



Feed Sustainability Insights: Stakeholder Needs & Ingredient Footprints

Lara Moody, Executive Director, IFEEDER

IFEEDER: Advancing understanding and trust in a sustainable feed and pet food supply chain through timely research and education.



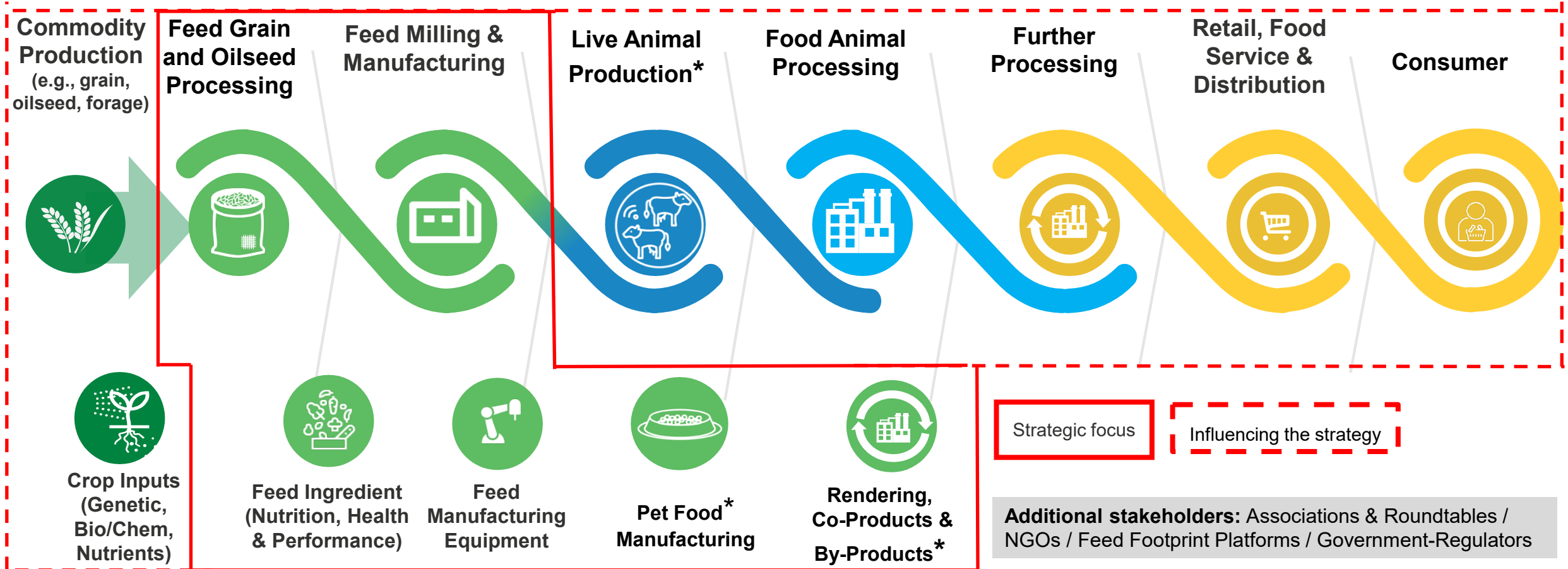
These resources were created with input and funds from IFEEDER Advisory Group Members & Contributors



Advancing Sustainability Throughout the US Animal Food Industry









WE ARE ALL IN THIS TOGETHER






Key: ● Suppliers ● Feed industry ● Downstream customers



How does the U.S. feed industry define sustainability?

Sustainability in the U.S. animal food industry is defined and managed by each individual organization to deliver measurable, continuous improvements on the impacts related to people, planet and governance that are most important to them and their stakeholders.

