

Catalyzing Feed Systems Sustainability by Engaging the Full Value Chain

September 28-29, 2022

Milwaukee, WI

*Organized by World Wildlife Fund &
The Institute for Feed Education & Research
with Support from The Context Network*



Summit Host



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Greetings,

On behalf of WWF and IFEEDER, thank you for making plans to join us for the Feed Systems Sustainability Summit in Milwaukee, WI September 28th and 29th. We know there are many demands for your time, and we appreciate the leadership you show by contributing to the dialogue throughout the Summit. We look forward to the rich conversation as we workshop new ways for the feed industry to deliver on value chain sustainability goals.

The Summit is a collaborative opportunity to support next steps in the feed industry's journey to advance sustainability research and tools, and we aim to build on the collaboration as new paths for action form following the Summit. Together as partners we seek to:

- **Advance a vision** for feed sustainability,
- **Catalyze action** on critical themes of feed sustainability,
- **Elevate learnings** and best practices,
- **Support** value chain needs.

As we engage and share insights with each other, we're working to collectively address key questions whose answers will serve as the basis for efforts to advance sustainable feed systems across the industry. Key questions include:

- What are the "must haves"?
- What stands in our way?
- What opportunities exist?
- What partnerships or collaborations need to be established?
- What can we do together to make meaningful progress?

In this email you will find relevant meeting information, background materials, and other resources to help you prepare for the Summit. We know it's a big packet, at a minimum we'd ask you to level set by reading the overview of the themes and the Summit FAQ. All of the case studies provide context to barriers and opportunities around the four Summit themes, the first six case studies will be directly utilized in the breakout sessions. If you have any questions, please let us know.

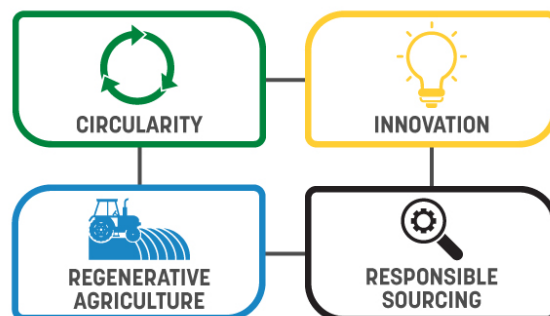
Regards,

*Lara Moody, Executive Director, Institute for Feed Education and Research
Courtney Hall, Director Sustainable Protein Systems, World Wildlife Fund*

SUMMIT THEMES

Feed industry innovations have delivered continuous improvements enabling animal production systems to do more with less. With growing demand for more sustainable animal proteins, the feed industry has a significant role in helping production systems meet increasingly complex challenges.

We have highlighted four themes that are important considerations to chart the course of the future of sustainable feed. The information below is intended to provide context and a shared understanding of why the themes matter for feed system sustainability, not to serve as common definitions or positions. Underpinning each of these themes are common needs around increased use and capabilities for sustainability tools and data, economic viability of systems changes, and an urgency for action.

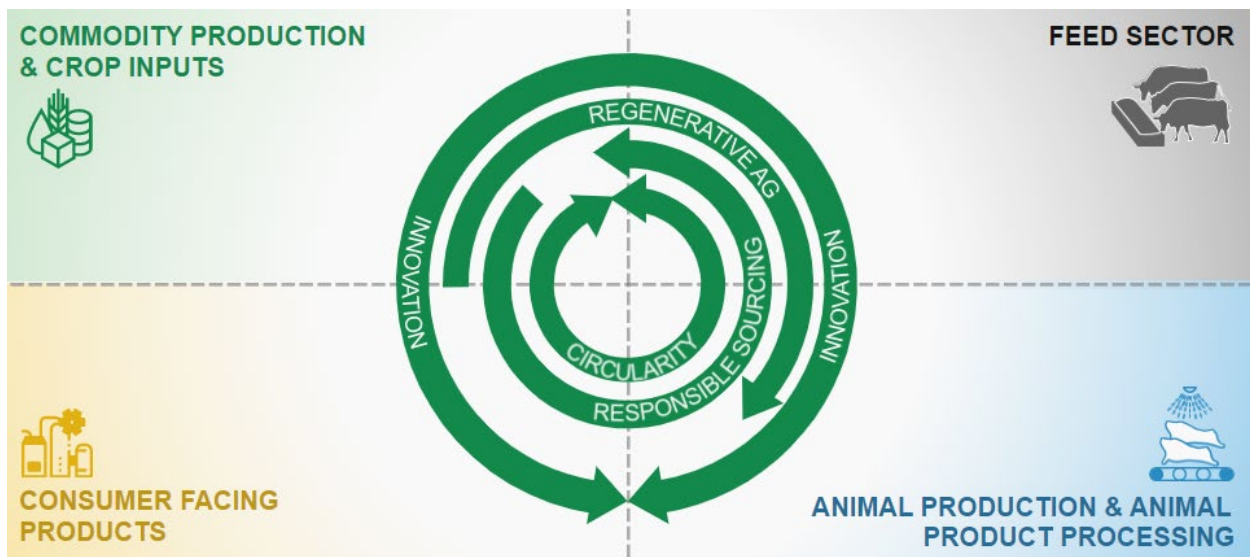


- **Regenerative Agriculture**
 - Regenerative agriculture is an approach that aims to build soil health, reduce carbon emissions, protect water sources, and improve producer livelihoods. Incorporating animals is a core principle of regenerative agriculture systems.
 - There has been strong momentum with recent industry investments focused on the expansion of producer practice adoption to meet ambitious climate commitments.
 - The quantifiable benefits of regenerative agriculture are not yet broadly embedded into the footprint of the feed and livestock.
- **Responsible Sourcing**
 - Responsible sourcing is when an organization incorporates ethical, social and/or sustainable considerations into the way it procures products and services that goes beyond cost and quality.
 - There is growing demand to protect ecosystems and halt land use change in agricultural supply chains to support private and public sector climate and biodiversity commitments, yet considerable barriers are preventing collective progress to meet the desire to address this challenge.
 - Transparency and traceability become critical to support better understanding of risks and opportunities to advance sustainable sourcing commitments – especially in animal protein and feed value chains – which are highly dynamic and complex.
- **Circularity**
 - Circularity seeks to design out waste and pollution, keep products and materials in use and regenerate natural systems. Animals are instrumental to circularity in the food supply chain.
 - Increased use of crop residues, by- and coproducts of the feed and food industries, as well as human food waste streams provide opportunities to improve circularity in sustainable feed systems.
 - Circular ingredients can be further enhanced and integrated into feeds through processing as safe, nutritionally relevant, and economically viable ingredients.

- Coproducts and by-products can help reduce demand on commodity crop supplies which can reduce potential for greater land conversion.
- Sustainability tools and accounting systems require refinement to support better understanding of current levels of coproduct and by-product use and positive impacts within and across animal and feed systems.
- **Innovation**
 - Various novel or even regionally “niche” ingredients and feeding strategies, with important nutritional and/or functional health attributes, display potential for broader and sustainable use in the feed industry.
 - Feed based opportunities exist to improve animal welfare, animal performance (through health and nutrition), and feed efficiency as well as reduce enteric methane; all in support of more sustainable feed systems.
 - Economics, regulation, optimization and scale-up in production and utilization processes present current barriers that will be solved by innovation.

Connectivity of Systems

The graphic below represents the connectivity of the four identified themes across the full feed value chain. Understanding and advancement of each theme is inherently linked to multiple stakeholders. The Feed Systems Sustainability Summit provides a needed opportunity for collective engagement and collaboration across the themes and the stakeholders to be able to identify and advance supporting actions.



FREQUENTLY ASKED QUESTIONS

FEED SYSTEMS SUSTAINABILITY SUMMIT

1. What is the purpose of the summit?

The Institute for Feed Education & Research (IFEEDER) and World Wildlife Fund (WWF) are collaboratively convening a Feed Systems Sustainability Summit to catalyze action around a shared vision for sustainable feed systems. Specific objectives include:

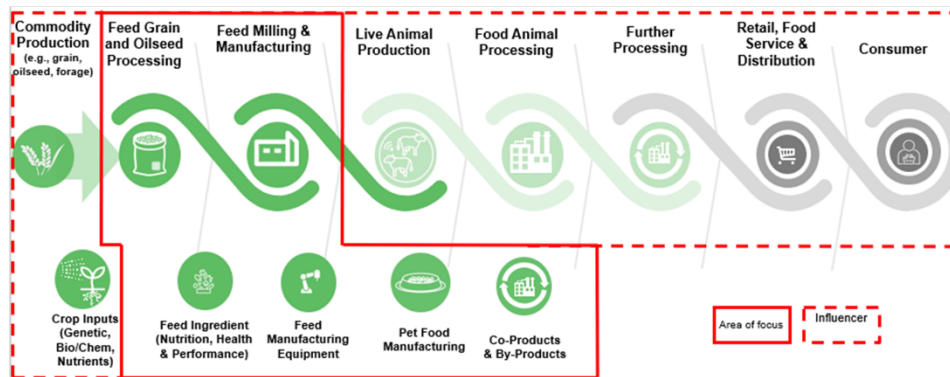
- Feed value chain alignment on a vision and key themes such as responsible sourcing of ingredients, regenerative agriculture, circularity, and innovation to drive progress on sustainability,
- Advance thought leadership across the feed industry and value chain,
- Provide insights into the IFEEDER feed sector Sustainability Road Map, and
- Gain insights and subject matter expertise for WWF white paper on feed sustainability.

2. What are the expected outcomes of the summit for participants?

- Alignment on opportunities to advance sustainable feed systems;
- A stronger network of relationships and awareness of drivers/opportunities/barriers to advancing action on responsible sourcing, circularity, regenerative agriculture, and feed innovations; and
- Insights into future thinking, needs, and potential solutions.

3. What sectors of the industry are represented at the Summit?

Participants covering many aspects of the feed and food production value chain will be in attendance. Refer to the pre-read kit for a list of participants.



4. What is the purpose of case studies?

The collected case studies were curated to provide context for the Summit discussions. They provide perspective on how feed sustainability is addressed today from those who are already on a sustainability journey. Additionally, the case studies address key themes and present insights that can inform action to advance the four practice areas for the feed sustainability (responsible sourcing, regenerative agriculture, circularity, and innovation). Through the case studies we can understand key

learnings of what went well and/or what could have been better to catalyze future action across the value chain. Case studies are not designed or intended to be a platform to promote a service or product.

5. How will case studies be used?

Case studies are insights shared as thought starters and contextual examples of how the four theme areas have been implemented to-date. For the Summit, we have selected six case studies to be presented and further explored during breakout discussions to advance understanding of barriers and needs around the Summit themes. The complete collection of case studies provides additional insights for consideration; therefore, all case studies are being made available to Feed Systems Sustainability Summit participants. Case studies will also be utilized by Partners to inform future engagement and action around feed systems sustainability.

6. Will there be opportunities to engage before the Summit?

Three webinars were organized for the feed industry value chain to explore topics relevant to feed. The following webinars were recorded and can be viewed on the [Feed Systems Sustainability Summit website](#). Highlights from each of the three webinars are provided in the pre-read materials.

- Animal Feed – The Secret Ingredient for Meeting Food Company Sustainability Targets
- LCAs- Should Your Products Have One?
- Feeding Future Sustainable Protein Systems

SUMMER SUSTAINABILITY SERIES

Webinar 1: Animal Feed – The Secret Ingredient for Meeting Food Company Sustainability Targets

[Full Recording](#)
[Highlights Video](#)

WEBINAR TAKEAWAYS

Livestock Feed is an Undervalued Opportunity for Food Companies to Achieve Sustainability Goals

Most of the environmental impact for animal protein is embedded in the feed that animals eat. By reducing feed impacts, food companies have an opportunity to make significant progress toward climate and sustainability goals.

In support of the upcoming [Feed Systems Sustainability Summit](#), the Institute for Feed Education and Research (IFEEDER) and World Wildlife Fund (WWF) explored this topic in the first of a three-part summer webinar series. This first webinar - Animal Feed - the Secret Ingredient for Meeting Food Company Sustainability Targets - featured Christa Anderson of WWF, Kendra Levine of McDonald's USA and Brandon Clark of United Dairymen of Arizona (UDA). Here are four key takeaways from the webinar.

1. FLAG can help companies with agriculture and land use in their supply chains set climate targets.

Stakeholders, investors, and consumers are increasingly interested in companies' plans to address climate change and environmental degradation, but businesses often lack a clearly defined, science-based framework to set goals and targets. The [Science Based Target Initiative](#) supports ambitious corporate action on climate in line with climate science.

Agriculture, forestry and other land use sectors account for 22% of global emissions, and land use change is often the most significant source of emissions for food companies. To address this and protect nature and native habitat, food companies need to eliminate deforestation and conversion, especially from growing feed crops, from their supply chains. But until recently, no standard method existed for companies to account for and set targets for emissions in the land sector.

That's about to change. Launching in the next few months, two tools will be available for companies to use to help them understand their [Forest, Land and Agriculture \(FLAG\)](#) emissions and develop science-based targets along with considerations for strategies to meet those goals.

2. Feed is a significant part of supply chain emissions.

In the global restaurant sector, McDonald's was an early adopter in setting a science-based target (SBT) and recognized that addressing climate was critical to the resiliency of their agricultural supply chain. Within McDonald's supply chain, feed is significant.

A collective request Levine identified is that we all have responsibility for the climate, and we need to commit to partnering to create solutions where they may not exist. Unique to feed, she identified the following opportunities for development:

- No feed should be produced on newly converted native habitat like forests and grasslands.
- Employ climate-smart agricultural practices during feedstuffs production.
- Use feed additives to reduce enteric emissions for confined and grazed animals.
- Explore new, more efficient crop varieties that could also reduce enteric emissions.
- Track and share transparent data of actions and outcomes.

3. Set sustainably targets with your employees to ensure buy-in and have a good data baseline.

UDA shared that it has set and received approval for their SBT and the association has included employees in goal development toward increased renewable energy use, reduced water withdrawal and waste diversion from landfills.

Given the impact employees can have on goal achievement, Clark noted the importance of their buy-in for long-term success. UDA also pursued a process that was data driven. Capturing, aggregating and presenting a solid baseline was important to ensure relevance and help stretch UDA's developed goals. Their carbon goal pushes UDA to reduce Scope 1 and Scope 2 GHG emissions by 50% as well as to achieve general Scope 3 emissions across their supply chain.

The carbon goal linked to Scope 3 has the potential to be drastically impacted by the feed via paths noted above as well as by increased transparency and traceability. UDA is already assessing themselves against their goals so they can identify key focus areas to advance their goals.

4. Feed sustainability is a major opportunity, but we must partner to break barriers and trace to capture results.

Each panelist recognized the potential for more sustainable feed, but also recognized the challenges to implementation of feed related sustainability initiatives, namely accounting for emissions, implementing solutions, and measuring their impact.

To address those challenges, there is a need to “partner like we’ve never partnered before” to address those barriers and break them down quickly. For example, McDonalds is [partnering](#) with ranchers and other companies in the Northern Great Plains to support sustainable grazing and grassland management. Collaborating with partners, internal and external, and drawing on expertise from the broad spectrum of stakeholders in the feed value chain is essential to identifying and scaling new and innovative solutions.

This call for thought leadership, partnership and new, innovative ideas mirrors the spirit and purpose of the [Feed Systems Sustainability Summit](#) this September, bringing together the full feed value chain to advance a vision for sustainable feed systems.

SUMMER SUSTAINABILITY SERIES

Webinar 2: LCAs – Should Your Products Have One?

[Full Recording](#)
[Highlights Video](#)

WEBINAR TAKEAWAYS

3 Things to Know About Life Cycle Assessments (LCA) for your Products or Production System

There is a growing interest for animal food companies to better understand the impacts of their operations and supply chains to identify market opportunities and meet expectations of downstream stakeholders. Utilizing life cycle assessment (LCA) tools are a great way to assess the footprint of operations and existing product lines. They can also be used to innovate and seize on growing demand for sustainable products in the marketplace.

LCAs are a tool for assessing the environmental impacts associated with a product over its lifecycle – from production, to transportation, to processing, to its end use. They can help prioritize improvements on products or processes and can be an important tool for comparing environmental tradeoffs and benefits of different products for internal decision making.

In support of the upcoming [Feed Systems Sustainability Summit](#), the Institute for Feed Education and Research (IFEEDER) and World Wildlife Fund (WWF) recently hosted a [webinar](#) exploring the use of LCA tools. Speakers Martin Guthrie, corporate director of environmental affairs for Darling Ingredients; Erica Lain, sustainability manager for Iowa Select Farms; and Tom Battagliese, senior manager global sustainability metrics for BASF offered insights into their organizations use of LCAs and data.

Here are my three takeaways from the discussion.

