least three crops in their operations. Many farm operations are diverse; we found 23 crop combinations across all participants.

Table 4. Number of crops grown, including peanuts,

as reported by grower participants		
Crops Grown	Grower Representation	Percent
2	12	17
3	20	29
4	24	35
5	7	10
6	3	4
7	2	3

Selected Farming Inputs and Outputs

From the information collected by the grower platform, we developed a profile to understand what it takes to grow, on average, peanuts in the U.S. and its environmental impact as measured by the Fieldprint Platform, keeping in mind the limitations of the sample size of grower participants.

To produce more representative estimates at the national level, the information shown in this section was first totaled by state. Then a weighted average was calculated according to the 2021 state proportion of the U.S. planted acreage, given in the table below:

State	Percent of 2021 planted acres
Alabama	11.76
Arkansas	1.69
Florida	10.30
Georgia	47.98
Louisiana	0.05
Mississippi	1.02
Missouri	1.21
New Mexico	0.71
North Carolina	7.17
Oklahoma	0.96
South Carolina	4.24
Texas	11.05
Virginia	1.87

Table 5. 2021 planted peanut acreage representation by state. Source: USDA FSA.

Relevant inputs and outputs across all states represented by grower participants are as follows:



What does the CO2e unit represent?

GHG emissions are typically measured and reported in carbon dioxide (CO₂) equivalent. Besides CO₂, common gasses emitted from agricultural production include N₂O released from nitrogen fertilizer applications or methane from rice production. Gas emissions are multiplied by their Global Warming Potential (GWP) to convert them to the CO₂ equivalent. The GWP shows that many gases are more effective at warming the Earth than CO₂ per unit mass. For example, the gas N₂O is nearly 275 times more potent at capturing energy than CO₂ [7].

The average GHG emissions were 0.167 lb CO₂e/lb peanuts. What does that mean?

That number represents the average emissions from all the peanut production activities from pre-planting to the delivery of the peanuts to the buying point.

We can use a comparison to get some context. The National Peanut Board measured U.S. peanut consumption per capita at 7.9 lb in 2021 [8], which will give us a GHG emission intensity of 1.3 lb CO₂e per person (7.9 lb × 0.167 lb CO₂e/lb peanuts = 1.3 lb CO₂e). A medium-sized car releases a comparable amount of GHG emissions by driving 1.5 miles. This estimation does not include the footprint of the rest of the supply chain (shelling, storage, manufacturing, transportation to the retailer, etc.) before a peanut product reaches an end consumer. However, it is informative to know that peanut production is efficient at the farm level.

Fieldprint Analysis

The Fieldprint Analysis aims to use farming inputs and operations to calculate metric scores to inform the industry about the environmental impact of peanut production. This approach enables the industry to connect farmers with each other to learn as a group, find opportunities for improvement, and use the platform to highlight many industry successes.

This section includes a glimpse of two of the eight metrics, Biodiversity and GHG Emissions. We describe their importance and ways for farmers to improve their scores over time, as defined by Field to Market.

Why show the data as box plots?

Box plots can handle and present a summary of a large amount of data in a visually simple and effective way. We can understand the range, distribution, mean, and outliers in the data presented in just a few seconds of looking at the graph. Box plots are more transparent in showing information than bar charts.

Biodiversity Metric

Why it matters

Farms are in rural landscapes near natural forests, prairies, wetlands, or deserts that give wildlife a place to forage for food, breed, and nest. Consumers see few sustainability issues as visible and understandable as the preservation of wildlife habitat. In addition, outdoor enthusiasts value these areas for hunting, fishing, and enjoying nature with their families. As farmers and landowners work to build and maintain trust in agricultural production, it is essential to take steps to conserve healthy ecosystems.

Producers already understand that productive farming systems depend on biodiversity. For example, native pollinators provide crop pollination and support resilience where domesticated honeybees struggle. Integrated pest management relies on ecosystems that support sufficient populations of natural pest predators. Cultivated and non-cultivated areas on the farm can be managed in ways that support biodiversity.