 Commodity Production (e.g., grain, oilseed, forage)	 Feed Grain and Oilseed Processing	 Feed Milling & Manufacturing	 Live Animal Production	 Food Animal Processing	 Further Processing	 Retail, Food Service & Distribution	 Consumer
<ol style="list-style-type: none"> Balchem Corporation Cargill Innovation Center for US Dairy Maxi-Lift Inc NPB SmithBucklin/United Soybean Board Sustainable Oils 	<ol style="list-style-type: none"> Balchem Corporation Cargill Innovation Center for US Dairy Maxi-Lift Inc SmithBucklin/United Soybean Board Sustainable Oils 	<ol style="list-style-type: none"> AgState Balchem Corporation Belstra Milling Co Cargill Chant ED&F Man Kauffman's Animal Health, Inc. Kent Nutrition Group Safe-Grain The HANOR Company Tyson Foods United Animal Health Western Milling 	<ol style="list-style-type: none"> Balchem Corporation Belstra Milling Co Colorado State University Innovation Center for US Dairy JBS Kent Nutrition Group Maxi-Lift Inc NPB The HANOR Company Tyson Foods United Animal Health US-RSPE 	<ol style="list-style-type: none"> Cargill Innovation Center for US Dairy JBS North American Meat Institute NPB Tyson Foods US-RSPE 	<ol style="list-style-type: none"> Balchem Corporation Cargill JBS North American Meat Institute Sustainable Oils Tyson Foods US-RSPE 	<ol style="list-style-type: none"> Bill Barr and Company Innovation Center for US Dairy JBS Nestle Purina PetCare NPB Restaurant Brands International US-RSPE 	<ol style="list-style-type: none"> Balchem Corporation Innovation Center for US Dairy Nestle Purina PetCare NPB Restaurant Brands International

 Crop Inputs (Genetic, Bio/Chem, Nutrients)	 Feed Ingredient (Nutrition, Health & Performance)	 Feed Manufacturing Equipment	 Pet Food Manufacturing	 Rendering, Co-Products & By-Products	
<ol style="list-style-type: none"> Balchem Corp. BASF Bayer Crop Science Innovation Center for US Dairy Kemin Industries Phibro Animal Health Western Milling 	<ol style="list-style-type: none"> AB Vista AgState APC, LLC Arm & Hammer Animal and Food Production Balchem Corp. Balchem Corporation BASF Berg+Schmidt America, LLC Bill Barr and Company BioZyme Incorporated Cargill CJ Bio Daybrook Fisheries, INC. DSM Animal Nutrition & Health 	<ol style="list-style-type: none"> ED&F Man Elanco Flavor & Fragrance Specialties Innovation Center for US Dairy International Ingredient Corporation Kauffman's Animal Health, Inc. Kemin Industries Kent Nutrition Group Micro-Lite, LLC Oligo Basics USA LLC Phibro Animal Health The Peterson Company UNITED ANIMAL HEALTH Western Milling Zinpro Corp 	<ol style="list-style-type: none"> Hayes & Stolz Industrial Mfg. Co. Maxi-Lift Inc Walinga USA Inc 	<ol style="list-style-type: none"> Balchem Corporation Cargill Kent Nutrition Group Nestle Purina PetCare Tyson Foods US-RSPE 	<ol style="list-style-type: none"> Cargill Innovation Center for US Dairy International Ingredient Corporation JBS Kent Nutrition Group The Peterson Company Tyson Foods

Key:  Suppliers  Feed industry   Downstream customers

Animal Food Industry: Sustainability Trends

96%*

of organizations expect to continue advancing their sustainability journeys in the future.



Current State

Animal food industry is early in its sustainability journey.