1) LCAs Are Valuable for Decision Making

LCAs provide insights into the environmental impacts of operations and supply chains to help companies better understand “hot spots” as well as where to allocate resources for improvement. Below are three, real-life examples of how LCAs have helped inform decision making in the feed industry:

- For **Darling Ingredients**, a rendering-based byproduct company, LCAs have been an important way to quantify greenhouse gas (GHG) avoidance linked to the use of rendered products. Developing LCAs illustrated the significant amount of carbon captured and repurposed within the food production system, and it has greatly informed their sustainability message. With LCAs, the company has also been able to use comparative emissions to understand with more granularity where there are opportunities to make changes to their processes and sourcing, further refining their footprint. Finally, LCAs have helped Darling innovate by providing more detailed insights and

ultimately informing their business and operational decision making.

- At **Iowa Select Farms**, a privately-owned pork producer in Iowa with over 800 farms, undertaking an LCA allowed them to gain a better understanding of their GHG footprint on the pork they produce. Through this process, they identified feed as the biggest part of their footprint and prioritized opportunities to minimize their impacts.
- At **BASF Animal Nutrition**, a feed additives manufacturer and innovation company, LCA data is used to help animal nutritionists and product formulators make decisions beyond least-cost ration development. Data sets like the [Global Feed Lifecycle Assessment Institute](#) create opportunities to integrate life cycle sustainability aspects with least-cost formulation based on nutritional requirements. Creating the opportunity to provide life cycle aspects at the nutritionists' and formulators' fingertips is critical to operationalizing targets that have been set to reduce feed environmental impact.

2) LCA Use Is on the Rise in the U.S.

LCAs, a mainstay in European sustainability efforts, are now a growing trend in the United States to support both customer and consumer demands for accountability and transparency in the supply chain.

Battagliese confirmed that the demand for LCAs in Europe is here and now, with many of their customers actively using them as an approach for communicating and tracking. In the U.S., it's coming on quickly from a market-driven perspective, whereas the early push in Europe was policy driven.

Guthrie agreed, noting that Darling Ingredients recently started seeing increased demand in the U.S. for this kind of data down through their supply chain to the final manufacturers. Whereas in Europe, their LCA data sets have been utilized for several years as a tool to set goals, as this data informs where to focus to improve energy and water usage.

Iowa Select Farms aims to capitalize on this new interest in LCAs to ensure alignment with their whole supply chain. As a customer-driven company, they know the importance of evolving with the needs of their stakeholders. They see sustainability efforts as a mainstay for their customers and consumers and want to continue moving forward by supporting their needs.

3) Work to Improve Your Data Sources

LCAs can be developed from both primary (i.e., specific) and secondary (i.e., generic) data sets. The greater the use of primary data, the more accurate the LCA becomes. Working to improve the data set a company uses for its LCA can provide a more accurate, and possibly lower, environmental impact assessment.

As Battagliese points out, data sources are important because data being used to drive decisions at a product level gets rolled up to decisions at the enterprise level. We're all setting corporate goals, but a lot of organizations haven't yet realized how to achieve those goals. Ultimately, a footprint is comprised of every product that is made, so without assessing at a product-level life cycle perspective, companies will never be able to achieve innovations necessary to connect at the enterprise level.

At Darling Ingredients, LCAs have informed their ability to obtain better and more useful data. As the company works to improve its unit processes, it needs to get more granular on where energy is used, which helps it further divide those processes within a facility. The process of increasing the use of water

flow meters and energy measurements throughout the facility is an improvement that allows the company to get better, more specific primary data.

For Iowa Select Farms, completing an LCA unveiled opportunities to collect and look at more accurate data throughout their feed system, but also through other systems within the business, such as water and energy usage. Lain indicated a potential to improve their LCA values by 40%, specific to their feed footprint, if they could obtain more specific primary data sets. Currently, they are looking at ways to be more efficient with data collection through technology.

SUMMER SUSTAINABILITY SERIES

Webinar 3: Feeding Future Sustainable Protein Systems

[Full Recording](#)
Highlights Video

WEBINAR TAKEAWAYS

Lessons for Feed from Animal Agriculture's Sustainability Journey

Our peers in animal agriculture, that is the farmers and ranchers who produce meat, milk and eggs every day for Americans to eat, must think holistically about the sustainability of their production systems. Beyond their downstream customers' sustainability reporting desires, they are responsible to the communities surrounding their farms, regulatory agencies monitoring environmental impact and consuming public's perceptions.

In support of the upcoming [Feed Systems Sustainability Summit](#), the Institute for Feed Education and Research (IFEEDER) and World Wildlife Fund (WWF) hosted a [webinar](#) to hear from our animal agriculture peers on the ways the feed industry can support them in their sustainability efforts. Speakers included Suzanne Vold, co-owner, Dorrich Dairy; Sam Krouse, vice president of business development, MPS Egg Farms; Dr. Samantha Werth, executive director, U.S. Roundtable for Sustainable Beef (USRSB); and Ashley McDonald, interim vice president of sustainability, National Pork Board (NPB).

Instead of focusing the takeaways on how the feed industry can support their sustainability efforts, let's focus on what they're doing that we should learn from.

1) Sustainability Supports Legacy and Community

As a fourth-generation dairy operation, Dorrich Dairy is working to extend their legacy. They live and make decisions by five value statements: do common things uncommonly well, leave it better than when they came, promote agriculture, surround themselves with great people and do the right thing. To ensure their legacy, the impact of their decisions is considered not just 10 years down the road, but 20 to 40 years. Then, they open their doors to the community and share their story.

Sustainability is a long game and a journey of continuous improvement, Vold explained, and decisions aren't made just to satisfy a purchaser's environmental impact request, but they are also considered for their benefits to the farm's ability to continue operating, animals and people at the operation. For example, Vold said that Dorrich Dairy uses robotics milkers and barn cleaning to benefit labor needs and animal welfare, variable speed drives on all motors and LED lighting to improve energy efficiency, biologic predator fly control and composted manure bedding to increase cow comfort and buffer strips and cover crops to prevent nutrient loss and improve crop production.

2) Sustainability Creates Product Differentiation

Starting as a grain mill in 1875, the operations of what is now [MPS Egg Farms](#) have evolved for more than a century. Beginning egg production in the late 1960s, today the company is vertically integrated

and raises 11 million hens on farms across three states and are raising about 25% of those hens cage-free. Krouse said if you look to the consumer, they recognize that we are all, at some level, in their chain of influence. Therefore, they are seeking ways to bring the great programs and practices that are happening on farms and in the feed mills to the influencers all the way down to the retailers and consumers.

Today, they are piloting the first-in-market program in eggs to source verified low carbon grain at a level suitable for a retailer to claim Scope 3 emissions reductions or to support low carbon claims. They are doing that by partnering with their farmers to purchase grains in which the farmer has provided data on the in-field production practices through the Farmer Business Network's Gradable platform. Gradable then scores the grain with a carbon score which MPS can apply to production in the feed mill and carry through to fed hens and produced eggs all the way to awareness by the customer. They've currently scored about 10% of their corn inputs and look to being able to tell that story of their framework to build the overall sustainability picture for MPS Farms.

3) Sustainability Needs Collaboration

The USRSB came into being in 2015 with membership across the beef value chain now with over 140 members that span beyond the value chain into civil society and allied industries. In April 2022, they launched [their industrywide sustainability goals, which](#) include targets specific to each sector of their value chain. Collaboration across the full beef value chain, from the cow-calf operator to the retail-food service and the allied industry organizations in between (e.g., feed), is inherent to achieving the goals and milestones they have established.

Additionally, they recognize feed is bigger than beef alone. The opportunity for feed lies in collectively working across all livestock sectors to collaborate, Werth said. Many of the needs the beef industry has identified for feed are important to other sectors, for example, feed to enhance animal production and performance, feed to reduce human food waste and increased feed data availability to represent sustainable systems. Importantly, collaboration isn't one-way. USRSB wants to know how beef helps the feed industry demonstrate feed sector sustainability efforts already happening and what else they do to support feed.

4) Sustainability Also Means Conveying Continuous Improvement

The actions required to advance sustainability are paramount to achieving the desired outcomes and goals being set. But, laying out a way to measure those actions that leads to conveying what those actions represent is also important. For animal agriculture, it's necessary to convey the continuous improvement story to stakeholders in the supply chain, as well as to external stakeholders and ultimately to consumers to build trust and value in U.S. pork products here and around the world, McDonald explained.

The National Pork Board has program for their pork producers to use that captures environmental outcomes for the practices being implemented in their systems from feedstuff production to operations on the farm. It not only identifies value-add or cost savings on the farm, but also represents outcomes in a way that means something to a stakeholder less familiar with on-farm operations.

As suppliers and customers within the livestock and poultry value chain, feed's role is clearly understood. There is an opportunity to learn a lot from our animal peers who have been working hard to carve a path for sustainability to grow within the industry. Each of these four lessons are useful to consider when advancing solutions around feed sustainability.

INNOVATION BREAKOUT #1



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

**Moving Beyond Least
Cost Formulation to
Enable a Sustainable
Animal Protein Value
Chain**

SUBMITTER INFORMATION

Submitter Name: Tom Battagliese

Submitter Title: Senior Manager, Global Sustainability Metrics

Submitter Organization: BASF Animal Nutrition

Submitter Email: thomas.battagliese@basf.com

Submitter Phone Number: 973-936-0009

CASE STUDY OVERVIEW

Project Title: Moving Beyond Least Cost Formulation to Enable a Sustainable Animal Protein Value Chain

Project Geographic Scope: Global

Project Partners: Bestmix (feed formulation software company), University of Arkansas + global industry players in feed and integrator space

Duration: Ongoing; Opteinics launched in April of 2021 after a couple of years of development.

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	●
Feed Ingredients	●
Feed Milling and Manufacturing	●
Feed Manufacturing Equipment	
Pet Food Manufacturing	●
Rendering, Co-Products, & By-Products	●
Live Animal Production	●
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	●
Innovation	●
Circularity	●

Impacts to Organization	
C-Suite Alignment	●
Broader Internal Awareness	●
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	●
Farmer Awareness	
Relationships with External Stakeholders	
Learnings Leveraged for Other Projects	
Other (Please Specify): Life cycle sustainability impacts for feed and animal protein	●

Project Overview:

Today, industry generally formulates on a least cost basis. This approach is missing a significant opportunity for addressing the root sustainability opportunity - namely consideration of sustainability impacts and associated innovations at the point of formulation design. BASF has created a cloud-based software called Opteinics that has unique interoperability with feed formulation and ration systems globally. Feed is associated with 50-80% of the life cycle environmental impact of meat, milk or eggs. Opteinics is a first-to-market scalable solution that enables environmental impact benchmarking and transparency needed for delivering sustainability innovations on feed formulation. Opteinics was launched in 2021. From pilot activities prior to launch and the past ~1 year of commercial activity, we have learnings that we will share as part of this case study that represent some needs for industry engagement and further development for the future what is needed to improve data quality, quantity and further integration across the industry.

Project Key Performance Indicators:

- Industry uptake of concept of formulating with sustainability in mind
 - Forward-looking indicators that quantify the specific impact reductions enabled through feed reformulation and innovations as a result of Opteinics usage. Indicators cover 10 environmental categories, including carbon, water, land, acidification, eutrophication, etc.
-

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	
Communities	
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

This solution is mainly focused on environmental aspects. Partners were engaged and an expanded suite of partners is underway at this time for ongoing and future broader developments.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

From a general industry perspective GHGs, Water Use, Water Quality and Land Use are most critical, however; the 2 most critical are generally GHGs and Water Quality (excess nutrients). The approach considers a total of 10 life cycle impact categories, and it is up to the user of the solution to determine which indicators are highest priority (based on results from system and/or organization strategy priorities).

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

As Opteinics provides the assessment of the life cycle sustainability impacts, the transparency of the impacts is enabled. Enterprise environmental impact is ultimately composed of a sum of all of the impacts of the product life cycle. Therefore, product life cycle data enable a transparent organization and environmental governance.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

While there is a strategic and commercial link to BASF, Opteinics is more interested in informing other feed, farm and integrator industry organizations' sustainability strategy delivery.

What went well during this project?

Industry engagement and high interest in such a concept. Leading organizations are setting sustainability targets for 'x'% carbon, water, land and other environmental impact reduction, but most don't have an operational way to deliver on these aspirational targets. Opteinics gives a tactical approach for sustainability impact reduction that is embedded with everyday feed formulation, animal farming and production.

What would you change if you did this project again?

Start education on the opportunity earlier in industry. There is a long-learning curve at the start due to the new concept, but this is changing due to the Global Feed Lifecycle Institute (GFLI) data availability and the increased discussion and application of life cycle data and systems.

What were the next steps that resulted from this project?

Commercial scale-up: collaborations and further partnerships being devised to establish a pathway for an ecosystem-based approach for farm-to-fork data flows and interoperability. Additionally, intensification of case studies with industry players to leverage best practice learnings and feed innovation opportunities for more sustainable formulation in order to scale more rapid uptake of the concept and corresponding impact reduction.

ADDITIONAL INFORMATION AND LINKS

- www.basf.com/opteinics

- 2021 FEFAC/AFIA webinar: <https://www.youtube.com/watch?v=AeacMmmS9Yk>

- Abstract from 2021 U of Minnesota Nutrition Conference presentation:
https://mnnutritionconf.umn.edu/sites/mnnutritionconf.umn.edu/files/2021-09/GRL%204%20ABS%20Battagliese%20Final_BASF.pdf

RESPONSIBLE SOURCING BREAKOUT #2



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

Connecting the Dots:

Driving Sustainability Through the Feed Value Chain with Data

SUBMITTER INFORMATION

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Submitter Organization: Bayer Crop Science

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Other (Please Specify): Life cycle sustainability impacts for feed and animal protein	●

Project Overview:

Today, industry generally formulates on a least cost basis. This approach is missing a significant opportunity for addressing the root sustainability opportunity - namely consideration of sustainability impacts and associated innovations at the point of formulation design. BASF has created a cloud-based software called Opteinics that has unique interoperability with feed formulation and ration systems globally. Feed is associated with 50-80% of the life cycle environmental impact of meat, milk or eggs. Opteinics is a first-to-market scalable solution that enables environmental impact benchmarking and transparency needed for delivering sustainability innovations on feed formulation. Opteinics was launched in 2021. From pilot activities prior to launch and the past ~1 year of commercial activity, we have learnings that we will share as part of this case study that represent some needs for industry engagement and further development for the future what is needed to improve data quality, quantity and further integration across the industry.

Project Key Performance Indicators:

- Industry uptake of concept of formulating with sustainability in mind
 - Forward-looking indicators that quantify the specific impact reductions enabled through feed reformulation and innovations as a result of Opteinics usage. Indicators cover 10 environmental categories, including carbon, water, land, acidification, eutrophication, etc.
-

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	
Communities	
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

This solution is mainly focused on environmental aspects. Partners were engaged and an expanded suite of partners is underway at this time for ongoing and future broader developments.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

From a general industry perspective GHGs, Water Use, Water Quality and Land Use are most critical, however; the 2 most critical are generally GHGs and Water Quality (excess nutrients). The approach considers a total of 10 life cycle impact categories, and it is up to the user of the solution to determine which indicators are highest priority (based on results from system and/or organization strategy priorities).

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

As Opteinics provides the assessment of the life cycle sustainability impacts, the transparency of the impacts is enabled. Enterprise environmental impact is ultimately composed of a sum of all of the impacts of the product life cycle. Therefore, product life cycle data enable a transparent organization and environmental governance.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

While there is a strategic and commercial link to BASF, Opteinics is more interested in informing other feed, farm and integrator industry organizations' sustainability strategy delivery.

What went well during this project?

Industry engagement and high interest in such a concept. Leading organizations are setting sustainability targets for 'x'% carbon, water, land and other environmental impact reduction, but most don't have an operational way to deliver on these aspirational targets. Opteinics gives a tactical approach for sustainability impact reduction that is embedded with everyday feed formulation, animal farming and production.

What would you change if you did this project again?

Start education on the opportunity earlier in industry. There is a long-learning curve at the start due to the new concept, but this is changing due to the Global Feed Lifecycle Institute (GFLI) data availability and the increased discussion and application of life cycle data and systems.

What were the next steps that resulted from this project?

Commercial scale-up: collaborations and further partnerships being devised to establish a pathway for an ecosystem-based approach for farm-to-fork data flows and interoperability. Additionally, intensification of case studies with industry players to leverage best practice learnings and feed innovation opportunities for more sustainable formulation in order to scale more rapid uptake of the concept and corresponding impact reduction.

ADDITIONAL INFORMATION AND LINKS

- www.basf.com/opteinics

- 2021 FEFAC/AFIA webinar: <https://www.youtube.com/watch?v=AeacMmmS9Yk>

- Abstract from 2021 U of Minnesota Nutrition Conference presentation:
https://mnnutritionconf.umn.edu/sites/mnnutritionconf.umn.edu/files/2021-09/GRL%204%20ABS%20Battagliese%20Final_BASF.pdf

CASE STUDY OVERVIEW

Project Title: Connecting the Dots: Driving Sustainability Through the Feed Value Chain with Data

Project Geographic Scope: Global – North America

Project Partners: Collaboration is required to advance the sustainability of the food, feed, fuel, and fiber value chain. The complexities of the agri-food value chain mandate a collaborative, ecosystem-driven approach to achieve success and lasting value. In this context, strategic partnerships are key to enable digital farming solutions.