How biodiversity is measured

The Fieldprint Platform assesses biodiversity using the Habitat Potential Index (HPI). HPI scores the potential for a given farm to provide wildlife habitat on land or in the water. HPI scores range from 0-100 and measure the level of opportunity to improve or maximize habitat potential.

Higher HPI scores are desirable and indicate a greater potential to support wildlife habitats. HPI scores of less than 50% represent significant opportunities for improving habitat potential. In contrast, values of 50-80% indicate moderate realized potential, and scores greater than 80% demonstrate farms that have likely maximized opportunities for biodiversity to flourish.

Factors that affect the biodiversity score

HPI is a measurement that factors in several variables:

- Attributes of the farm, such as the land cover type and the ecoregion where the farm is located.
- Changes in land use, such as the conversion of uncultivated land into agricultural production.
- Management practices, such as field borders, that provide forage and cover for breeding and nesting wildlife.
- Crop production practices including water, nutrient and pest management that conserve and protect water quality.



Figure 10. Biodiversity metric scores from 113 fields managed by 69 participant farmers in the 2021 growing season

The results show that 45% and 54% of the 113 fields enrolled scored in the Moderate and High categories, respectively, with an average HPI score of 78% (Figure 10). Some factors that influenced the scores are that most fields have no tile drainage, peanuts are consistently grown in rotation with other crops, and 62% of fields had breeding or nesting habitats for wildlife in their vicinity.

Ways to improve the biodiversity score

- Provide forage and nesting habitat for wildlife. Maintain vegetative cover on cultivated areas with cover crops and retain crop residues on fields.
- Implement integrated pest management, which discourages the development of pest populations while ensuring the least possible disruption to agroecosystems.
- Reduce tillage to increase the amount of crop residue on the soil.

Greenhouse Gas Emissions Metric

Why it matters

Agricultural activities release three greenhouse gases: carbon dioxide, nitrous oxide, and methane.

- Carbon Dioxide (CO₂) is released to the atmosphere by burning fossil fuels, and when soil organic matter is oxidized by aerobic respiration.
- Nitrous Oxide (N₂O) is released from nitrate in fertilizer, manure, or other organic matter. Since the peanut is a legume that naturally captures its nitrogen, little nitrogen fertilizer is applied nationally.
- Methane (CH₄) is produced by bacteria in anaerobic conditions, such as in the digestive system of livestock and water-saturated rice fields. Methane emission is not a concern for peanut production.
- The peanut industry can use the GHG Emissions metric to demonstrate how resource-efficient U.S. peanut production is and find improvement areas.

How GHG emissions are measured

GHG emissions are reported in the Fieldprint Platform as pounds of carbon dioxide equivalent (CO₂e) per pound of peanuts. "CO₂e" simply means all other emission sources are converted to the equivalent amount of CO₂. This conversion provides a standard unit for all emissions in one measure, comparable over time and influenced by all the actions a farmer takes. To calculate CO₂ emissions, the Fieldprint Platform uses standard U.S. government fuel-use assumptions. CO₂ emissions also result from electricity, fuel usage, and burning crop residues.

The Fieldprint Platform uses crop type, region, and soil texture data to determine how much N₂O results from nitrogen additions. It also converts N from fertilizer and manure into N₂O based on a reference table from detailed crop modeling performed for the annual U.S. government emissions inventory.

Low scores are desirable and indicate less greenhouse gas emitted per pound of peanuts.

Factors that affect the GHG Emissions score

- Greenhouse gas emissions are directly related to energy use. Energy-intensive practices that produce CO_2 as a by-product are:
- Manufacturing crop protectants and fertilizers
- Transportation to the peanut buying point and crop drying
- Pumping irrigation water
- $\cdot\,$ Setting crop residues on fire
- Field operations (planting, tillage, spraying, application of fertilizers, digging, and combining)



Figure 11. GHG Emissions metric scores from 113 fields managed by 69 participant farmers in the 2021 growing season

For the 2021 season, 90% of fields scored below the national benchmark from Field to Market of 0.3 pounds of CO₂e per pound of peanuts (Figure 11). We can also show the impact of the sources of GHG.