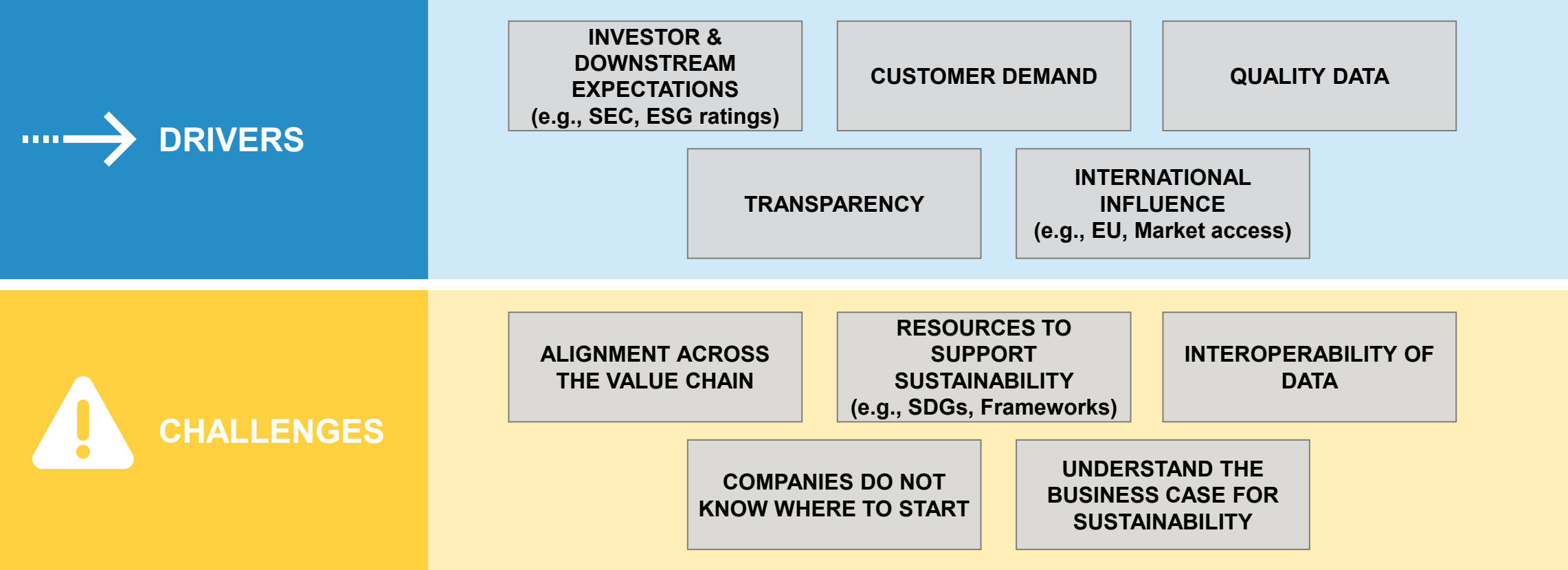
Some are getting started, some further advanced.



Future State

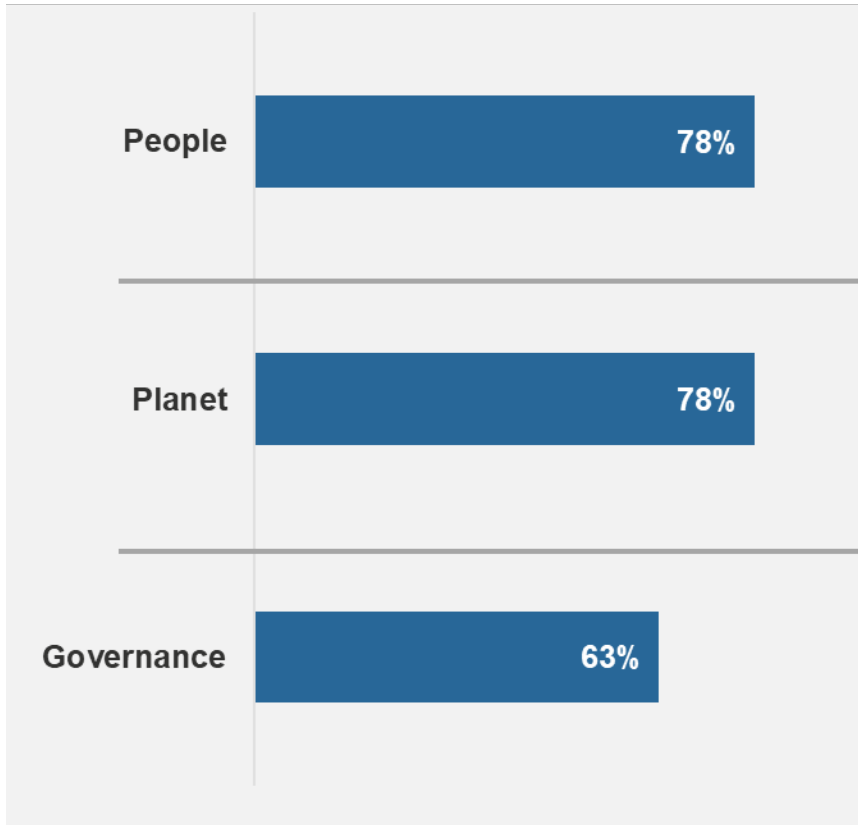
Additional expectations from customers, investment capital expectations, and regulators will require industry to accelerate efforts.