In order to enable connected, seamless and credible digital ecosystems to serve growers and the entire value chain, all partners need to rely on each other and bring their expertise, relationships, data and analytics.

For example, we are partnering with Microsoft to develop our joint Agri-Food Cloud Platform, which combines our ag-expertise with their enterprise cloud expertise. Teaming with Microsoft allows our in-house teams to continue innovating and bringing novel features and capabilities being requested by the industry. Additional platform participants are expected soon, adding even more value to prospective customers and users.

Furthermore, as part of Project Carbonview for the U.S., Bayer partnered with others in the value chain. Bushel was a partner to ensure the data captured by Climate FieldView across millions of acres in the US is connected to the delivery information from Bushel's platform of 54,000 active users, and Bayer partnered with The Andersons' who helped inform the value proposition ensuring high applicability to all value chain participants.

Duration: Bayer's digital farming solution is an ongoing approach, with dedicated investment and resources designed to accelerate digital innovation. The company's journey began in late 2013, with the acquisition of The Climate Corporation, catalyzing a wave of agtech investment across the industry. Climate FieldView™, Bayer's flagship digital farming product, launched in 2015. First available in the United States, it quickly expanded to Canada, Brazil, Argentina, and major ag producing countries in Europe, and most recently in Southern Africa. In 2021, Bayer organized to better serve farmers and the industry by consolidating our digital innovation activities including Climate LLC under the leadership of Jeremy Williams. Within this structure, specific tools and projects are at different stages of maturity, with the goal for continuous improvements and adaptation of each solution to the needs of the broader, feed, food and fuel value chains.

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	●
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	●
Innovation	●
Circularity	

Impacts to Organization	
C-Suite Alignment	●
Broader Internal Awareness	●
Increased Investment Opportunities	●
Return on Investment	●
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	
Other (Please Specify):	

Project Overview:

Farms have always produced data. But throughout agriculture's 10,000-year history, most of it has remained out of reach and underutilized. Today, digital tools are helping farmers access these data driven insights to harness innovations and participate in unprecedented opportunities. With the power of this data at their fingertips, farmers are better able to address the evolving challenges, from helping to ensure global food security, to combating climate change, to conserving precious natural resources.

Data is also a key enabler for the entire value chain, helping to reduce the environmental impact of agriculture from farm to fork. **Taking the feed value chain as an example, data and digital tools can improve efficiency and transparency, which are two major challenges the industry is facing.** With improved access to insights, the **animal protein supply chain can make decisions based on both least cost formulations and least environmental impact formulations.** With **feed accounting for over 45% of the greenhouse gas emissions linked to animal protein production**, reducing the environmental footprint of feed ingredients is a key priority, and precision farming enabled by data can help us get there.

In order for the feed and protein value chain to unlock the power of data and analytics, **collaboration** is needed to improve **connectivity and interoperability, increase transparency and reduce development costs and timelines**, to deliver solutions at scale in a rapidly evolving landscape.

At Bayer, we have made digital transformation the backbone of our strategy, and we continuously invest resources to tackle these key challenges. **Some examples of our ongoing projects and approaches are outlined below:**

- **Climate FieldView**, our company's flagship digital farming product, aims to help the world's farmers sustainably increase their productivity through data driven insights. Through FieldView, farmers receive advice on exactly what products to use, where and at what time, improving resource efficiency, reducing GHG emissions and nutrient runoff. They can digitally record their on-farm activities and pass that information down to their customers, enabling participation in new revenue-generating opportunities, carbon sequestration programs and other eco-friendly initiatives. FieldView is already enabling growers' participation in Carbon initiatives in the US and Brazil.
- **In Partnership with Microsoft**, we are developing a **cloud platform with capabilities to service the entire agri-food value chain.** This is a B2B digital platform that leverages Microsoft's enterprise cloud leadership and Bayer's agronomic expertise to deliver a connected, accessible and interoperable space for the entire value chain to drive productivity and sustainability outcomes. The platform is intended to enable things like visibility into farm-level environmental footprints, the ability to develop custom Sustainability as a Service applications that leverage insights from data farmers participating in various programs might share, and also build new businesses based on the ability to monetize this new value – all while reducing time to market and lowering costs.
- We are also developing **Project Carbonview for the U.S.**, a first of its kind **seamless data solution that will help corn growers drive more sustainable supply chains**, mitigate the impact agriculture has on the environment and participate in the value created by aggregating the cumulative carbon footprint from the field to the ethanol facility. Farmer agreeing to share their FieldView data with Project Carbonview for the U.S. will be able to share their aggregated carbon emissions data starting from planting through each step in the supply chain through the production of ethanol provided by the facility, capturing the carbon intensity of the ethanol feedstock and allowing ethanol producers and farmers to receive a premium as part of the various low carbon fuel programs (e.g., CARB in California).

Project Key Performance Indicators:

- **Customer centricity**, to ensure solutions are developed with and for their end users, be them farmers or industry players in the feed, food fuel and fiber value chain. It is critical we avoid silver bullets and respond to the real challenges and needs of our stakeholders.
- **Transparency and Trust** – when it comes to data and how it is used, transparency and trust are critically important. As digital agriculture becomes more mainstream, farmers have more and more questions about data privacy, which needs to be taken very seriously. For example, FieldView users own their farm data and choose if and when to share their data with third parties.
- **Interoperability** of data tools and solutions across the value chain are a key prerequisite of digital efforts, ensuring that these elements can be readily shared, understood and compared against each other to ensure that actionable insights can be generated for farmers and industry players.
- **Connectivity** of data sets, insights, and capabilities across the entire digital agri-food value chain in a scalable, secure, and regulatory-compliant form are also key attributes.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	●
People	
Human Health & Wellness	
Communities	
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Technical capacity is the most important indicator impacted by our Digital Farming Solution approach. Solid technical infrastructure and capabilities are a key success factor to enable our customers, the growers, to collect and analyze data in the most effective way possible. As we expand our approach to empower more sustainable decision making by the value chain, that technical capacity is expanding to tackle challenges like interoperability of data systems and data privacy issues.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	
Water Quality	
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

GHG Emissions and Resource Use are the most relevant sustainability indicators impacted by our digital farming solutions approach. Digital tools, data analytics and insights are ultimately enabling our customers to optimize their use of resources, lowering the environmental footprint of agriculture. By connecting the dots along the value chain, our digital B2B platform will also enable better decision making along the value chain, and the opportunity to measure impact from farm to fork, generating incentives for sustainably produced crops, feed and animal protein.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	●
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

Transparency and Stakeholder engagement are the two most important indicators impacted by our digital farming solutions approach.

LEARNINGS AND RESULTS

How did this project inform your organization's sustainability approach?

We believe digitalization and data are the key to farming's future, and we are harnessing its power to find more sustainable solutions that can help farmers produce enough for a growing world—all without starving the planet.

For example, in partnership with farmers, **we committed to reduce by 30% the greenhouse gas emissions of key cropping systems globally**. Digital insights collected through FieldView™ make a massive difference. By revealing new layers of information, farmers can make more informed decisions about how to manage their operations, allowing them to conserve resources, optimize inputs, and ultimately reducing the environmental footprint of their operations.

By the same token, our access to the farm gate and to those insights can enable the rest of the value chain, for example, grain processors, feed manufacturers and protein companies, to make more informed decisions and to invest in promoting sustainable farming practices in their supply sheds, improving the linkage between the actions they are promoting and sponsoring to the impact that is having at the farm level.

We also **committed to reduce the environmental footprint of our crop protection products by 30% by 2030**. Data and analytics are empowering our scientists to get transformative and more environmentally friendly innovations to the market faster. At farm level, using artificial intelligence to analyze farm's historical and real-life data collected through the tractors and combines can also dramatically reduce the amount of frequency of inputs needed in the field.

What went well during this project?

Collaboration: the teams worked well together driven by meaningful support provided by Amazon Web Services who used their Walking Backwards method to help us understand the needs of the customer and drive the solution towards their needs. This framework ensured a customer centric approach in solutioning and improved overall applicability.

What would you change if you did this project again?

Overall, we would seek out participation from the regulatory and administrative organizations to inform the product with their insights and concerns refining the solution. While their information was used, it was through open-source material rather than direct collaboration.

What were the next steps that resulted from this project?

Our digital transformation process is ongoing and in constant evolution to meet the fast-changing needs of the entire value chain, from farm to fork.

For example, in August 2022, we announced the launch, in the United States, of ForeGround, a digital platform for farmers offering tools, resources and discounts to adopt sustainable farming practices, as well as opportunities to earn revenue through the Bayer Carbon Program.

Our key goals for the future are:

- **To scale our current solutions**, increasing the number of acres covered by our digital platforms, in diverse geographies and for a wider range of crops. In this context, we are also working to address the need of small-holder farmers globally.
- **Develop specific solutions and use cases relevant for all links of the agri-food chain.** Our target is to conduct a 'Public Preview' (Beta) launch of the Bayer- Microsoft Agri-Food Cloud Platform in the Q4 2022. This will enable broader reach and collaboration opportunities along the value chain to achieve the goal of enabling and measuring sustainable, low carbon feed to reduce the impact of animal protein production.
- Building on our existing Climate FieldView™ capabilities, and on our experience working with growers to implement sustainable, regenerative farming approaches, we aim to **provide growers more and more ways to measure the sustainability of their farms, collecting credible and shareable data with their customers.** This will not only enable growers to participate in new revenue opportunities but will also enable the entire value chain to adequately measure their scope 3 emissions and make credible claims about their environmental footprint.

ADDITIONAL INFORMATION AND LINKS

• <https://youtu.be/69E4fSrzgG0>

• [A Farmer's Journey: FieldView™ Documentary Series \(climate.com\)](#)

[Digital Farming decisions and insights to maximize every acre \(climatefieldview.ca\)](#)

[Home | Bayer \(bayerforground.com\)](#)



Tailored solutions to address farmers' individual needs and challenges



REGENERATIVE AGRICULTURE BREAKOUT #3



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

Nebraska Soil Carbon Project (TNC - Target - McDonald's - Cargill)

SUBMITTER INFORMATION

Submitter Name: Marty Muenzmaier

Submitter Title: Sr. Director, Sustainability

Submitter Organization: Cargill

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Submitter Phone Number: 952 – 334 - 9684

CASE STUDY OVERVIEW

Project Title: Nebraska Soil Carbon Project (TNC - Target - McDonald's - Cargill)

Project Geographic Scope: Nebraska, USA

Project Partners: The Nature Conservancy, Cargill, Target, McDonald's, Natural Resources Conservation Service (NRCS), Ecosystem Service Market Consortium (ESMC), 50 Farmers

Duration: 60 months (5 years)

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	●
Innovation	
Circularity	

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	●
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●
Other (Please Specify):	

Project Overview:

As part of a five-year partnership, The Nature Conservancy, Cargill, McDonald's, Target, and NRCS are teaming up with farmers in central Nebraska to adopt sustainable soil management practices, such as cover crops, no-till, and diversified rotations on row crop farms that supply feed ingredients into the United States beef supply chain. Over the lifespan of the project, the newly adopted soil health practices will impact approximately 100,000 acres that will be estimated to store 150,000 MT CO₂eq cumulatively and prevent an estimated 375,000 tons of erosion.

Project Key Performance Indicators:

- Farmer enrollment (53 as of May 2022)
 - Acres of cover crop (14,500 as of May 2022)
 - Acres of no-till (8,700 as of May 2022),
 - Acres of diversified crop rotation (100 acres as of May 2022)
 - Estimated MT CO₂eq sequestration (soil carbon storage).
-

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	●
Human Health & Wellness	
Communities	●
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

The Nebraska Soil Carbon Project recognizes farmers at the forefront of climate change. They are often the first to be impacted, while also the first able to be impactful. With that, the project was designed to assist and incentive farmers to utilize techniques that sequester soil carbon, through payments on a per acre basis. Therefore, People and Communities are indicators that go hand in hand; the economic state of a community is enhanced through the livelihood and wellbeing of the farmers and people in that community. By providing farmers with the technical capacity and resources to make the transition to sustainable soil management practices, while also creating a value stream, risk and uncertainty can be reduced and impact can be increased.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	
Water Quality	
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

The two primary goals of the Nebraska Soil Carbon Project involve GHG emissions and Land & Resource Use, therefore these areas were the highest priorities for the project to achieve. Over five years, the project is estimated to impact 100,000 acres of land in central Nebraska while storing an

estimated 150,000 MT CO₂eq cumulatively and preventing an estimated 375,000 tons of erosion. These indicators are directly impacted through farmer enrollment in (and payment for) sustainable soil management practices such as cover crops, no-till, and/or diversified crop rotations. Through these interventions, soil carbon sequestration is expected to increase while simultaneously reducing soil erosion because of less disturbed soils.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	●
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

As Cargill aims to lead in the sustainability space, the BeefUp Sustainability Program and its projects, including the Nebraska Soil Carbon Project, are clear examples of accountability and transparency at work. Through our multi-stakeholder partnerships that bring together NGOs, corporations, individual farmers, and regional partners, accountability at each level is paramount to ensure that the project progresses with ease and that all partners realize the expected outcomes. For the project to be a success, each partner must understand their individual accountability and their contribution to something larger than themselves. Furthermore, transparency is a critical aspect in Cargill maintaining our reputation as a trusted partner in sustainability and beyond, communicating to others our commitment to our sustainability goals and our path to achieve them.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

The Nebraska Soil Carbon Project has been key in helping Cargill make progress toward achieving our Scope 3 greenhouse gas target, which includes reducing the emissions of our supply chains by 30% by 2030 per ton of product sold (compared to a 2017 baseline). Through this multi-stakeholder partnership, we have come away with key learnings that have informed our BeefUp Signature Sustainability Program as well as other sustainability programs across Cargill, including but not limited to carbon and ecosystem services markets, measurement, reporting, and verification (MRV), farmer recruitment and retention, and collaboration among partners. As the carbon accounting landscape continues to evolve, we are adapting our sustainability approach to reflect best practices which is achieved more easily through our involvement in critical Scope 3 climate projects such as the Nebraska Soil Carbon Project.

What went well during this project?

The Nebraska Soil Carbon Project is still ongoing, with the first year of the project ending in May 2022. We are continuously learning and adapting to new findings, which are made easier through open and frequent communications among partners. Our implementation partners, including The Nature Conservancy and NRCS, have tackled farmer enrollment with ease despite clear challenges from COVID-19, and are integral in directly communicating with and understanding farmers' needs. Finally, The Nature Conservancy's bi-weekly meeting schedule allows for challenges to be brought forth early and to be heard by all partners, resulting in quicker discussion and resolution. Consistent communication and reporting (e.g., annual reports) from The Nature Conservancy also mitigates the prospect of surprises or unclear expectations.

What would you change if you did this project again?

As the Nebraska Soil Carbon Project is still ongoing, we expect to learn even more about potential areas for improvement as the years continue. One challenge we did experience in the first year was farmer uncertainty of enrolling in the program due to general skepticism about carbon markets and the risks they might incur. We expect to address this concern in future years through more direct communication and education about carbon markets to farmers.

What were the next steps that resulted from this project?

As this project is ongoing, next steps are still to come. However, working with The Nature Conservancy, Target, and McDonald's in this collaborative manner has opened the door for future partnership opportunities with these organizations on similar projects or in different areas of the beef supply chain.

ADDITIONAL INFORMATION AND LINKS

<https://www.cargill.com/2020/the-nature-conservancy-cargill-mcdonalds-and-target-unite>

CIRCULARITY BREAKOUT #4



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

Kipster's Journey Towards Circular, Low Carbon and Land Less Feed

SUBMITTER INFORMATION

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Submitter Title: Managing Director

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CASE STUDY OVERVIEW

Project Title: Kipster's Journey Towards Circular, Low Carbon, and Land Less Feed

Project Geographic Scope: Netherlands, USA

Project Partners: In the Netherlands, we work with several partners including Nijssen Company and Hendrix Genetics. Our vision and approach are inspired by research out of Wageningen University and Research. Blonk Sustainability verified our carbon footprint in 2021.

In the U.S., we work with MPS Egg Farms, Kalmbach Feed, Hendrix Genetics, Nijssen Company, amongst other parties.

Duration: Our case-study is not a project but rather our way of operating our business. We founded the Kipster business in 2013. The first hens hatched in June of 2017. They started laying eggs in the brand new Kipster barn in October 2017. We have been experimenting and mainstreaming our feed formulation, management, and feed practices since then.