Emmisions

Figure 12. Area-weighted proportions for GHG Emissions categories, sorted from largest to smallest emission contributors

From Figure 12, we learn that, based on a weighted average, over 55% of emissions come from applying fertilizers and crop protectants, their embedded GHG emissions, and other field operations such as tillage. One of the industry's strategies to make progress in sustainability is by supporting peanut breeders to develop improved varieties. Several peanut varieties, which are planned for release in the next few seasons, have shown excellent natural resistance to foliar diseases [9]. Disease resistance will decrease the costs to farmers, the GHG emissions from the crop-protectant products, and the field operations for the application. Improving the footprint of peanut production is a never-ending effort for the industry.

Self-Assessment Responses from Pilot Enrollees

The purpose of the self-assessment questionnaire is two-fold:

- Enable peanut growers to demonstrate all the good farm management practices they apply.
- Serve as a reminder and learning resource for laws and regulations that apply to farming and optional management practices growers might consider in the future.

The self-assessment incorporates, removes, or adapts questions based on irrigated vs. non-irrigated production and regions (Delta, Southeast, Southwest, and Virginia-Carolinas) to acknowledge production nuances across the peanut belt. However, most questions are common to all regions and irrigation types. The self-assessment covers all crops produced by growers, not just peanut-specific practices.

Example of responses

Below, we include three question summaries to provide a glimpse of the information produced from the initiative.



Figure 13. The proportion of farmer responses to a self-assessment question example about peanut nodulation

The summary graph in Figure 13 shows how proactive growers are towards maintaining proper plant nutrition and health, with nearly 95% of producers stating that they apply inoculants or monitor the number of root nodules that produce nitrogen. As a legume, the peanut plant generates its nitrogen through a symbiotic relationship with soil bacteria. In many regions, producers are advised to apply inoculants with the soil bacteria to ensure that no nitrogen fertilizer is needed during the growing season. Some fields that have been in peanut production for a long time might not need the inoculant as there is a large enough bacteria population. However, since peanuts are grown every three or four years on the same field, it is usually prudent to apply the inoculant.



Figure 14. The proportion of farmer responses to a self-assessment question example about conservation tillage



Figure 15. The proportion of farmer responses to a self-assessment question example about measuring water use

Like many producers across the U.S., peanut growers have adopted less intensive tillage to conserve their soils and reduce costs over time. The summary in Figure 14 shows that over 90% of grower participants have adopted conservation practices for one or more of their fields.

From the growers that have irrigated acres, about 60% of participants have flow meters for at least one of their fields (Figure 15). Water flow meters are essential to measure and manage water use during the critical growing periods of the peanut crop. Growers already follow multiple regulations at the state and national levels regarding water use and management.

Summary

The U.S. peanut industry has taken a significant and proactive step on the journey to increase the transparency of peanut production, address buyers' interest in sustainability, and help growers understand their environmental footprint and ways to improve over time.

The initiative's pilot year demonstrates that growers are willing to participate. We encourage the entire peanut supply chain to come together to support growers in this initiative.

This first report of the initiative's pilot year is but a glimpse of the wealth of information we can produce on behalf of the peanut industry. It represents the beginning of what we hope will be a long-term effort to be a leading global agricultural commodity with consistent transparency about our footprint and the steps we are taking toward continuous improvement.

Quotes from a few of our Founding Sponsors and Collaborators

Rebecca Ott, Director, Sustainability The J.M. Smucker Co.

As one of the leading roasters of peanuts in the United States, we have a unique appreciation for the work of peanut growers to promote innovative and sustainable practices and proudly support the Sustainable U.S. Peanuts Initiative (SUSP). The SUSP Initiative highlights and validates these practices through credible methodology, data tracking and analysis, and dedicated reporting. Through the SUSP Initiative, we are able to further educate consumers and give them continued confidence in the quality, nutrition, and sustainability of peanuts grown in the U.S. while encouraging consistent progress as an industry.

Michael Campagna, Vice President of Quality, Food Safety, and Regulatory John B. Sanfilippo & Son, Inc.

The peanut sustainability initiative is foundational to how John B. Sanfilippo & Son, Inc. (JBSS) meets consumer demands and sustainability goals, and shares farmer successes. JBSS recognizes the value of our farmers producing high-yielding crops with low inputs and wants to help improve farmer sustainability over time.