Drivers & Challenges to Advance Sustainability for the US Animal Food Industry



N = 20

FREQUENCY OF THE PILLARS IDENTIFIED AS APPLICABLE TO THE ORGANIZATION'S CURRENT SUSTAINABILITY STRATEGY



ALLOCATION OF 100 POINTS TO THE PILLARS BY LEVEL OF IMPORTANCE

	MIN	AVG	MAX
People	10	48	100
Planet	10	42	100
Governance	5	23	40

INTERVIEW INSIGHTS

- “Most within company think of sustainability as planet but trying to transition more to think of the social side”
 - “Extremely important to attract good talent”
 - “Very important but hardest stories to tell”
-
- “This is where the consumer expectations are going to come from. Expect it to escalate significantly, on what expectations are GHG, water quality and usage.”
 - “There are going to be increasingly more resource constraints. It will become more obvious about how important it is and how constrained resources will be”
-
- “The governance and regulatory pillar is going to grow more rapidly compared to the others.”
 - “Without governance, can’t do what we can with people and planet.”

Material Issues Considerations

People	Planet	Governance
<ul style="list-style-type: none">• Feed Safety & Food Safety• Human Capital• Human Health & Wellness• Social Good & Helping Communities• Worker Safety	<ul style="list-style-type: none">• Energy Use• GHG• Land, Marine & Resource Use• Waste• Water Quality• Water Usage	<ul style="list-style-type: none">• Accountability• Legal, Regulatory & Institutional Compliance• Stakeholders & Shareholders• Shareholder Rights• Transparency

Material Issues Considerations

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Most relevant & applicable issue from industry survey of 48 organizations

Material Issues Considerations

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IN PARTNERSHIP WITH

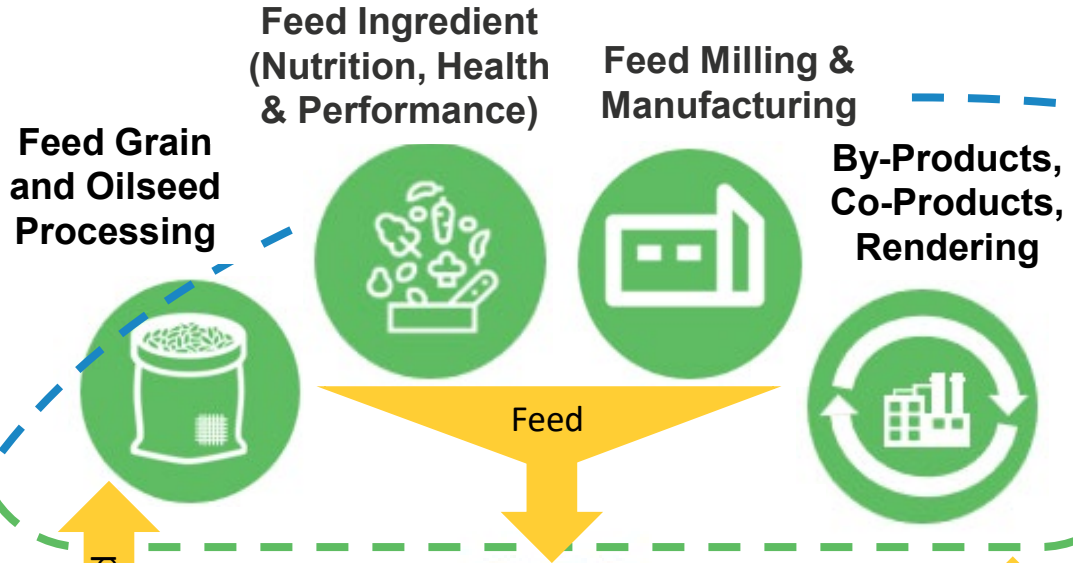
IOWA STATE UNIVERSITY

Resources Available:

- Issue description & importance to the industry
- Feed industry examples



RATION INNOVATION



INFLUENCING FEED'S ENVIRONMENTAL FOOTPRINT

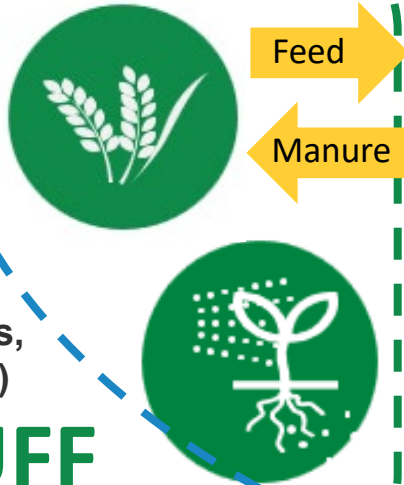
RESPONSIBLE SOURCING

Commodity Production (e.g., grain, oilseed, forage)

Practices (4Rs, No Land Conversion, Conservation)

Crop Inputs (Genetics, Bio/Chem, Nutrients)

FEEDSTUFF PRODUCTION








Live Animal Production

CIRCULARITY








US Roundtables & Associations

The matrix demonstrates the common themes among the metrics that are tracked within each organization.

Focus Indicators					
Greenhouse Gas (GHG)	Intensity Net Zero Strategy to GHG Neutrality	Carbon footprint calculation 40% reduction commitment by 2030	Verification, footprint calculation, emissions reduction Scope 1,2&3, air quality	Emissions reduction Scope 1,2&3 as it ties into climate neutrality for the beef industry by 2040	GHG emissions reduction, supplier engagement
Water Quality	Improve water quality by optimizing utilization of manure & nutrients	Nutrient management, tracking acres of buffer strips/waterways	Nutrient management	Nutrient management, grazing management	Water risk assessment of production sites
Feed Safety & Food Safety	Validation, efficacy, awareness	% Pork traced to packing plant, PQA certification, PQA Plus certification, transportation quality assurance	Verification, compliance, food defense, biosecurity	Food waste in direct operations & their suppliers	Nutrition
Water Usage	Intensity, optimize water use while maximizing recycling	Intensity	Intensity, water stewardship	Water resource management, risk assessment	Water use efficiency, water reduction
Land & Marine Resource Use	Biodiversity impacts, land use change	LCA tracking, barn acres, crop acres	Biodiversity, deforestation / land use change impacts	Biodiversity & land conversion risk impacts, grazing management, nutrient management	Promotion of sustainability production practices

Canadian Roundtables & Associations

The matrix demonstrates the common themes among the metrics that are tracked within each organization.

Focus Indicators					
GHG	Emissions reduction Scope 1,2&3, LCA measurements	Carbon footprint, life cycle assessment	LCA measurements	LCA measurements (Incl. GHG inventory to inform reduction targets)	Carbon Footprint, Net Zero by 2050, LCA, energy
Water Quality		Full water assessment, wet land management	Quality testing	Quality testing	Access to clean water, annual water tests
Feed Safety & Food Safety	Approval process/program, audits/verification	Quality beef, food safety standards	Quality pork, food safety standards, biosecurity	Pest control, biosecurity, feed quality, on-farm food safety	Biosecurity, food safety standards – annually (CFIA recognition)
Water Usage	Working to better understand water intensity – current no metrics	Responsible use	LCA measurements	LCA measurements water use & water stress, sourcing documentation	Water consumption (facility, cows, feed)
Land & Marine Resource Use	LCA measurements	Minimize impacts & pollution, soil health, biodiversity, land use change (expansion of urban areas), manure management (strategy)	LCA measurements, economic factors	Land use acreages to produce per kg unit, certifications, soil health, biodiversity	Land use, Nutrient management, soil health, biodiversity

Companies included in the assessment are focused on the downstream portion of the supply chain