Feed Value Chain Focus	
Crop Inputs	
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	●
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	●
Live Animal Production	●
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	
Innovation	●
Circularity	●

Impacts to Organization	
C-Suite Alignment	●
Broader Internal Awareness	●
Increased Investment Opportunities	
Return on Investment	●
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	
Other (Please Specify):	

Project Overview:

In the Netherlands, our carbon footprint of the Kipster ‘circular’ feed is about 50% less than standard chicken feed. Our hens eat feed specifically developed for Kipster. It contains over 50% of safe by-products and surplus food from large commercial bakeries, and other food producers. Around 25-30% of the feed ingredients consists of farm residues and supplements, but also still includes around 10% conventional feed. Over time, Kipster aims to be completely ‘land-less’. Kipster wants to bypass the use of agricultural land. We do not want to contribute to conversion of the last remaining native grasslands or forests to feed the animals. Our senior management works closely with our in-house veterinarian, farm managers, and environmental impact officer, as well as our feed suppliers and other experts to formulate our feed. We seek to optimize cost, carbon footprint, and nutritional requirements of our feed ingredients for our hens and roosters. We also consider other impacts such as land use and energy.

In November 2022, Kipster hens will start producing eggs in the United States. We aim to approach our feed like our operations in the Netherlands. In the U.S., we are planning to use around 50% by-products from commercial pasta makers. Additionally, we plan to use distillers’ grains, meat, and bone meal as protein sources. While we start with inclusion of conventional feed crops such as corn, soy, and wheat, over time, we aim to reduce these inputs significantly to reduce our land and carbon footprints. Our eggs will be carbon neutral product certified in the United States.

In the Netherlands, our four barns house 24,000 hens each. We raise the roosters for meat, which is around 24,000 roosters per batch each time the hens are born. In the U.S., we will start with four barns with 24,000 hens each. We will also raise the roosters for meat consumption.

Project Key Performance Indicators:

- 1) Health and well-being of chickens (including mortality rates, sickness, behavior)
(e.g, Mortality rates: 2018: 10.59%; 2019: 2,55%; 2020: 2.28%; average production of 330 eggs per chicken per year)
- 2) Carbon footprint of feed ingredients (in 2020: 2,033 tonnes of KG CO2eq)
- 3) Nutritional content and quality of feed ingredients

Information about performance can be found in our sustainability report at [2020 ANNUAL REPORT \(kipster.farm\)](#). We are expecting to release our latest report with updated numbers in the fall of 2022.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	●
People	
Human Health & Wellness	
Communities	
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Technical capacity and feed safety/quality. We need more science-based evidence, innovation, trials, breeding, and genetic selection of the hens and roosters to improve the circular feed system for layers. We show that circular feeding operations can be part of sustainable, profitable farming systems, but we need more technical support to fine-tune and further develop our concept.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	●
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Carbon footprint and land use. In the Netherlands, our carbon footprint of 'circular' feed is approximately 50% less than standard chicken feed. Also, we use approximately 42% less land. We have not quantified our avoided impact on water use, water quality, biodiversity yet. But we expect that by reducing our land use significantly, we also reduce our impact on water and biodiversity.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

Stakeholder engagement and transparency are foundational to our business. We work with a broad range of scientists, suppliers, breeders, veterinarians, environmental and animal welfare NGOs, investors to continuously improve our operations and business model. We share our learnings publicly.

We communicate transparently with our consumers and anyone who is interested through our sustainability report and website. Most importantly, everyone is welcome to visit our barns. We have windows through which people can see the chickens in action as well as a visitor center at the barn where people can see the chickens and engage in our educational exhibition.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

The approach we take towards chicken feed is one of the foundational pillars of our business. It is our goal to produce eggs and meat with minimal use of land while utilizing ‘waste’ streams from the food system. Feed is responsible for over 70% of our carbon footprint. Our circular feed is critical for us to meet our goal of producing carbon neutral eggs and to use as little land as possible.

Our philosophy is that agricultural lands with fertile soils should be used to grow crops for humans primarily, in regenerative ways. Marginal lands can be grazed by ruminants. Organic waste is for livestock. It's how agriculture has been done for thousands of years. We try to vitalize it in a contemporary way, making it fit the current societal context. Pigs, chickens, and cows are efficient ‘waste’ processors. Animals can eat by-products from food manufacturing, organic waste, post-harvest waste. By-products from slaughter such as bones, blood, and feathers are nutritious protein sources for pigs and chickens.

Research from Wageningen University inspired our farm system.

What went well during this project?

We have successfully operated Kipster barns with steady production of eggs in the Netherlands since 2017. We are now expanding in the Netherlands as well as internationally. Our success is evidence of the fact that circular, carbon neutral egg farming with high animal welfare standards can be done in productive and profitable ways.

We have shown that we can significantly reduce our carbon and land footprint. But we know we need to continuously improve our environmental performance to meet our landless goal and to keep lowering our carbon footprint.

What would you change if you did this project again?

There is very little science-based research regarding circular feed in egg production operations. Existing breeds of hens are bred to maximize production based on conventional feed diets. We need more research to support us in fine-tuning the optimum circular feed ingredients for layers. The impact and performance of a broad range of circular feed ingredients on performance, animal health and digestive tract needs to be investigated. Genetic selection and improvement for 'circular' fed hens is in early stages.

Additionally, environmental impact assessments, including LCAs, are based on economic allocations. We need a more comprehensive assessment approach, which includes human health and nutrition. A method that can assess which crops and lands are most suitable for feeding humans before being allocated to livestock. The method should support the implementation of circular food systems so that we can be as efficient as possible with the existing natural resources to feed people while staying within the planetary boundaries of Earth. The current economic allocation and impact assessment system does not take the limitations of natural resource availability well into account.

What were the next steps that resulted from this project?

We will continue to optimize the balance between environmental indicators, nutritional quality, costs, hen health, and productivity. We are planning the implementation of carbon budgets for our operations, including for feed. We will keep minimizing our carbon, energy and land footprints while continuing to improve the nutritional quality of our feed.

Our business is expanding within the Netherlands from 3 to 6 barns. Additionally, we are starting Kipster farms in Belgium, France, the United Kingdom, and the United States. This is not only because of the circular feed, but also our other pillars, including high animal welfare standards.

The first batch of pullets are being raised in the US. The hens will be producing eggs towards the end of 2022. The information we are sharing is from our production in the Netherlands, but it informs our business operations in the U.S. and in other countries. We are working closely with MPS Egg Farms who will operate the Kipster farms, as well as Kalmbach Feed, Darling Ingredients, and others to formulate our 'circular' feed in the U.S.

We are inviting and encouraging a broad range of stakeholders to come along with us on this circular feed journey. We need better science, practices, genetics, and other support systems to keep improving.

ADDITIONAL INFORMATION AND LINKS

www.kipster.farm

<https://www.kipster.farm/blog/case-study-kipster-compassion-in-world-farming>

<https://www.rockefellerfoundation.org/meet-the-top-visionaries-food-system-vision-prize/re-rooting-the-dutch-food-system-from-more-to-better/>

<https://www.kipster.farm/blog/2020-annual-report>

We have shared information about our operations in the Netherlands. But as we expand to the U.S. and other countries, we will take a similar approach to those operations.

REGENERATIVE AGRICULTURE BREAKOUT #5



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

Your Farm Sustainability Reports:

Equipping Farmers, Informing the Supply
Chain, Reporting Progress

SUBMITTER INFORMATION

Submitter Name: Ashley McDonald

Submitter Title: Interim VP, Sustainability

Submitter Organization: National Pork Board

Submitter Email: amcdonald@pork.org

Submitter Phone Number: 202-701-0118

CASE STUDY OVERVIEW

Project Title: Your Farm Sustainability Reports: Equipping Farmers, Informing the Supply Chain, Reporting Progress

Project Geographic Scope: U.S. pig-producing states

Project Partners: As the National Pork Board embarked on this effort, we recognized the need to involve third-party partners to gain additional expertise and credibility. We work with Sustainable Environmental Consultants (SEC) and its EcoPractices platform to collect and analyze the data for the on-farm sustainability reports. SEC coordinates with our 200+ farmers to input data and provides the follow-up reports directly to the operation. Tapping into SEC’s existing, proven systems and platforms helps us ensure the data is analyzed in a valid and verified way, improving farmers’ ability to act on it and the industry’s confidence in the progress we report.

Duration: The National Pork Board, in partnership with Sustainable Environmental Consultants, aggregated the first report of on-farm data in 2019, which was the beginning of the Your Farm Sustainability Report project. The project is ongoing and continues to grow and evolve.

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	
Feed Ingredients	
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	●
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	●
Innovation	
Circularity	●

Impacts to Organization	
C-Suite Alignment	●
Broader Internal Awareness	●
Increased Investment Opportunities	
Return on Investment	●
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●
Other (Please Specify):	

Project Overview:

Identifying how to feed a growing population while preserving our natural resources is a challenge every sector of the food industry is tackling. The pork industry and pig farmers recognize our role in providing a solution and our unique position to do so in the following ways: 1) providing lean, quality, and affordable protein, 2) improving soil health as an important part of the nutrient management cycle, and 3) lowering our impact on the environment. We also recognize we impact the sustainability efforts of others in the industry, as they impact us. For example, the feed we use to feed our animals has an impact on pork’s overall sustainability. Our sustainability efforts impact our feed partners as many rely on us for the nutrients they need for productive soil and fields.

This recognition of the circularity of sustainability helped inform the development of the Your Farm Sustainability reports – individualized, farm-specific, data-driven reports that outline the outcomes of farming practices in areas such as CO2 emissions, carbon sequestration, soil erosion and more. To date, more than 200 farms have participated in the reports, representing approximately 2.4 million pigs across the United States. While this data is valuable to the industry as a whole – and to our sector partners – it is the individualized reports and informed actions farmers can take based on them, that best demonstrate the real progress that can be made with reliable information, technical assistance, and a comprehensive approach. This case study will share both the industry-wide efforts and outcomes of the project to-date, while also offering select examples from individual farms to demonstrate global and local impact.

Project Key Performance Indicators:

The data collected from the Your Farm Sustainability Reports provides benchmarks and measurements for individual farms and provides farmers with Sustainable Continuous Improvement Plans (SCIP). The SCIP helps farmers make changes or apply different practices to demonstrate improvement in their new report.

The industry also aggregates data from the reports to benchmark and track progress on an industry-level. To make this information as applicable as possible, the National Pork Board is focused on growing the number of pigs nationwide represented in the data. To date, approximately 2.4 million pigs are accounted for in the aggregated data set.

The Your Farm Sustainability Report project also demonstrates progress by providing data and examples to answer many of the questions supply chain partners are receiving from their customers and stakeholders.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	●
Human Health & Wellness	
Communities	●
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Sustainable farms that will provide opportunities for future generations also support sustainable communities. While the Your Farm Sustainability reports are focused primarily on environmental indicators, they are also an important part of the pork industries We Care® Ethical Principles goals and metrics, which include a focus on our people, public health, and communities. As the project continues to grow, we will work to identify additional factors to better capture and reflect additional indicators.

On an individual farm level, farmers contribute to their communities and provide for their people in various ways. We will provide specific examples as they are gathered.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	
Water Quality	●
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

We started this project with a focus on what we could measure well and impact most with more data and information. As a result, the Your Farm Sustainability reports began with a strong focus on 1) water quality in the form of benchmarking erosion and comparing it to national averages, 2) CO2 emissions, and 3) carbon sequestration, due to cover crops and no-till.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	●
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

The Your Farm Sustainability reports were developed as an opportunity for farmers individually and the industry collectively to share more clearly the outcomes of the practices applied on the farm. The aggregated data demonstrates progress and commitment in a transparent way with real on-farm data. We have also established accountability through setting forward-looking goals and metrics to ensure we continue progress into the future.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

Your Farm Sustainability Reports are an essential tool for the pork industry – and, by association, the feed industry – as we work to track progress actively and consistently toward goals. In addition to the reports giving insight into individual farmers, the data is aggregated with data from established on-farm measurement system to provide a holistic look at the industry’s progress in areas such as manure application savings, cover crop impact, tillage impact, and the soil conditioning index. The initial reporting process provided an important benchmark for the industry collectively as we worked to set forward-looking goals and metrics.

For individual farmers, the data provided in the reports help them make informed decisions on both short-term and long-term bases, identifying the areas they are doing well and places where they have opportunities to improve – environmentally, economically, or socially. For example, farmers who have received three years of reports can document progress and changes in their outcomes based on their practices.

What went well during this project?

Protecting farmers' data and privacy was a significant priority during the project; as a result, it was particularly important to find the right partners, processes, and programs to ensure the data was reliable and farmers were confident it was secure. Through a careful and transparent process, we were able to ensure farmers felt confident providing their data and, as a result, we have been able to gather enough data to achieve a good representation of the industry. The data collection is easy and turn-key, reducing another barrier that may keep farmers from participating.

What would you change if you did this project again?

In hindsight, our team would have communicated and encouraged participation earlier so we could gather more data in less time. The information the reports provide is so useful, we wish we had five more years of it! In addition, when we first started, the reports focused a lot on land use and feed production. As we evolve, we are identifying more opportunities to include data specific to the pig barn.

What were the next steps that resulted from this project?

This project is constantly evolving as we learn more from the data and from the farmers participating in it. From an industry perspective, follow-up outcome is the development of a carbon footprint calculator, which helps gather and analyze more barn-specific environmental data.

For farmers, the next steps vary based on the outcomes of their individual reports. Farms receive a sustainable continuous improvement plan (SCIP) as an outcome of the Your Sustainability Reports, which identify specific opportunities for farmers to make further progress on various factors. The reports and SCIP also lay the groundwork for partnership with consumer product goods (CPG) companies who may be able to invest in farmers' efforts to apply the recommendations in the SCIP (e.g., implement cover crops).

ADDITIONAL INFORMATION AND LINKS

2021 Sustainability Report:

https://www.porkcdn.com/sites/porkcheckoff/assets/files/2244_NPB+2021+Pork+Industry+Sustainability+Report+Final.pdf

Sample Your Farm Sustainability Report:

<https://www.porkcdn.com/sites/porkcheckoff/assets/files/Sample+On-Farm+Sustainability+Report+2.3.22.pdf>

Sponsored AP Content Services Story:

https://apnews.com/direct/?prx_t=BJUHABEdVA9ZYPA&ntv_acpl=1021685&ntv_acsc=0&ntv_ht=lzroYgA

As you consider participants at the summit, the National Pork Board can work to identify producers to share their experiences with the Your Farm Sustainability reports. Ashley McDonald or Marguerite Tan on the sustainability team can also share more details about how the reports will continue to evolve to encompass more data and areas of focus.

INNOVATION BREAKOUT #6



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

Seed Technology for Climate Smart Agriculture:

Discovery, Testing, Quantification & Reporting

SUBMITTER INFORMATION

Submitter Name: Dayna Gross

Submitter Title: Sustainability Manager

Submitter Organization: Syngenta

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CASE STUDY OVERVIEW

Project Title: Seed Technology for Climate Smart Agriculture: Discovery, Testing, Quantification & Reporting.

Project Geographic Scope: Currently US and Canada with global regulatory approvals pending

Project Partners: Enogen® is commercially available and across the United States used with many dairy and beef farms with on-farm grain and silage production. Enogen production in the US can be viewed here: <https://ip360.agconnections.com/>

Efficiency results based on University of Nebraska Lincoln Research Studies, 2013-2017; Kansas State University Research Studies, 2016-2018; Penn State University Research Study, 2020. 2 Based on LCA conducted by the University of Arkansas Resiliency Center, 2020, for 1000 head, backgrounding through feed yard, using these experimental data and resources: Transl. Anim. Sci. Volume 3, Issue 1, January 2019, 504-512, <https://doi.org/10.1093/tas/txy121> (Exp 2); Kansas Agricultural Experiment Station Research Reports: Vol. 4: Issue 1, <https://doi.org/10.4148/2378-5977.7543> (Exp 1).

Duration: Enogen is entering its 12th year as a key player in the biofuels market and has become well-established in the beef and dairy industry through grain and silage products. Further testing of Enogen is underway to determine the viability of expanding into new markets to benefit other species.

[Cropwise® Sustainability](#) and its Sustainable Outcomes in Agriculture standard is available to growers, ag retailers and value chain partners.

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	●
Innovation	●
Circularity	

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	●
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●
Other (Please Specify):	

Project Overview:

Discovery: Enogen corn was introduced in 2011 as a seed technology to withstand the temperature variations in ethanol production. A highly efficient alpha-amylase enzyme technology was inserted inside the corn kernel to more efficiently convert starch to simple sugar. This is helpful in ethanol production, but benefits were identified in feed studies for ruminants in 2014. The alpha-amylase in Enogen grain or silage drives the conversion of starch to usable sugars more efficiently which increases digestibility significantly compared to other corn.

A more easily digested ration means more available energy for beef and dairy cattle which could positively impact production and decrease days on feed and the amount of feed consumed. University studies have shown feed efficiency gains around 5% through either Dry Matter Intake (DMI) decrease or, more frequently, net production increase.

In summary, when Enogen fed to beef and dairy cattle, starch is converted to sugar more efficiently and delivers more available energy to cattle.

Every acre of Enogen produced is tracked and contracted in the GrowMore360 platform. Syngenta is committed to voluntary product stewardship of Enogen to prevent the corn from entering supply chains where starch is a necessary ingredient (e.g., corn chips).

Cropwise Sustainability is a readily available app for growers to measure farm- and crop-level sustainability with the Sustainable Outcomes in Agriculture Standard, a standard meeting [SAI FSA 3.0 Gold Equivalency](#). Cropwise Sustainability scores growers' leadership in six sustainable outcomes and provides insights for continuous improvement against each outcome.