Victor Galindo, Corporate CEO Galdisa

We are a company that has spanned multiple generations, not only in its ownership, but also in each person that makes up the Galdisa family. For us, it is vitally important to make sure that we leave a legacy that our future stakeholders can feel proud about, and that we have the ability to continue creating jobs for the communities where we operate. This is why we are very excited about the Sustainable U.S. Peanuts Initiative and we want to contribute, in any way we can, to telling the amazing story of how peanuts positively impact our society and the environment.

Bob Parker, President and CEO National Peanut Board

Peanut farmers know that caring for the land and investing in conservation and sustainable practices means investing in their future and their children. Peanuts have an incredible sustainability story, and we have come together as an industry to tell it. We have an opportunity to continue finding ways to be even more environmentally friendly. Consumers are eager to know where their products come from and their environmental impact. For that reason, the National Peanut Board is a founding sponsor of the Sustainable U.S. Peanuts Initiative. Investing in environmental sustainability is an investment in the future of our industry.

Jacob Davis, Executive Director Alabama Peanut Producers Association

Peanuts are an inherently sustainable crop because every part of the plant can be used. Alabama peanut farmers continue to make improvements in water conservation, chemical reduction, and land resource management. This initiative helps share our growers' compelling sustainability message with consumers.

Don Koehler, Executive Director Georgia Peanut Commission

It has been my observation that when a train is coming, it is better to be the one laying the track. Otherwise, the train might run you over. We need to control our own destiny in an effort to defend our sustainability.

Ashley Collins, CEO North Carolina Peanut Growers Association

For far too long, the agriculture narrative has been told without sound science by those with influence but without expertise in the subject. The peanut industry's collective voice and support for the Sustainable U.S. Peanuts Initiative demonstrate our desire to be transparent, research-based, and data-driven as we work to produce a safe and sustainable food supply.

Shelly Nutt, Executive Director Texas Peanut Producers Board

Year in and year out, farmers' livelihood depends on being sustainable. Farmers tend to the land, manage irrigation, check soil profiles, prevent erosion, and implement the most efficient practices. They do all this to continue to farm and have a land heritage to leave their children and grandchildren.

While sustainability has become such a hot topic, growers have been practicing sustainability for decades and have improved as they have learned new methods. The Sustainable U.S. Peanuts Initiative is a great program to document peanut growers' sustainable practices and bring to light their dedication to protecting the land they love and earn a living from. The Texas Peanut Producers Board is proud to partner with a program that we believe tells the grower stories accurately to the general public and consumers.

John Powell, Executive Director American Peanut Shellers Association

Today's consumers are increasingly choosing to spend their purchasing dollars on sustainable products. The Sustainable U.S. Peanuts Initiative provides the verified metrics which allow U.S. shellers to supply manufacturers with the high-quality peanuts they need to confidently make sustainability claims in their marketing campaigns.

Courtney Dorsett, Vice-President, Food Safety & Sustainability Premium Peanut

The Sustainable U.S. Peanuts (SUSP) Initiative is validating what we in the industry have known all along: peanuts are the sustainable choice for a healthy, protein-rich food. This program provides the data our customers require to meet the demands of their customers, the consuming public. Premium Peanut is proud to be part of the U.S. peanut supply chain. As a founding sponsor, we believe that the SUSP Initiative will help educate consumers worldwide about how peanuts benefit people and the planet. As the number of enrolled growers increases, the platform will showcase how U.S. peanut farmers work to protect the environment and sustain their livelihood for future generations while at the same time producing a delicious and affordable food for the world.

Tommy Jumper, President and CEO Delta Peanut

We really are on a mission to leave things better than we found them. Our owners steward their farms to preserve and improve the privilege of production for the next generation. Our company facilitates increased plantings of peanuts in a new area. Those acres allow us to leverage the advantages unique to peanuts in a more significant way. I am grateful for the sustainability initiative that allows us to measure progress and identify opportunities.