FOOD ANIMAL PROCESSING & FURTHER PROCESSING



RETAIL, FOOD SERVICE & DISTRIBUTION

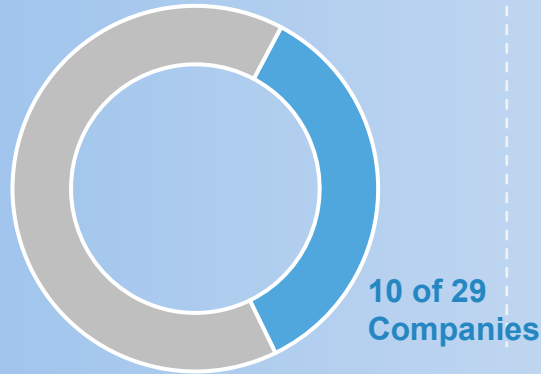
RESTAURANT	RETAIL	FOOD SERVICE & DISTRIBUTION	CONSUMER PACKED GOODS

This is a representative sample not an exhaustive list of companies.

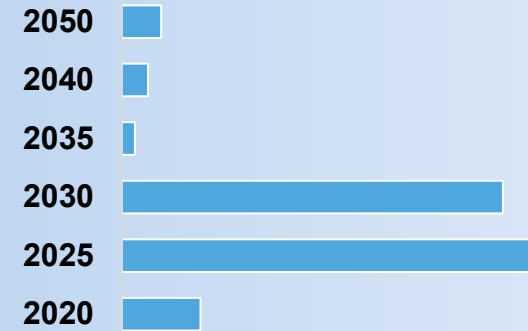
DOWNSTREAM COMPANIES

29 out of 35
companies have
made goals
related to the
indicators

COMPANIES REPORTING ON PROGRESS TOWARD GOALS



TIME FRAME FOR GOALS



The downstream customers are at various stages of their sustainability journeys with some sectors' **goals** spanning more indicators than others

Goals are external facing objectives

- ✓ High > 20%
- ✓ Med 10 – 20%
- ✓ Low < 10%

PILLAR	INDICATOR	Food Animal Processing & Further Processing	Restaurant	Retail	Food Service & Distribution	Consumer Packaged Goods
PEOPLE	1. FEED SAFETY & FOOD SAFETY	5%			5%	2%
	2. HUMAN CAPITAL	10%	5%	10%	10%	11%
	3. HUMAN HEALTH & WELLNESS	9%	7%	7%		11%
	4. SOCIAL GOOD/HELPING COMMUNITIES	7%	7%	8%	5%	5%
	5. WORKER SAFETY	5%				3%
PLANET	6. ENERGY USAGE	19%	9%	7%	10%	8%
	7. GHG (Scope 1, 2 & 3)	7%	19%	19%	15%	16%
	8. LAND, MARINE & RESOURCES USE	5%	21%	11%	5%	12%
	9. WASTE	9%	9%	28%	15%	18%
	10. WATER QUALITY					14%
	11. WATER USAGE	6%	7%	4%		4%
	Goal Sample Size	59	43	104	20	162
	Company Sample Size	5	7	9	3	13

This is a representative sample not an exhaustive list of companies.

The downstream customers are at various stages of their sustainability journeys with some sectors' **material topics** spanning more indicators than others