Using the Growmore360 tracking platform in combination with the Syngenta Cropwise® Sustainability digital platform which helps growers measure their sustainability performance and identify opportunities for continuous improvement on-farm, Enogen Corn for Feed can be combined with practices like cover cropping, tillage, and habitat improvement for increased environmental outcomes.

Syngenta has completed LCAs for beef and dairy production using Enogen with evidence quantifying the environmental benefits of its use.

Project Key Performance Indicators:

- Acres producing Enogen
- Beef and dairy cattle fed Enogen Corn for Feed and translating the environmental benefits from the LCA to cattle head-count
- GHG emissions reductions
- Sustainability performance using Sustainable Outcomes in Agriculture Standard and Cropwise Sustainability

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	●
People	
Human Health & Wellness	
Communities	
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Farmer adoptability (simplicity in adopting Enogen Corn for Feed), food security (doing more with less).

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Land use: growing Enogen requires less land and fewer resources per head of cattle.

It is estimated (per the dairy LCA):

Life Cycle Assessment shows potential environmental savings could be significant: increasing feed efficiency by about 4% in dairy could yield savings like these per 1000 lactating cows for 1 year:

- GHG equivalent of 314 passenger cars (>1.4k kg CO2e),
- Land use equivalent of 189 football fields (>249 acres),
- Enough water to fill 21 Olympic swimming pools >13m Gallons,
- Energy to power 19 average homes for one year (>22K kWh).

For beef a Life Cycle Assessment shows potential environmental savings could be significant: increasing feed efficiency by about 5% in backgrounding and feed yard could yield savings like these per 1000 head of cattle:

- GHG equivalent of 35 passenger cars (>162k kg CO2e),
- Land use equivalent of 50 football fields (66 acres),
- Enough water to fill 9 Olympic swimming pools (>6m Gallons),
- Energy to power 25 average homes for one year (>269K KWH).

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	●
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

Transparency with the peer reviewed science and Growmore360 platform
 Stakeholder engagement because Enogen is a way for our supply chain and customers to be part of the ecosystem of climate and regenerative commitments simply and effectively.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

Syngenta is guided by the Good Growth Plan which puts the urgent fight against climate change and biodiversity loss at the heart of farming’s productive future and is a step-change towards regenerative agriculture.

What went well during this project?

Enogen demonstrates productivity and profitability benefits for producers while delivering quantifiable environmental benefits. We are continuing to build demand across the value chain to use Enogen as an easy-to-add solution to meeting emissions commitments. There are no production hurdles for growers to include Enogen in their operation (no new equipment etc); generating a ‘pull’ across the value chain will speed its adoption.

What would you change if you did this project again?

This is a commercial solution available to producers and the value chain today.

More and more, opportunities exist for companies to integrate sustainably priorities into research and development, production and supply objectives. Had Enogen been developed or evaluated early with a sustainability lens, we would have rolled out a business plan focused on elevating the sustainability benefits and potential outcomes from the onset.

What were the next steps that resulted from this project?

Communications with potential customers, supply chain partners and the public about the environmental benefits of Enogen.

ADDITIONAL INFORMATION AND LINKS

Cropwise Sustainability: www.cropwise.com/us/sustainability

Sustainable Outcomes in Agriculture: <https://www.agriculture.com/news/technology/syngenta-launches-soa-standard-through-cropwise-sustainability-app>

Enogen: <https://www.syngenta-us.com/enogen/default.aspx>

Enogen is a scalable, traceable, ready-to-use first step in mitigating emissions in beef and dairy production. It can be coupled with other regenerative agriculture practices in the field to bring even more benefits to farmers and the value chain.



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Arm & Hammer Animal and Food Production Sustainability – Using Natural Feed Additives to Retain Manure Nitrogen and Reduce Odors in Swine Housing

SUBMITTER INFORMATION

Submitter Name: Ben Towns

Submitter Title: Global Business Director

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CASE STUDY OVERVIEW

Project Title: Arm & Hammer Animal and Food Production Sustainability – Using Natural Feed Additives to Retain Manure Nitrogen and Reduce Odors in Swine Housing

Project Geographic Scope: Midwest

Project Partners: Manure nutrient and volatile fatty acid (VFA) analyses were conducted by A&L Great Lakes Laboratories in Fort Wayne, IL

Duration: Samples were taken over the course of the year in 2009 (12 months).

Feed Value Chain Focus	
Crop Inputs	
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	●
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	
Innovation	●
Circularity	●

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	●
Farmer Awareness	
Relationships with External Stakeholders	
Learnings Leveraged for Other Projects	●
Other (Please Specify):	

Project Overview:

A field study was conducted to evaluate the effect of including CERTILLUS™ Eco in swine rations fed within grow-finish operations in the Midwest. This study encompassed nutrient and microbial analyses of 217 deep pit manure storage samples collected from commercial swine grow-finish systems before and after implementation of CERTILLUS Eco, already feeding CERTILLUS Eco, and never having fed CERTILLUS Eco (n=141 CERTILLUS Eco; n=76 Control). CERTILLUS Eco is a feed additive that contains *Bacillus subtilis* and *Bacillus licheniformis*. The primary hypothesis was that including this feed ingredient would impact the resulting manure composition and the odor-causing compounds in the manure storage systems. CERTILLUS Eco was administered in the feed of the grow-finish pigs at a rate of 1 x 10⁵ CFU/g feed, compared to pigs who were fed similar corn/soybean meal-based diets with dried distillers' grain, typical of diets formulated for commercial swine production but without CERTILLUS Eco.

Project Key Performance Indicators:

Nutrient composition KPIs – Nutrient composition (%) of manure pit samples: Moisture, Crude Fat, ADF, NDF, Crude protein, Ammonia N

Odor causing compound KPI – Manure solids, nitrogen, and fiber composition via Nutrient composition analysis and VFA composition %: Dry Matter %, Viscosity, cps Nitrogen % (Total N, Ammonia N, ADF_N), Fiber % (Crude fiber, NDF, ADF), VFA composition % (Crude fat, Total VFA, Acetate, Propionate, Butyrate, Iso-Valerate)

Manure pit microbial analysis - Overall microbial ecology differences between treated and untreated manure pit samples, methanogens (methane-producing microorganisms), sulfate-reducing bacteria (microorganisms responsible for hydrogen sulfide gas production)

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	
Communities	●
Worker Safety	
Technical Capacity	

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Microbial digestion of manure solids and nutrient retention reduces volatile odor compounds released into the environment.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	
Land, Marine, & Resource Use	
Waste	●
Water Quality	●
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Waste - Increased nitrogen retention in manure resulting in lower quantities of volatilized ammonia N

Water quality - reduced volatile ammonia N and improved nitrogen retention This lowers the risk of nitrogen contaminants in run-off while maximizing the nitrogen that can be returned to the soil through proper nutrient management practices.

GOVERNANCE PILLAR IMPACTS

Governance Pillar
Accountability
Legal, Regulatory, & Institutional Compliance
Stakeholder and Shareholder Engagement
Shareholder Rights
Transparency

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

N/A

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

Our sustainability approach has been formed around 3 primary pillars - Commitment to Responsible Animal Production, Commitment to the Environment, and Commitment to People. While many organizations focus their approach on manufacturing and corporate sustainability messaging, Arm & Hammer Animal and Food Production fills a niche as a business unit of a larger corporation. Our day-to-day goals and emissions are tracked alongside Church & Dwight’s sustainability reporting process, leaving us room to highlight not just our own accomplishments and goals, but those of our customers, who are working across the food chain to feed the world every day. This research solidified this approach considerably. The nutrient retention demonstrated will help improve fertilizer values for our customers, while providing a more nutrient dense fertilizer to help cultivate their future crops, all while reducing volatile ammonia gas, which affects people, animals, and the planet.

Our sustainability approach will continue to be centered around how our products can enable producers to reach their sustainability goals, thus impacting the environmental footprint of animal agriculture as whole.

What went well during this project?

- Statistically significant changes in nutrient composition, specifically increased N retention and reduction in fiber content
- Reduced manure viscosity indicating a more complete manure solids digestion making pumping the pit easier and using less electricity/fuel inputs
- Reduced VFAs
- Reduction in methane- and hydrogen sulfide gas-producing microorganisms

What would you change if you did this project again?

- Optimize the study design to account for other sources of variation in the sample set other than just the CERTILLUS Eco treatment, i.e. consistent management and feed at each farm sampled

- Use more sophisticated molecular biology techniques to investigate the changes in the manure microbiology and target key sustainability organisms, like methanogens and fiber-degrading bacteria

What were the next steps that resulted from this project?

The product was made available commercially and future use with customers is being tracked when possible. Further uses of CERTILLUS are currently being evaluated for their potential sustainability-centered effects.

ADDITIONAL INFORMATION AND LINKS

CERTILLUS™ Eco Nutrient Composition Research Notes - https://ahfoodchain.com/-/media/spd/files/research/certillus-eco_nutrient-composition-related-to-odors_research-notes_web.pdf

CERTILLUS Eco Fertilizer Value Research Notes - https://ahfoodchain.com/-/media/spd/files/research/certillus-eco_manure-nutrietns_research-notes_web.pdf



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

Regenerative Agriculture:

Demonstrating Outcomes via In-
Field Trials

SUBMITTER INFORMATION

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Submitter Title: Senior Manager Partnerships, Stakeholders Affairs and Strategic Partnerships

Submitter Organization: Bayer Crop Science

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Submitter Phone Number:

CASE STUDY OVERVIEW

Project Title: Regenerative Agriculture: Demonstrating outcomes via In-Field Trials

Project Geographic Scope: Latin America and United States

Currently we have 8 long term strip trials across LATAM (Argentina, Brazil Colombia, Mexico) with multiple level of intensification of agronomic systems.

Strip trials

Argentina

- Pergamino (9th years)

Brasil

- Uberlandia (3rd years)
- Carambei (3rd years)
- Itabera (3rd years)
- Sorriso (2nd year)
- Sapezal (2nd year)

Colombia

- La Tupia (2nd year)

Mexico

- Sinaloa (1st year)

We are currently in the third season of field trials, which are executed in partnership with 100 farmers in more than 170 fields for a total of 4300 plus hectares of information generated each year.

Farm trials

Argentina: Center & North (8 states)

Brasil: South, Center and North of (11 states)

Mexico: Pacifico and Bajio Regions.

Project Partners: Moving from strip trials performed at Bayer research facilities to doing actual comparative farm trials requires extensive partnership with our customers, farmers and local research institutions. Over the past 3 years, we have partnered with 54 farmers in Brazil, 12 farmers in Mexico, and 30 farmers in Argentina to take our research trial methods to real farmers farms to test the efficacy of our solutions. The trials have also been conducted with the support of the Mato Grosso Foundation and the ABC Foundation in Brazil.

Duration: Bayer's Market Development Team in Latin America has been working on these trials for over six years and our ProCarbono project has been underway for over two years.

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	●
Innovation	
Circularity	

Impacts to Organization	
C-Suite Alignment	●
Broader Internal Awareness	●
Increased Investment Opportunities	●
Return on Investment	
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	
Other (Please Specify):	

Project Overview:

At Bayer, we believe that our products can be an essential part of a sustainably intensification model of production that utilizes some of the principles of regenerative agriculture including minimizing disturbance of the soil, cover crops and diversifying the rotations. We have been working for over 5 years to test and learn in the field with farmers to build a set of recommendations for Latin America on the most beneficial agronomic system in a continuous cropping model. We are now expanding this approach to North America.

Our data from Latin America shows that **implementing many of the regenerative agriculture principles** (i.e., more diverse crop rotations, no till, cover crops, and improved fertilization) **can result in yield improvements between 8 and 29%**, improved system stability, reductions in crop protection sprays, a **reduction in overall greenhouse gas emissions** including enhanced removals, and an **improvement in gross margins**. The best results are seen following a longer more diverse rotation that includes wheat/soy, a cover crop, corn, cover crop, and soy.

The results of these strips trials have formed the foundation for the agronomic advice and support we are providing through our **ProCarbano project in Latin America**. In order to adapt those agronomic practices to different regions and farmers, we took the learning from the strip trials and implemented them through a set of field trials, before commercial deployment.

Field trials combine the learning generated during strip trials with the expertise of farmers in a specific region, generating a customized group or practices.

Through Bayer's ProCarbano project, farmers are encouraged and supported to implement these regenerative agriculture practices adapted to their region and available technologies. As a result, they are rewarded with better connectivity to the market for lower carbon commodities, and the possibility to access premiums from their customers interested in sourcing low carbon, regenerative ingredients.

Project Key Performance Indicators:

Both the strip trials and Field trials used the following economic and environmental indicators to measure progress of the cropping system models compared during this research:

- Economic Indicators

- o Grain yields
- o System productivity
- o Yield variability and risk
- o Economic return

- Environmental Indicators

- o Resource use efficiency
- o Carbon, water, and nutrient balance
- o Environmental impact reduction of crop protection products
- o Greenhouse Gas emissions and balance
- o Soil health

For field trials in Latin America, we worked with 100 farmers in more than 170 fields for a total of more than 4300 hectares.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	
Communities	●
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Technical Capacity and Communities were the two most important indicators impacted by this project. Strong partnership with local research institutes and with our internal Bayer experts, as well as with farmers, are key success factors to guarantee the credibility of collected data and to inform better practices across diverse cropping systems and geographies. By increasing productivity and improving the sustainability of farming, the approach has a positive effect on farming communities and our entire value chain.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

GHG Emissions and Resource Use are the most relevant sustainability indicators impacted by our trials. Real world data and insights are ultimately enabling our customers to optimize their use of resources, lowering the environmental footprint of agriculture. This information, which will be digitally enabled can allow for better decision making along the value chain, and the opportunity to measure impact from farm to fork, generating incentives for sustainably produced crops, feed and animal protein.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

Stakeholder Engagement is the most relevant Governance indicator impacted by this project. Without the buy in and collaboration of our farmer customer and our partners at the local level, including research institutions and value chain companies committed to sustainable sourcing, we would not be able to test and quantify the benefit of real-farm regenerative practices. Engagement was also essential with internal stakeholders, mobilizing the support of all critical Bayer team involved in the trials and in engaging customers. Transparency and Accountability inform all of our interaction with our stakeholders.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

Testing solutions in the field to determine their efficacy in different locations is key to serving our customers best. These trials form the foundation for the recommendations we are making through our ProCarbano platform in Latin America, which is paying farmers to adopt regenerative agriculture practices. We want to ensure the recommendations we promote through this platform are resulting in real measurable change on the ground, which has been proven through this initiative led by our Market Development team.

This research also informs what must be done to meet our internal sustainability goals of **reducing the greenhouse gas emissions of key cropping systems globally by 30%, reducing the environmental footprint of our crop protection products by 30% by 2030, and empowering 100M smallholder farmers**. It is through these market development and grower led trials that we can truly understand the on-farm measured impacts of the practices, products, and systems we are proposing to our customers.

Additionally, our access to the farm gate and to those insights can enable the rest of the value chain, for example, grain processors, feed manufacturers and protein companies, to make more informed decisions and to invest in promoting sustainable farming practices in their supply sheds, improving the linkage between the actions they are promoting and sponsoring to the impact that is having at the farm level.

What went well during this project?

The possibility to dedicate multiple years to running strip and field trials gave us the ability to understand the short-, mid- and long-term impacts of these systems across multiple indicators, including productivity, soil health, sustainability and farmers' profitability. These long periods of evaluation over the systems gave us the ability to capture the positive residual effects of practices implemented in each of the systems.

What would you change if you did this project again?

Increase the time and resources spent to provide farmers with insights onto the recommended regenerative practices, in order for them to truly understand the magnitude of the impact on their farm operations and productivity. This would have likely encouraged more farmers' participation and better adoption rates of the practices in the long term. However even if not all farmers adopted all practices recommended during the trials and the follow up, we were still able to demonstrate that the more practices farmers adopted cumulatively on their farms, the bigger in the positive impacts on productivity, profitability and environmental regeneration.

What were the next steps that resulted from this project?

There are two key next steps, one internal and one external, that emerged from the success of these farm trials. Internally we have received support to develop a standardized operating procedure for these trials to be performed in other markets. We have expanded the scope to now include trials in North America, which are concluding their first year, and Europe, which are just starting.

In the United States, we are partnering with Kansas State University and Iowa State University to develop a funding proposal to replicate the farm trials across multiple crops in our key geographies. Current research on climate smart practices primarily targets specific crop production components and is limited in scope when it comes to climates and soils. The objective of our work in North America is to pull partners and resources to integrate research efforts in order to identify and validate the best combination of management practices that increase agricultural productivity, optimize water and nutrient use, and protect against yield losses from environmental stresses while improving soil carbon and soil health.

Externally, the results from these trials are being used to enhance the agronomic expertise we provide to our customers to help them achieve the same results seen in these pilots. We are now promoting a systems approach that will have long term economic and environmental sustainability benefits.