Donald Chase Georgia peanut grower

As peanut farmers, we are always concerned with producing a sustainable, nutritious, and affordable crop. It is becoming ever more important to our peanut manufacturers and, ultimately, to consumers that we share with them how we achieve these goals. I believe the Sustainable U.S. Peanuts Initiative is an efficient tool for us to demonstrate this. It allows us to share our data easily while maintaining data privacy and gives growers feedback on how they can bring efficiencies to their operations.

Otis Lee Johnson Texas peanut grower

The buzzword seems to be sustainability. All it takes is one manufacturer or retailer to want to know we are doing things right before they buy U.S. peanuts to affect the market and demand for our peanuts. I think getting our sustainable story out is going to be more and more important in the future. The Sustainable U.S. Peanuts Initiative is the best tool we have to get that story told now. And with the available funding and help from the industry, this is the perfect time to move forward.

Dan Ward North Carolina peanut grower

The Sustainable U.S. Peanuts Initiative is going to assist us in connecting our amazing peanut story to consumers today and in the future. It will help us document and share the efficiencies and improvements we make every day in our production practices as we compete with producers worldwide.

Byron Small Missouri peanut grower

Sustainability and farming go hand in hand. As a lifelong farmer, my goals always begin and end with resource conservation and land preservation for the future. Not just for my future but for the generations that come after me. Our family farm understands how important sustainable food and fiber are to the world's population, and we do not take this responsibility lightly.

Our farm is excited to now have the Sustainable U.S. Peanuts Initiative to help the world see what we have known all along: that American farmers consistently use sustainable practices in their operations. Practices such as water management, buffer zones, wildlife management, cover crops, fertility conservation, Integrated Pest Management, and crop rotations, to name a few, can now be reported easily and completely online with the Sustainable U.S. Peanuts Initiative. Filling out the online survey also helps growers to think about new or different ways to improve their operation by adding more conservation practices.

Farmers in Southeast Missouri have only been growing peanuts for the last ten years, but the crop has certainly been good for our area. Missouri farmers look forward to working with consumers and the peanut industry to continue to produce sustainably grown peanuts for years to come.

David Prybylowski

Oregon Wheat Commission, previously Director of Sustainability at the American Peanut Council (2007 – 2021)

The Sustainable U.S. Peanuts Initiative is the outcome of over a decade of work done by the APC Sustainability Committee. The committee gathered information on the sustainability impacts of U.S. peanuts, what were the members' needs across the industry, and how other crops are approaching the challenge to develop a program that works for all industry segments. This disciplined approach has led to a program that everyone in the industry should be proud of. I was pleased to read of the progress that has been made in 2022, particularly the grower engagement.

References

- 1. Jack P. Davis, Lisa L. Dean. Chapter 11: Peanut Composition, Flavor and Nutrition. Peanuts. AOCS Press. 2016. Pages 289-345.
- 2. Field to Market: The Alliance for Sustainable Agriculture. https://fieldtomarket.org/the-alliance/
- 3. Field to Market: The Alliance for Sustainable Agriculture, 2021. Environmental Outcomes from On-Farm Agricultural Production in the United States (Fourth Edition). https://fieldtomarket.org/nationalindicators-report/
- 4. National Peanut Board. New Data Confirms Peanuts are More Water Efficient Than Ever. https://www. nationalpeanutboard.org/news/new-data-confirms-peanuts-are-more-water-efficient-than-ever.htm
- 5. Maeve Webster. What do consumers want to know about their food. https://co-nxt.com/blog/what-doconsumers-want-to-know-about-their-food/
- 6. International Food Information Council Food & Health Survey. 2022. https://foodinsight.org/2022-foodand-health-survey/
- 7. U.S. Environmental Protection Agency. Understanding Global Warming Potentials. https://www.epa.gov/ ghgemissions/understanding-global-warming-potentials
- 8. National Peanut Board. Peanut Per Capita Consumption Breaks New Record for Second Year in a Row. https://www.nationalpeanutboard.org/news/peanut-per-capita-consumption-breaks-new-record-for-second-year-in-row.htm
- 9. Chu, Ye et al. Registration of Two Peanut Recombinant Inbred Lines (TifGP-5 and TifGP-6) Resistant to Late Leaf Spot Disease. Journal of Plant Registrations. 2022. https://doi.org/10.1002/plr2.20242