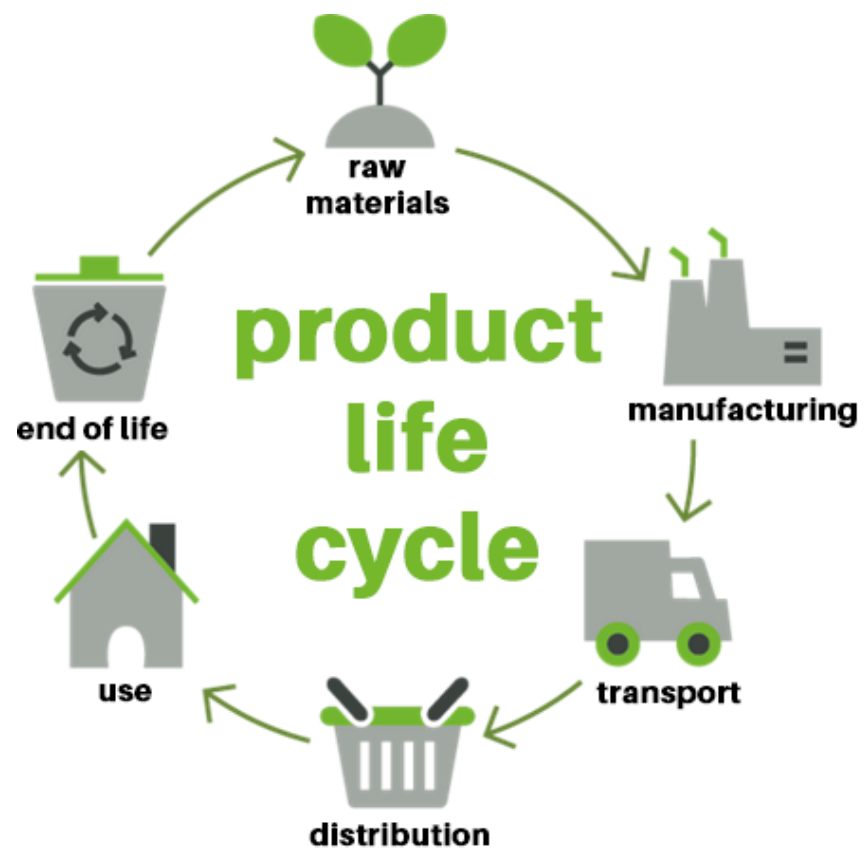
Material topics are topics that reflect an organization's significant economic, environmental and social impacts; or that substantively influences the assessments and decisions of stakeholders (Source: GRI)

- ✓ High > 20%
- ✓ Med 10 – 20%
- ✓ Low < 10%

PILLAR	INDICATOR	Food Animal Processing & Further Processing	Restaurant	Retail	Food Service & Distribution	Consumer Packaged Goods
PEOPLE	1. FEED SAFETY & FOOD SAFETY	11%	11%	7%	14%	11%
	2. HUMAN CAPITAL	6%	11%	12%	10%	10%
	3. HUMAN HEALTH & WELLNESS	6%		11%	10%	8%
	4. SOCIAL GOOD/HELPING COMMUNITIES	11%	11%	9%	10%	7%
	5. WORKER SAFETY	11%		9%	5%	10%
PLANET	6. ENERGY USAGE	8%	7%	4%	10%	6%
	7. GHG (Scope 1, 2 & 3)	14%	19%	16%	10%	17%
	8. LAND, MARINE & RESOURCES USE	8%	7%	7%	10%	7%
	9. WASTE	8%	11%	11%	14%	10%
	10. WATER QUALITY	8%	11%	7%	5%	4%
	11. WATER USAGE	8%	11%	9%	5%	10%
	Material Topic Sample Size	36	27	57	21	89
	Company Sample Size	5	7	9	3	13

This is a representative sample not an exhaustive list of companies.

Life Cycle Assessments



Feed Industry Trends

15 organizations were interviewed to gain their perspectives on the LCA environment



INTERVIEW DETAILS:

The objective of each hour-long interview was to better understand the LCA environment, current and future LCA engagement, and how IFEEDER can support members' needs.

Eleven U.S. organizations and four Canadian organizations were interviewed.