ADDITIONAL INFORMATION AND LINKS

[PRO Carbon | Carbon Bayer Brazil & LATAM](#) – includes some videos explaining the project

<https://www.bayer.com/pt/agricultura/pro-carbono>

<https://youtu.be/7qJpCNjBHo0>



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Dairy Feed in Focus:

Economic & Environmental Benefits for Dairy
Farms of All Sizes

SUBMITTER INFORMATION

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Submitter Title: Vice President, Environmental Stewardship

Submitter Organization: Dairy Management, Inc.

Submitter Email: Michelle.Rossman@dairy.org

Submitter Phone Number: (507) 206-7986

CASE STUDY OVERVIEW

Project Title: Dairy Feed in Focus: Economic & Environmental Benefits for Dairy Farms of All Sizes

Project Geographic Scope: Wisconsin

Project Partners: Innovation Center for U.S. Dairy, Syngenta, The Nature Conservancy, Nestle, Foremost Farms

Duration: Launched in 2021, continuing through 2024

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	●
Innovation	
Circularity	

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	●
Carbon Footprint	
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●
Other (Please Specify): This project has provided insights into farmer recruitment and outreach, partner alignment and roles as well as data collection. After bringing a diverse group of partners together, the project team was able to define roles and utilize the expertise of individuals to support the project from initiation to execution. Farmer outreach materials were customized for the co-op and disseminated through established meetings and communication channels. Data collection protocols were developed to minimize farmer burden and align with multiple modeling tools.	●

Project Overview:

This program aims to pilot, replicate, and scale up the adoption of best management practices in feed/forage production and feed efficiency to drive environmental and economic benefits for farms of all sizes.

- Focused specifically on dairy feed grown by the dairy farmer, including varieties grown, crop rotation, cover crops, use of manure, etc.
- Less prescription, more choice: a tiered “menu” approach that allows for multiple entry points to meet farmers where they are
- Targeted agronomic advice and incentives for farmers
- A bottom-up approach to meeting value chain goals and industry commitments
- Less complexity in data collection and reporting requirements - data collection that yields meaningful agronomic and environmental management information
- Incentives for data access through cost-share or credits for adoption of conservation practices (e.g., ecosystem services)
- Access to knowledge and technical support to inform decisions

Project Key Performance Indicators:

FARM ES- Enteric, Manure and Feed Print (2023 and 2024) and Field Print Calculator 7 key metrics (2022-2024). The project will use FARM ES when the new version is ready for public use.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	
Communities	●
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

This project brings together technical expertise from multiple project partners as well as the trusted service providers who are already assisting the farmers enrolled in this program. Bringing these diverse groups together will provide opportunities to understand the optimal delivery of technical information as well as gaps in technical resources. This information will be shared across partners and used to develop new resources and dissemination plans. Farmers will provide valuable feedback regarding the technical support provided as well as insights on the resources developed during this project.

In addition, this project will result in a replicable model that can be adapted for use in additional geographies by dairy supply chain partners.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	
Waste	
Water Quality	●
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Implementation of practices such as cover crops, tillage changes, crop rotations and increased grazing will have multiple impact including:

- Improve chemical (total C and N; C and N in particulate organic matter; organic matter content; C mineralization rates; nutrient balances), physical (water holding capacity; water infiltration; cation exchange capacity; aggregate stability; bulk density; soil resistance to penetration) and biological (microbial biomass respiration; fungi/bacteria ratios) parameters of soil quality-
- Reduce wind and water erosion-
- Deep tap root tillage radish and turnip can reduce soil compaction
- Remove GHG by increasing carbon sequestration in soil
- Reduce GHG emissions by fixing atmospheric N, reducing need for fertilizer
- Reduce erosion and increase water infiltration
- Reduce nutrient, pesticides, and antibiotics loads to impaired waterbodies, reducing water pollution and algae blooms
- Improved habitat resources for wildlife, beneficial insects, and pollinators
- Suppress soil diseases and reduce weed infestation
- N credits from legume cover crops
- Cover crops could be used as a feed source for livestock.

GOVERNANCE PILLAR IMPACTS

Governance Pillar
Accountability
Legal, Regulatory, & Institutional Compliance
Stakeholder and Shareholder Engagement
Shareholder Rights
Transparency

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

N/A yet - project still in process

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

This project has provided insights into the incentives that attract farmers to projects. We’ve also learned that the entire team must be knowledgeable and able to speak to the details of the project and serve as spokespeople both internally to participants and technical service providers as well as

to external partners. Alignment on project goals and impact is essential as well as clearly defined roles for all partners. As the project progresses, additional insights from practice adoption, farmer engagement and expansion of the project will be gathered and shared.

What went well during this project?

All partners brought their diverse resources to the project including funding, technical knowledge and farmer communication and outreach channels. Working together to apply those resources to build out a project to provide technical and financial assistance to farmers took time and extensive partner engagement but it was accomplished.

The project is entering year 2 and farmers will be implementing the practices chosen. 10 farmers are active in Wisconsin. Recruitment of farmers is occurring in Michigan.

What would you change if you did this project again?

The timeline would be adjusted to account for the partner on-boarding and alignment on tasks, development of recruitment materials and time needed to recruit farmers. Farmers have limited time to discuss new projects and ideas and there must be sufficient time allocated to provide information in multiple formats as well as an evaluation phase by the farmer and trusted service providers.

Timing must also be taken into account for the season of practice implementation so that the farmer has adequate time to consider the practice change and implement at the appropriate place in the crop/management rotation.

What were the next steps that resulted from this project?

The project is in process and has expanded from one state to two states.

ADDITIONAL INFORMATION AND LINKS

No links available



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Large Scale Study: The Effect of Seaweed and Rapeseed Protein for Animal Feed

SUBMITTER INFORMATION

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CASE STUDY OVERVIEW

Project Title: Large scale study: The Effect of Seaweed and Rapeseed Protein for Animal Feed

Project Geographic Scope: Denmark

Project Partners: Copenhagen University: Responsible for analysis of blood inflammatory markers and the 16 rRNA analysis of gut microflora bacteria.

Fermentation experts: Overall project manager

European Protein: Protein producer

Ocean Rainforest: Supplier of seaweed for fermentation

Duration: The project started in 2019 with ongoing start-ups of new farms. The last data was registered in 2022. The project findings have been collected in a large gut health database, which is the object of current and future studies on feeds' influence on gut health, performance and its' relation to the feed's carbon footprint.

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	●
Feed Manufacturing Equipment	●
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	
Innovation	●
Circularity	●

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	●
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	
Learnings Leveraged for Other Projects	

Project Overview:

EUROPEAN PROTEIN has tested the application of fermented feed with seaweed on 36 pig farms. The study compared animal productivity and health 1) before feeding the new protein and 2) after feeding the protein for 5 and 9 months.

The aim of the project was to use a patented fermentation method to:

1. Utilize a local source of protein and ingredients for feed,
2. Increase the health of sows and their offspring and thus reducing the need for antibiotics in medicinal zinc, and
3. Produce an economically feasible protein source.

EUROPEAN PROTEIN and Copenhagen University have fed more than 30,000 sows with seaweed-induced rapeseed protein. Together they gathered and analyzed microbiome data from more than 1,000 sows (including fecal samples and blood samples) and combined the data with farm production results. The combined information shows a significant increase in gut health and productivity.

Project Key Performance Indicators:

Improved performance and health for sows when fed with fermented rapeseed and seaweed:

- More weaned piglets per litter,
- Reduced feed conversion rate,
- Reduced mortality,
- Reduced low-grade inflammation in blood,
- Increased gut microflora diversity,
- Reduced number of pathogens in feces, and
- Price neutral or improved margin for the farmer.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	●
People	
Human Health & Wellness	●
Communities	●
Worker Safety	
Technical Capacity	

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

One health summarizes how our ecosystem of people, animals and the planet are interconnected. When making feed solutions, we need to consider all challenges, like antimicrobial resistance through the reduction of antibiotics for humans and animals and responsible sourcing (using locally available crops), while making sure that we utilize both food and feed to a maximum without increasing emissions through energy or water-demanding refining processes. This study encompasses a wide range of challenges to producing protein for animals and people - in a more sustainable way.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	●
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Solid state lacto-fermentation needs less water and energy than traditional fermentation. Secondly lacto-fermentation (unlike yeast fermentation) makes lactic acid and not CO2. This means that the waste product is actually a valuable acid, so there's no waste in the actual fermentation process. Through fermentation, we can utilize seaweed and rapeseed for an economically feasible feed, with

fewer fertilizers, transportation and no deforestation. The animals increase their absorption of nutrients, and consequently, less is needed. As a result, less nitrogen and phosphorous is excreted on the field and into the water.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

As 36 farmers were included in the process and data shared amongst them, they too experienced how local crops can be used as protein and ingredients for feed without increasing the total cost of the pig production.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

EUROPEAN PROTEIN is actively seeking local protein or byproducts to maximize local production and circularity. It is a founding principle that the technology of lactic acid fermentation should be shared as widely as possible through licenses to local partners to quickly set up local fermentation factories on the partners home markets.

LCA-analysis are currently being calculated by a third party so EUROPEAN PROTEIN can declare carbon footprints on its feed based on its unique fermentation technology, new ingredient and protein sources and link these data to the study results.

What went well during this project?

EUROPEAN PROTEIN managed to use its fermentation technology on large scale to produce a new feed made from local plant proteins. The feed was successfully included in the sow and piglet feed with improved performance, health, and reduced need for antibiotics. The feed increased the value of the production to a point where the total cost of use of the alternative feed was less than the use of traditional unrefined sources of protein.

What would you change if you did this project again?

We would include measurements of the digestibility of the feed and animal excretion before and after the intervention to assess the climate impact of the intervention, and we would put in place a better screening program for participating farms.

What were the next steps that resulted from this project?

Copenhagen University is writing papers for animal Journals based on the study results, and we hope to publish them in 2023.

European Protein and Ocean Rainforest have secured funds to conduct the largest sow trial to date in the EU. The aim is to map the feed's mode of action, answering why the inclusion of seaweed induces health and productivity for sows and their offspring.

ADDITIONAL INFORMATION AND LINKS

About the approach of maternal feeding: <https://youtu.be/QvdbCJgKoRQ?t=2404>

Article: <https://www.feedstrategy.com/press-releases/seaweed-prepares-pig-producers-for-zinc-free-weaning/>

Farmer case (1): <https://youtu.be/laLzXRrn2-g>



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Farmers for Sustainable Food & Lafayette Ag Stewardship Alliance:

A Framework for Farm-Level Sustainability
Projects

SUBMITTER INFORMATION

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Submitter Title: Managing Director

Submitter Organization: Farmers for Sustainable Food

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Submitter Phone Number: 920-392-1220

CASE STUDY OVERVIEW

Project Title: Farmers for Sustainable Food & Lafayette Ag Stewardship Alliance – A Framework for Farm-Level Sustainability Projects

Project Geographic Scope: Lafayette County in Southwest Wisconsin

Project Partners: Lafayette Ag Stewardship Alliance (LASA), founded in 2017, is a farmer-led watershed conservation group that was formed to identify and promote conservation practices (CPs) throughout southwestern Wisconsin.

Houston Engineering, Inc., which provides a full range of civil engineering, environmental, planning, and technology consulting solutions for clients across the United States, provided technical expertise for this project.

Tools to track progress:

- Field to Market’s Fieldprint® Platform: Tool used to measure on-farm sustainability metrics.
- FINPACK software, Center for Farm Financial Management, University of Minnesota: Tool used to measure farm financials.
- Prioritize, Target, and Measure Application (PTMApp), Minnesota Board of Water and Soil Resources: Tool used to identify local water resources.

Duration: 36 Months (2019-2021 crop years)

Feed Value Chain Focus	
Crop Inputs	
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	●
Innovation	
Circularity	

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	●
Carbon Footprint	
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●
Other (Please Specify):	

Project Overview:

Farmers for Sustainable Food (FSF), the Lafayette Ag Stewardship Alliance (LASA) and key stakeholders in the agricultural supply chain partnered in 2019 to create a replicable Framework for Farm-Level Sustainability Projects. The framework provides a pathway for establishing sustainability projects that address financial and environmental outcomes driven by on-farm conservation across the country.

This case study summarizes three years of data collection and analysis (2019-2021 crop years) involving 15 LASA farmers that manage over 40,000 acres, primarily from Lafayette County, Wisconsin, to demonstrate the efficacy and impact of conservation practices and best management practices on sustainability, farm financials and local water resources using FSF’s framework. Four farms participated in the crop enterprise financial analysis. Farmers are committed to continuing to work with the project for two additional years, which will result in five years of data.

Key project purposes include:

- 1) Assess if current farming practices in conservation-conscious areas are having a positive impact on sustainability and water quality,
- 2) Demonstrate the financial benefits of conservation practices on farms, and
- 3) Increase the use of sustainability measurement platforms by farmers to inform land and water management decisions, leading to increased adoption of conservation measures.

Project Key Performance Indicators:

Environmental field-level: Soil conservation, energy use, GHG, water quality, biodiversity and land use were benchmarked for three crops: corn grain, corn silage and alfalfa. Watershed level: surface water (sediment, phosphorus and nitrogen reductions to local waterways), groundwater sensitivity and estimated reduction of nitrogen.

Financial: Yield, direct cost, gross return for three crops: corn grain, corn silage and alfalfa

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	●
Communities	●
Worker Safety	
Technical Capacity	

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Human health and wellness were impacted due to the project's significant focus on local water quality as described later in this report. Additionally, the community was theoretically impacted through economic stimulation from hiring local custom services for sustainability practices and savings generated from lower input costs enabling community investment.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	
Waste	
Water Quality	●
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Water quality is the priority resource concern in the region and project area due to the high density of cold-water trout streams and shallow soils over bedrock/groundwater aquifers. Excess sediment, phosphorus and nitrogen can result in impairment to fish and wildlife habitat and drinking water. Field to Market’s Fieldprint® Platform (FPP) uses USDA’s Stewardship Tool for Environmental Performance (STEP) tool, an index tool designed to rate the potential for nutrients to run off the edge of the field or leach below the rootzone for four categories of nutrient loss. STEP operates by determining the site-specific risk of nutrient loss and then evaluating the farm management practices based on how they do or do not mitigate site-specific risk. The four pathways are aggregated to provide a single water quality metric between 0 and 4. Each point expresses if a specific nutrient loss has been mitigated.

The LASA group completed data entry for 2019-2021, providing insights into three years of field data for project participants. The aggregated score for the LASA project in 2021 is 2.3 out of 4, suggesting that on average, each of the 15 farmers is mitigating two pathways. As an example, for the aggregated score, 50 percent equates to a score of 2/4 for the project. The project score went from 1.9 to 2.3 out of 4 between 2019 and 2021, an improvement of 18 percent.

Table 3 outlines the different phosphorus and nitrogen loss pathways that are calculated with the FPP and the results from the project for the 2021 crop year. Figure 3 outlines the different pathways that are mitigated within the LASA project for all three years. This figure is a visual interpretation of Table 3 and shows how over time, the water quality metric has improved across the project.

Table 3: Water quality loss pathway explanation

	Loss Pathway	
	Phosphorus	Nitrogen
Surface Pathway Mitigation	52% of the fields mitigated surface phosphorus in 2021. No change	58% of the fields mitigated surface nitrogen in 2021. Decrease of 7%
Subsurface Pathway Mitigation	13% of the fields mitigated subsurface phosphorus in 2021. Increase of 10%	88% of the fields mitigated subsurface nitrogen in 2021. Increase of 13%

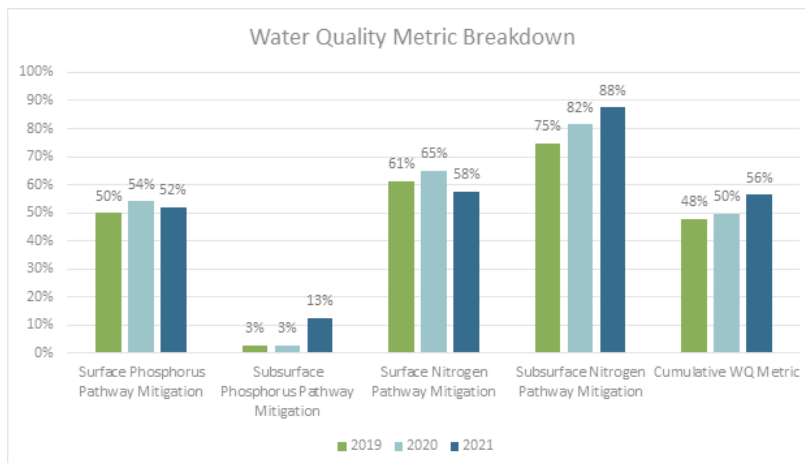


Figure 3: Water quality metric breakdown for three-year period

Farms using the Fieldprint Platform self-report conservation practices that are implemented on each field within the platform. Between the 15 farmers, there were 839 conservation practices being used on the fields in 2021. This is an average of five practices per field. The top six practices used within the LASA project are grassed waterways (159), contouring (130), cover crops (129), reduced tillage (112), strip-cropping (102) and no-tillage (31).

The local water resource component of the project looked at the water quality impact to local rivers and lakes from implemented conservation practices (CP) and best management practices (BMPs). The PTMApp tool was used to evaluate the effectiveness of local conservation projects for reducing sediment, nitrogen and phosphorus delivered to local rivers and lakes. This information can help create better dialogue around agriculture and water quality issues as well as target outreach, technical assistance and financial assistance to those farms and fields where adoption of CPs and BMPs will produce cost-effective land treatment. An extensive review of how PTMApp was used within the LASA project can be found in the year two report (<https://farmersforsustainablefood.com/projects-and-resources/>).

To illustrate the impact of current conservation practices and potential benefits of new conservation practices, PTMApp was run for the Silver Spring Creek (SSC) watershed, chosen because it is listed as impaired for fish and wildlife habitat with the sediment and non-point source pollution as the cause. More information can be found at the end of this report.

Model results estimate that current adopted conservation practices (grassed waterways, contouring, cover crops and no-till/reduced till) by project farms in the SSC watershed have reduced sediment loading by 28% (about 2 tons/acre/year) compared to a baseline conventional farming scenario (fall and spring tillage, no cover crops and no contouring). The model then estimated that adding cover crops on 50% of fields in the watershed would result in a 54% reduction from baseline conditions.

Current conservation is helping reduce sediment loading to SSC and that the PTMApp tool can be used to develop new conservation implementation scenarios, using conservation practices acceptable to farmers in the watershed, to achieve sediment reduction goals for the Silver Spring Creek watershed.

Project benchmarks are a useful way to show a farmer how individual scores compare to those of others enrolled in the project as well as at the state and national levels. They are also useful to set goals and strive for improvement over time. Table 1 contains the LASA project benchmarks for corn grain, corn silage and alfalfa based on 15 farms for the three-year project period of 2019-2021. The benchmarks are averaged over all three years.

The project and interested farmers can compare metrics to national indicators and state benchmarks to better understand how the project performs against national and state averages. Field to Market has published updated national indicator metrics for 2020. The comparisons are listed in Table 2.

Table 2 shows that across all categories except for corn grain greenhouse gas emissions, the project is, on average, performing better than the national indicator. Greenhouse gas emissions for corn grain are 30% higher in the LASA program compared to national indicators.

Table 1: LASA Fieldprint Platform project sustainability metrics for the three-year period 2019- 2021

	Corn Grain	Corn Silage	Alfalfa
Soil Conservation ton/ac/yr		
	1.4	3	3.6
Energy Use	... btu/bu btu/ton	
	24,781	119,343	1,164,795
Greenhouse Gas	lbs. CO ₂ e/bu	lbs. CO ₂ e/ton	
	13.3	87.9	432.9
Water Quality unitless		
	1.22	1.39	2.66
Biodiversity %		
	72.6	76.1	77.2
Land Useac/bu....ac/ton.....	
	0.0043	0.382	0.2954

Table 2: National indicators vs project benchmarks by crop type

		Corn Grain	Corn Silage	Alfalfa
Soil Conservation	 tons/ac/yr		
	Project	1.4	3.0	3.6
	National indicator	4.7	4.7	NA
Energy Use	btu/bu..... btu/ton	
	Project	24,781	119,343	1,164,795
	National indicator	37,791	312,716	NA
Greenhouse Gas		lbs. CO ₂ e/bu	lbs. CO ₂ e/ton	
	Project	13.3	87.9	433
	National indicator	10.7	122.2	NA
Land Use		...ac/bu...ac/ton.....	
	Project	0.043	0.0382	0.2954
	National indicator	0.058	0.0493	NA

GOVERNANCE PILLAR IMPACTS

Governance Pillar
Accountability
Legal, Regulatory, & Institutional Compliance
Stakeholder and Shareholder Engagement
Shareholder Rights
Transparency

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

N/A

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

LASA and FSF piloted the framework through this project using Field to Market’s Fieldprint® Platform to measure on-farm sustainability. The project utilized Field to Market’s 2021 National Indicators Report: Environmental Indicators for Measuring Outcomes of On-Farm Agricultural Production in the United States to benchmark progress for the six KPIs highlighted in the project. The report provides critical national-level analysis on progress in environmental indicators across eleven U.S. commodity crops. The key performance indicators for this project which were benchmarked against the National Indicators Report include, soil conservation, energy use, GHG and land use. The report aims to highlight project learnings with downstream partners and has been shared among Field to Market’s 160+ members representing the full agricultural supply chain including growers, agribusinesses, civil societies, affiliates and brands/retail.

What went well during this project?

Compared to project benchmarks for all KPI categories (soil conservation, energy use, greenhouse gas and land use) for the three crop categories (corn grain, corn silage, alfalfa) except for corn grain greenhouse gas emissions, the project is, on average, performing better than the national indicator. GHG emissions for corn grain are 30% higher in the LASA program compared to national indicators.

What would you change if you did this project again?

There is a significant need to provide support for farmers for data collection in projects like this. FSF is currently seeking a staff member to be a data collection specialist for this project and other projects underway that require data collection on-farm. It would greatly increase the efficiency of the project and consistency in data collection and entry to have a dedicated individual in this role to support farmers.

In the farm financial analysis portion of the project, the four farms participating used an average of five conservation practices per field, creating a challenge to identify financial return on investment

(ROI) for one specific conservation practice. More consideration on how to identify financial ROI for individual practices would be beneficial for the next iteration of the project.

What were the next steps that resulted from this project?

The Lafayette Ag Stewardship Alliance has decided to move forward with two additional years of data collection with Fieldprint Platform and on the financial analysis side of the project. This continuation of data collection will provide a total of five years of data that can be used to review changes over time.

ADDITIONAL INFORMATION AND LINKS

Access the Framework for Farm-Level Sustainability Projects and all available project reports here:

<https://farmersforsustainablefood.com/projects-and-resources/>

Project mention in Grande Cheese: https://www.grande.com/social-responsibility/#report_40

Recorded presentations about the project:

<https://www.youtube.com/watch?v=LzYrKs3yZ1Y>

<https://www.youtube.com/watch?v=wT32T98x20o>

Video interview From World Dairy Expo, Sustainable food production is focus of dairy industry partnership: <https://vimeo.com/617301515?ref=em-share>

Podcast Interview with Emily Johannes, Nestle USA and Lauren Brey, FSF on Climate Change with Scott Amyx: https://scottamyx.com/2022/05/30/interview-with-emily-johannes-nestle-usa-and-lauren-brey-farmers-for-sustainable-food/?fbclid=IwAR3S-rOcEmsFRJ2atpqGaPvrXWSCtBQwzI-Dq75QZdrGP0Pw7WCT_qOGAd0



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Nutri-Gold® Dried Milk: Recovering Retail Milk for Animal Feed

SUBMITTER INFORMATION

Submitter Name: Jennifer Luchte

Submitter Title: Sustainability Director

Submitter Organization: International Ingredient Corporation

Submitter Email: jluchte@gfsolutions.com

Submitter Phone Number: (636) 343-4111 x 1189

CASE STUDY OVERVIEW

Project Title: Nutri-Gold® Dried Milk: Recovering Retail Milk for Animal Feed

Project Geographic Scope: Mid-south (Texas)

Project Partners: Fluid milk bottling companies.

Duration: Twelve (12) months. The project began in 2007, and Nutri-Gold® Dried Milk remains in the IIC product portfolio today.

Feed Value Chain Focus	
Crop Inputs	
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	
Innovation	●
Circularity	●

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	●
Return on Investment	
Carbon Footprint	●
Farmer Awareness	
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●
Other (Please Specify):	

Project Overview:

Nutri-Gold® Dried Milk stemmed from observing a need to divert near-date milk intended for human consumption from a land application or landfill destination. Pasteurized milk contains nutrients beneficial to animal health and nutrition, and IIC believed those nutrients could be dried and upcycled into the animal feed chain. This project returned milk proteins, fats, and lactose to the diet of livestock animals, in turn creating high-quality protein for human consumption

Project Key Performance Indicators:

Pounds of milk diverted, pounds of milk protein and fat dried, number of animals fed, return on investment, pounds of packaging recycled, animal performance.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	●
People	
Human Health & Wellness	
Communities	●
Worker Safety	
Technical Capacity	

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Food Safety & Feed Safety: turned perishable liquid milk into a stable dry powder that is safe to handle and for animals to consume. Community: provided economic stimulus and increased job availability to Cleburne, TX, area where plant is located.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	
Waste	●
Water Quality	
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

GHG: by removing more than 1.6 million gallons of milk annually from landfill/land application, IIC’s process avoids approximately 55 metric tons of CO₂ emissions and 7 metric tons of methane (H₄) emissions) (Source: EPA WARM Tool). Additionally, IIC recycles more than 210,000 pounds of the mixed plastic packaging recycled every year.

Waste: by upcycling packaged milk, milk proteins and fats are changed from a perishable liquid to a stable dry form. Milk packaging is also recycled (plastic and/or paper), which reduces waste entering the landfill.

GOVERNANCE PILLAR IMPACTS

Governance Pillar
Accountability
Legal, Regulatory, & Institutional Compliance
Stakeholder and Shareholder Engagement
Shareholder Rights
Transparency

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

N/A

LEARNINGS AND RESULTS

How did this project inform your organization's sustainability approach?

This project confirmed that sustainability projects could be profitable for IIC and encouraged further sustainable product development projects within our organization.

What went well during this project?

Research proving value of milk protein and fat in animal diets, and increased brand recognition for the product.

What would you change if you did this project again?

We would try to capture more of the milk supply at the beginning of the project. We were uncertain how the product would be received, so we started with a small project. Knowing what we now know, we could have started with a larger number of bottlers to have a greater impact.

What were the next steps that resulted from this project?

We introduced it to the international market which allowed us access to a new market (calf milk replacer) to expand into other upcycled ingredients (e.g., cheese, fats).

ADDITIONAL INFORMATION AND LINKS

Please see our website (<https://iicag.com/products/swine/> and Nutri-

Gold® Dried Milk Product Features).



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Comparative Sustainability of Essential Amino Acids (EAAs) from Animal-Based Proteins and Vegetable Proteins

SUBMITTER INFORMATION

Submitter Name: David L. Meeker, Ph.D., MBA

Submitter Title: Sr. VP Scientific Affairs

Submitter Organization: North American Renderers Association

Submitter Email: dmeeker@nara.org

Submitter Phone Number: 703-683-2633

CASE STUDY OVERVIEW

Project Title: Comparative Sustainability of Essential Amino Acids (EAAs) from Animal-Based Proteins and Vegetable Proteins


Project Geographic Scope: North America

Project Partners: Decision Innovation Solutions, Economic Research Firm

Duration: 6 months

Feed Value Chain Focus	
Crop Inputs	
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	●
Rendering, Co-Products, & By-Products	●
Live Animal Production	●
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	
Innovation	
Circularity	●

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	
Farmer Awareness	
Relationships with External Stakeholders	
Learnings Leveraged for Other Projects	
Other (Please Specify): Information to enhance usage of processed by-products and thus increase circularity and sustainability of animal production and pet care.	

Project Overview:

In comparing the environmental footprint of animal food production with that of crop cultivation, often the comparison is just made on a raw weight basis. However, to accurately compare animal-based food and feed products to crop products, a much more accurate assessment can be made if the comparisons are made considering the quality of the proteins being assessed. Doing the assessment on an essential amino acids (EAA) perspective provides both a qualitative and a quantitative assessment of how the sustainability of animal-based products and by-products compare. This is important because, while sources of proteins can be either animal or vegetable foods, broadly speaking, the nutritional value of vegetable proteins is lower than that of animal ones. The former has a deficient and/or an unbalanced EAA content. Whey protein, animal meats, meat by-products and eggs, for example, contain high levels of all the EAAs, while only soybeans and quinoa come close to those protein levels as a crop source.

Project Key Performance Indicators:

Research project managed and monitored by the Fats and Proteins Research Foundation (FPRF), David L. Meeker, Ph.D., Director of Research

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	●
People	
Human Health & Wellness	
Communities	
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Providing information so animal nutritionist can use more rendered proteins in diets was an important component for the effort. The project is on-going and the effectiveness is yet to be determined.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	●
Water Quality	
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Inclusion of the highest possible usage of recycled and processed by-products in animal feed can reduce waste and reduce land use for animal feed production.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	●
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

The information provided by this project could lead to increased transparency and accountability for the actual footprint of feed rations. This would enable nutritionists to account more accurately for true environmental footprint at a deeper level than is currently possible.

LEARNINGS AND RESULTS

How did this project inform your organization’s sustainability approach?

Information can be used to inform animal nutritionists so they can more readily use rendered proteins in diet formulations.

What went well during this project?

The project is not yet finished. Preliminary work indicates that substantial reductions in GHG emissions could be achieved if rations were balanced on essential amino acids rather than solely on protein levels. Inclusion rates of animal byproduct-based protein products in hog and poultry rations were increased compared to current inclusion rates.

What would you change if you did this project again?

Some of the commodities studied have little information on GHG emissions from production, and methods used are not standard across all.

What were the next steps that resulted from this project?

Publication of results and plans to increase awareness among nutritionists. The information will enhance usage of processed by-products and thus increase the circularity and sustainability of animal production and pet care.

ADDITIONAL INFORMATION AND LINKS

<http://www.nara.org>; <http://www.fprf.org>; <http://www.decision-innovation.com/>



THE FEED SYSTEMS SUSTAINABILITY SUMMIT

Feeding Oats to Beef Cattle

Small Grains in the Corn Belt:

A Gateway to Regenerative Agriculture

SUBMITTER INFORMATION

Submitter Name: Carol Healy

Submitter Title: Program Director, Agriculture & Environment

Submitter Organization: Sustainable Food Lab

Submitter Email: chealy@sustainablefood.org

Submitter Phone Number: 978-290-1064

CASE STUDY OVERVIEW

Project Title: Feeding Oats to Cattle. Small Grains in the Corn Belt: A Gateway to Regenerative Agriculture

Project Geographic Scope: Iowa

Project Partners: Beef Feeding Trial Project Partners: Sustainable Food Lab, Practical Farmers of Iowa, McDonald's Corporation, Couser Cattle Company

Duration: The small grains beef feeding trial was eight months, though about 20 months total when considering trial design and analyses. The feeding trial was a component of a Conservation Innovation Grant (CIG) and a pre-competitive collaboration between companies and non-profits that is in its sixth year.

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	●
Innovation	
Circularity	

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	
Learnings Leveraged for Other Projects	
Other (Please Specify): The project is fundamentally a pre-competitive collaboration with learnings shared across the industry and supply chain.	●

Project Overview:

The cattle small grain feeding trial tested the inclusion of oats into cattle feed rations. The trial was designed by Practical Farmers of Iowa and Sustainable Food Lab, and partially sponsored by McDonald's Corporation, which was interested in tracking animal, economic and GHG benefits of the feeding intervention. The trial evaluated the animal performance and health outcomes, along with greenhouse gas emissions impacts; it also evaluated farm feasibility and economics of incorporating oats and displacing corn.

Today, the Corn Belt is dominated by two crops, corn and soybeans. Crop rotation is one of the most important principles of regenerative agriculture and a key to unlocking low-emission cropping systems. Livestock feed is a primary driver of what crops are grown in the Midwest. This trial aimed to build the environmental case for driving market demand for oats in an extended rotation system and was a component of a broader pre-competitive initiative among food and beverage companies, the Sustainable Food Lab, and Practical Farmers of Iowa called Small Grains in the Corn Belt.

Project Key Performance Indicators:

Cattle performance, health and quality measurements: Dry matter intake, animals that received health treatment, morbidity, mortality, carcass yield and USDA quality grade.

Environmental measurements: GHG emissions from feed to farm-gate, modeled using the Cool Farm Tool. Water quality indicators as proxies given historic tile water field monitoring and Fieldprint Calculator models, as well as other Fieldprint Calculator indicators (biodiversity, etc.)

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	●
Communities	
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Core to this project is supporting the capacity of technical and trusted advisors to coach, provide support, and offer peer networks to farmers in order to reduce farmer risk of practice change. This is a critical component of any program or project aimed at behavior change on the ground. More diverse crop rotations have proven water quality improvement outcomes, which are essential in many communities of the Corn Belt that are suffering from ground and surface water contamination.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	
GHG Emissions	●
Land, Marine, & Resource Use	
Waste	
Water Quality	●
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

A small grain and legume cover crop grown in an extended rotation with corn and soybean compared to a typical corn/corn or corn/soybean rotation has material environmental impacts. We have collected farm production data and modeled environmental impacts using the Cool Farm Tool and Fieldprint Calculator, as well as collected tile water samples.

The key takeaways of the data analyses are:

1. The extended rotation offers reduced GHG emissions through source reduction and synthetic inputs (biological nitrogen from the legume cover crop displaces up to 1/2 of the corn nitrogen application) and,
2. Ground cover and root systems store water and retain pollutants with 1/2 to 1/3 nitrate concentration in tile water compared to the corn/soy system.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	●
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

N/A

LEARNINGS AND RESULTS

How did this project inform your organization's sustainability approach?

The results indicated that a crop diversification strategy within the feed industry could be a catalyst for landscape change and realize material GHG reductions. However, it is not a quick win and will require collaboration and co-investment with other grain buyers in the supply chain to share in costs and benefits of more diverse rotations on the landscape.

What went well during this project?

The feeding trial successfully answered the initial question of whether cattle could achieve the same performance on an oat ration versus a standard corn ration. The cattle groups resulted in no statistical difference in body weights, cattle performance or carcass quality. It cost more to finish cows on an oat ration because oats are more expensive than corn on a pound-for-pound basis and cows require more oats to achieve the same gain as corn.

The trial also provided topline findings on the GHG emissions impact of incorporating a small grain into the feed ration to finish cattle. At the farmgate, GHG emissions are reduced when you account for carbon sequestration of red clover, though modest. At scale, there is significant emissions reductions impact potential on the landscape. This revealed that the economics at the finishing stage and the complexity of accounting for benefits do not justify the modest GHG benefits at the farm gate.

See more detail on the project results here: https://sustainablefoodlab.org/wp-content/uploads/2021/11/Outcomes-of-Inclusion-of-Oats-in-Finishing-Beef-Rations_11.2.21-Final.pdf

What would you change if you did this project again?

We would have had the cattle farmer grow the small grain versus buying the small grain in order to evaluate the whole farm economic impact.

What were the next steps that resulted from this project?

The trial revealed that there are further areas of exploration to be addressed in order for the feed industry to activate a crop diversification strategy. These include:

1. Understand the optimal small grains ration that balances costs with GHG and regenerative benefits. The economics may not be right at the finishing stage for small grain inclusion.
2. Evaluate the manure management benefits, including GHG emissions changes, from applying manure in an extended rotation system (small grain, legume cover crop, corn/soy). Sustainable Food Lab, Practical Farmers of Iowa, and Smithfield, Inc. are engaging in a pilot project.
3. While inclusion of oats at the finishing stage may not be the quick win lever for the feed industry to create market pull for more diverse rotations, we plan to model a cover crop after corn scenario to understand how that would contribute to more diverse crops in the Midwest. Our logic is that a cover crop after corn commitment would generate demand for small grain cover crop seed which would drive more small grain production in the Midwest. We are scoping this commitment and the needed infrastructure with project partners.

ADDITIONAL INFORMATION AND LINKS

Article with project summary: <https://sustainablefoodlab.org/what-we-learned-feeding-oats-to-cattle/>

Video highlighting the project: <https://www.youtube.com/watch?v=R7N5VR5DOA8>

Greenhouse Gas Outcomes of Inclusion of Oats in Finishing Beef Rations:
https://sustainablefoodlab.org/wp-content/uploads/2021/11/Outcomes-of-Inclusion-of-Oats-in-Finishing-Beef-Rations_11.2.21-Final.pdf

Inclusion of Oats in Finishing Beef Rations: <https://practicalfarmers.org/research/inclusion-of-oats-in-finishing-beef-rations/>

Small Grains in the Corn Belt project website: <https://sustainablefoodlab.org/initiatives/smallgrains>



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Converting a Truck Fleet from Diesel Power to Renewable Biofuels Generated by CA Dairies

SUBMITTER INFORMATION

Submitter Name: Dan Rice

Submitter Title: QA Director

Submitter Organization: Western Milling

Submitter Email: drice@westernmilling.com

Submitter Phone Number: 559-747-9494

CASE STUDY OVERVIEW

Project Title: Converting a Truck Fleet from Diesel Power to Renewable Biofuels Generated by CA Dairies

Project Geographic Scope: California's Central Valley

Project Partners: <https://calbioenergy.com/>

Duration: 12 months

Feed Value Chain Focus	
Crop Inputs	
Feed Grain and Oilseed Processing	
Feed Ingredients	
Feed Milling and Manufacturing	●
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	
Innovation	
Circularity	●

Impacts to Organization	
C-Suite Alignment	●
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	

Project Overview:

In early 2020 Western Milling began a project that involved two main initiatives:

1. Converting the company owned diesel truck fleet over to natural gas, and
2. Building a fueling station of renewable natural gas sourced from California dairies.

Project Key Performance Indicators:

Reduced diesel gallons purchased, lowered carbon emissions

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	
Communities	●
Worker Safety	
Technical Capacity	●

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

Our local community of Goshen, CA will benefit due to the lowered diesel emissions from Western Milling (WM) operations. CalBio has been a tremendous partner in supporting this WM initiative and assisting with plans for the long term.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	●
Water Quality	
Water Usage	

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

1. By taking nearly 40 diesel powered tractor trailers off the road and replacing them with near zero emission RNG power units, we are contributing to much improved air quality in the California Central Valley.
2. Buying RNG from biogas digesters helps to solidify the market for this fuel and ensure that methane is not released into the atmosphere.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	●
Legal, Regulatory, & Institutional Compliance	●
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

1. Ensuring that WM is tracking to stay compliant with CA's clean targets and directives issued by the Air Board.
2. Establishing a way to lower fuel costs and minimize freight charges to customers as much as possible, passing through savings.

LEARNINGS AND RESULTS

How did this project inform your organization's sustainability approach?

Buying RNG back from the dairies that WM hauls feed to is fundamental component of our view of circularity in California.

What went well during this project?

Timeline adherence of building the fueling station was very good along with delivery of the CNG trucks.

What would you change if you did this project again?

We would have included more compression capacity at the onset to ensure the potential of fast fueling for more customers

What were the next steps that resulted from this project?

Ordering of additional CNG trucks to add to the WM fleet.

ADDITIONAL INFORMATION AND LINKS

<https://krusewesternrenewablefuels.com/>

AFIA blog post on this topic from June 2022:

<https://www.afia.org/news/afia-blog/fueling-a-fleet-of-feed-trucks-with-dairy-waste/>



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



Benefits & Trade-Offs of Food Waste-to-Feed Pathways

SUBMITTER INFORMATION

Submitter Name: Leigh Prezkop

Submitter Title: Senior Program Officer

Submitter Organization: World Wildlife Fund

Submitter Email: leigh.prezkop@wwfus.org

Submitter Phone Number: (805)345-6239

CASE STUDY OVERVIEW

Project Title: Benefits & Trade-Offs of Food Waste-to-Feed Pathways

Project Geographic Scope: US

Project Partners: Quantis and WWF. WWF also hosted an advisory committee for the project with members from: Burnbrae Farms, USDA, EPA, Evonik, Penn State University, University of Arkansas, University of British Columbia, Tyson foods, University of California, Davis, Granico, The Kroger Co., and the University of Wageningen

Duration: 6 Months

Feed Value Chain Focus	
Crop Inputs	
Feed Grain and Oilseed Processing	
Feed Ingredients	●
Feed Milling and Manufacturing	●
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	
Live Animal Production	
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	
Other (Specify)	

Relevant Themes	
Responsible Sourcing	
Regenerative Agriculture	
Innovation	●
Circularity	●

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	
Farmer Awareness	
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●
Other (Please Specify):	

Project Overview:

The objectives of this work included:

- Understanding whether there are environmental benefits when using feed made from food waste in layer's diet in the US
- Evaluate the environmental impacts of producing 3 food-waste-based alternative feed ingredients:
 - black soldier fly meal, derived from processed black soldier fly larvae (BSFL) into meal and fed to layers (larvae's feed is made from retail produce waste),
 - Food waste feed, as chemically digested food-waste pellets made from retail produce waste and,
 - Bakery meal, made from bakery waste.

Project Key Performance Indicators:

This research was performed using Life-Cycle Assessments (LCAs). The impact indicators used in the LCAs included: global warming potential, water consumption, marine eutrophication, land use and land transformation, nitrogen assessment, and resource use fossils.

Results showed that including food-waste-based ingredients in hen layers' diets can lead to environmental trade-off, mostly increases in the carbon footprint and potential water consumption while providing benefits to land use, land use change, and marine eutrophication. These findings indicate that the use of food waste as feed for laying hens has the potential for only modest environmental improvement, while carrying risks of significantly higher environmental impact.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	
People	
Human Health & Wellness	
Communities	
Worker Safety	
Technical Capacity	

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

N/A

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	●
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Not necessarily the highest priority, but the indicator that showed a result that WWF was interested in pursuing was the potential for reduced land conversion associated with reduced corn and soybean usage in animal feed. Next steps are to look at landfill as an end-of-life destinations versus feed because running rough numbers through ReFED's Impact Calculator reveals that it could change the overall GHG equation.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	
Shareholder Rights	
Transparency	●

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

This work provided companies with insight of their impact of traditional ingredients in animal feed.

LEARNINGS AND RESULTS

How did this project inform your organization's sustainability approach?

This report reaffirmed many assumptions that the emphasis should be kept on preventing food waste, wherever possible, as the top priority. However, there is a full realization that there will always be some percentage of unavoidable food waste that cannot be prevented, and that unavoidable food waste must be managed via a circular system, never landfilled.

As WWF works with companies and businesses investing, exploring, and innovating on waste-to-feed, we will ensure that each product, and each ingredient is assessed on a case-by-case basis to avoid unexpected environmental consequences.

The study showed that GHG footprints can vary between different waste-to-feed pathways. Energy usage can be a determining factor in terms of a feed processors' emission ranking. Use of renewable energy and other efforts should be employed to minimize carbon impacts within processing operations.

The most impactful learning from this study for WWF was that waste-to-feed pathways have the potential to provide modest benefits from a land footprint perspective when replacing commodity grains. It's possible to decrease demand for corn and soy by utilizing larger amounts of food waste for feed which could have a positive impact on further land use change and native habitat conversion in places like the Northern Great Plains.

What went well during this project?

Considering the short timeline that was provided, the feedback from our advisory committee (listed above) was critical in helping to establish the most significant parameters for the project and LCAs. WWF always prioritizes key stakeholder group feedback both internally to the organization, and external to WWF.

What would you change if you did this project again?

In addition to that response, we'd explore additional novel ingredients like insect meal, other grocery store items, and seaweed.

What were the next steps that resulted from this project?

Understanding the emissions associated with sending food waste to landfill, or other waste management systems. This would have been an added complexity to the project since we were already looking at three different pathways with carbon accounting standard practices. This might show added climate benefits that could change the overall GHG equation.

ADDITIONAL INFORMATION AND LINKS

https://files.worldwildlife.org/wwfcmsprod/files/Publication/file/2q8g6qmx4s_WWF_NoFoodIV_Waste_to_Feed_Pathways.pdf?_ga=2.250415492.36601812.1661366202-633673847.1638558752



THE FEED SYSTEMS SUSTAINABILITY SUMMIT



THE FUTURE OF FEED:

How Low Opportunity Cost Livestock Feed
Could Support a More Resilient UK Food
System

SUBMITTER INFORMATION

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CASE STUDY OVERVIEW

Project Title: Future of Feed - How Low Opportunity Cost Livestock Feed Could Support a More Resilient UK Food System

Project Geographic Scope: UK-focused, but applicable globally

Project Partners: Other WWF Network offices

Duration: 12 months

Feed Value Chain Focus	
Crop Inputs	●
Feed Grain and Oilseed Processing	●
Feed Ingredients	●
Feed Milling and Manufacturing	
Feed Manufacturing Equipment	
Pet Food Manufacturing	
Rendering, Co-Products, & By-Products	●
Live Animal Production	●
Food Animal Processing	
Further Processing	
Retail, Food, Service, and Distribution	●
Other (Specify)	

Relevant Themes	
Responsible Sourcing	●
Regenerative Agriculture	●
Innovation	●
Circularity	●

Impacts to Organization	
C-Suite Alignment	
Broader Internal Awareness	●
Increased Investment Opportunities	
Return on Investment	
Carbon Footprint	●
Farmer Awareness	●
Relationships with External Stakeholders	●
Learnings Leveraged for Other Projects	●

Project Overview:

In this report, WWF-UK have developed a new perspective for looking at the environmental impact of feed and of livestock systems: exploring the impact of the livestock feed system through the lens of opportunity cost.

In the rapid development of net zero ambitions (both private and public), the environmental impact of agriculture has often been distilled into CO2e metrics. This has a number of flaws; it can encourage intensification, CO2e is not necessarily the best metric for the ruminant sector and a carbon-focused lens doesn't consider other important environmental impacts, such as biodiversity or water.

This exploratory report outlines the opportunity to do things differently. We introduce the new concept of 'opportunity cost' as a metric of the environmental sustainability of the feed system. In introducing this concept, we explore a scenario where instead of using land to grow crops for animals to eat, we use these crops to feed humans. Using this as a theoretic constant, we then explore how to prioritize and make best use of "low opportunity cost" animal feed sources that do not compete with human nutrition, such as grass, by-products, wastes and innovations such as insect feed. We map how the size and relative make-up of the UK livestock sector would change under this conceptual scenario, measure the environmental and food security benefits and consider the public and business policy changes that would make shifts towards such an approach in a series of recommendations.

In launching the report in the UK, we've had considerable amounts of positive feedback from the UK agriculture sector, particularly the ruminant sector who found the approach of using a non-CO2e-based metric to measuring the environmental impact of agriculture refreshing (given the bad press ruminants can get for causing climate change).

Project Key Performance Indicators:

Coverage and interest. In the first week, the report got over 400 downloads in the UK, was mentioned in 146 press articles and reached 2.9 million people.

The Agricultural Industries Confederation (AIC), the agrisupply industry's leading trade association, called the report a 'Curate's Egg', and said that whilst the feed sector take exception to some of the assumptions, some parts of the report were 'excellent'.

PEOPLE PILLAR IMPACTS

People Pillar	
Feed Safety & Food Safety	●
People	●
Human Health & Wellness	●
Communities	●
Worker Safety	
Technical Capacity	

Which two People indicators were the highest priority for your project and how did your project impact those two indicators?

People and communities.

This report focused on changing the narrative around 'land sparing' (areas of intensive agriculture and areas of trees (with agricultural and rural communities potentially removed) to 'land sharing' approaches. The vision in the report seeks to recognize, and not compromise, agricultural and rural communities and landscapes in the UK. The report finds a path where the benefits that farmers and rural communities bring to food production, landscapes and rural economies can be maintained, with nature and carbon increased.

PLANET PILLAR IMPACTS

Planet Pillar	
Energy	●
GHG Emissions	●
Land, Marine, & Resource Use	●
Waste	●
Water Quality	●
Water Usage	●

Which two Planet indicators were the highest priority for your project and how did your project impact those two indicators?

Land and resource use; through highlighting how much land and resources we dedicate to feeding animals, instead of people. To address this, we show how we can have a thriving agricultural sector (and meet dietary protein requirements) through a focus on low opportunity cost feeds.

GHG emissions; through highlighting how we need a multi-metric approach to assessing the positive and negative environmental impacts of agriculture, and that CO2e is too much of a blunt tool.

GOVERNANCE PILLAR IMPACTS

Governance Pillar	
Accountability	
Legal, Regulatory, & Institutional Compliance	
Stakeholder and Shareholder Engagement	●
Shareholder Rights	
Transparency	

Which two Governance indicators were the highest priority for your project and how did your project impact those two indicators?

The six key recommendations provide WWF-UK's advocacy strategy on feed and agriculture to the food and farming sector, as well as UK government. However, we feel these recommendations, and the findings of our conceptual analysis, have international resonance and could prompt interesting discussions.

LEARNINGS AND RESULTS

How did this project inform your organization's sustainability approach?

This report really showcases how we must use a multi-metric approach to assessing the environmental impact of agriculture. CO2e is a blunt tool that could have significant unintended consequences. Furthermore, we highlight the important role of livestock (and ruminants in particular) in regenerative agriculture to create circular systems that maximize the benefit of low opportunity cost feeds. Finally, we recognize the importance of innovation in the feed sector, to again maximize the benefit of low opportunity cost feeds. These 'innovations' include wastes, by-products, insects, seaweed etc.

All of these findings, plus all the analysis of the report (<https://www.wwf.org.uk/learn/low-opportunity-cost-feed>) will support WWF-UK's advocacy on feed in the UK. However, we feel the findings are likely to be similar for other countries with developed feed and agriculture sectors, so would like to share our findings as a case study which could have global synergies.

What went well during this project?

Engagement with the agricultural sector, innovative findings and research, feedback from WWF offices across the international network, and creating evidence to showcase the positive role livestock can play/have to play in regenerative and resilient food systems.

What would you change if you did this project again?

More engagement with the feed sector, particularly prior to launch.

What were the next steps that resulted from this project?

We have 6 clear recommendations, which we want to engage the feed and agriculture sector on, prior to launching an advocacy strategy around the report and those recommendations.

ADDITIONAL INFORMATION AND LINKS

Here is the link to the webpage - <https://www.wwf.org.uk/learn/low-opportunity-cost-feed>

Here is a press link to one article - <https://www.independent.co.uk/climate-change/news/wwf-norfolk-yorkshire-b2113317.html>

Here is a Twitter thread that distils the findings of the report - <https://mobile.twitter.com/CallumAgric/status/1542756789216763904>