FURST-MCNESS COMPANY

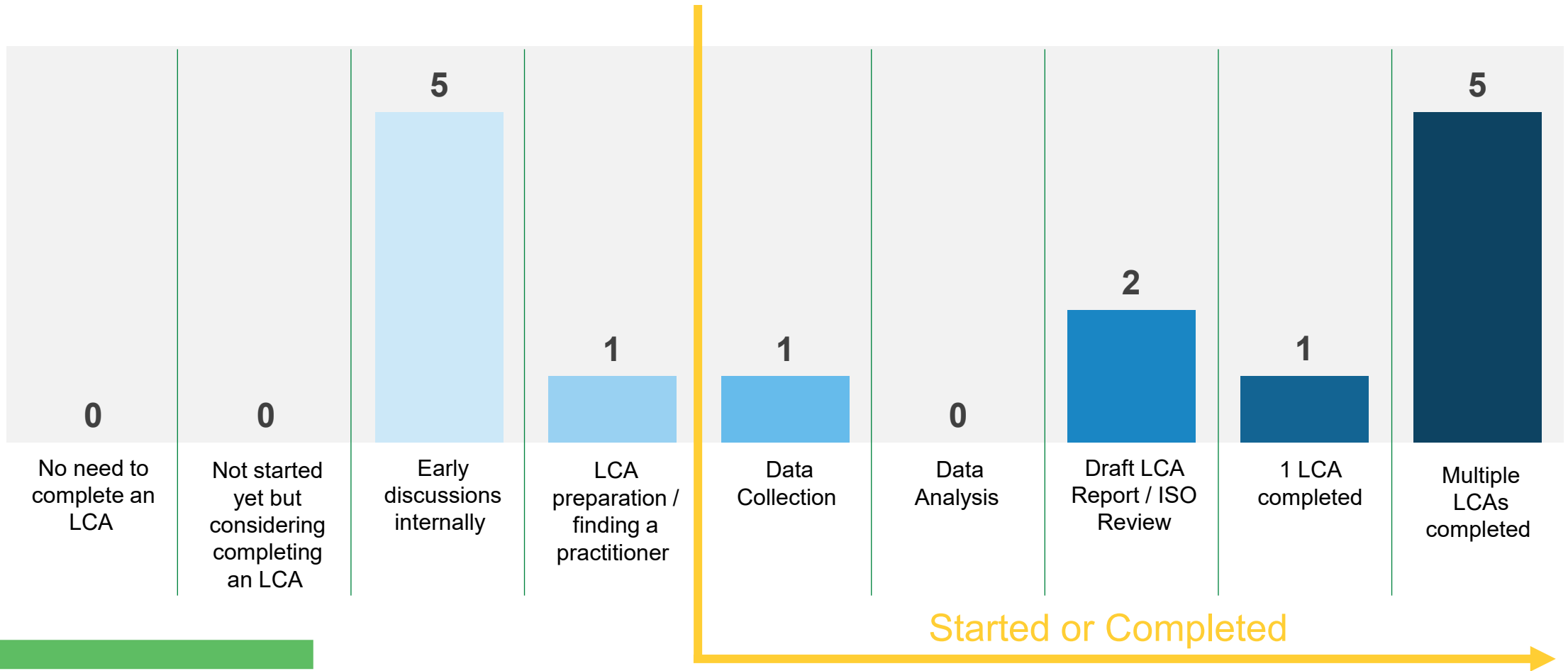


ritchie-smith feeds



LCA Journey

9 out of the 15 interviewees have started or completed an LCA



Interest in Completing an LCA

Of the 6 interviewees who had not completed an LCA, they noted a high level of interest in completing an LCA in the next 5 years

What is your interest level for completing an LCA in the next five years?



Why did you choose that score?

Limitations of resources and time
(cost, people, resources)
Just getting started
Lack of immediate incentive and demand
Need to make the business case first

UNDER 6 OVER

Customer requests (U.S. and EU)
Product specific dependent

Drivers to completing LCAs

Interviewees who both had and had not completed an LCA noted three main drivers for completing and/or pursuing LCAs



Strategy

- Overall company strategy support
- Understanding how much potential value is in a product
- Identify what areas we are doing well in and where we can improve
- Benchmark information to improve upon



Customers

- The ability to have a robust conversation with customers
- Quantifying the potential impact of a specific product for customers
- Customers who are looking to meet their climate goals want proof



Regulatory Pressure

- Reporting obligations
- Regulatory pressures (EU Green Deal)
- Societal and industry pressures for sustainable accounting (e.g., Corporate Sustainability Reporting Directive, PEFCR Feed: Product Environmental Footprint Category Rules)
- Net zero emissions targets and other public commitments

Of the interviewees who had completed an LCA, they mentioned using one of these boundaries shown below relevant to their organization

Cradle to Farm Gate

Cradle to Processor Gate

Cradle to Grave

Commodity Production
(e.g., grain, oilseed, forage)

Feed Grain & Oilseed Processing

Feed Milling & Manufacturing

Live Animal Production

Food Animal Processing

Further Processing

Retail, Food Service & Distribution

Consumer



Crop Inputs
(Genetic, Bio/Chem, Nutrients)

Feed Ingredient
(Nutrition, Health & Performance)

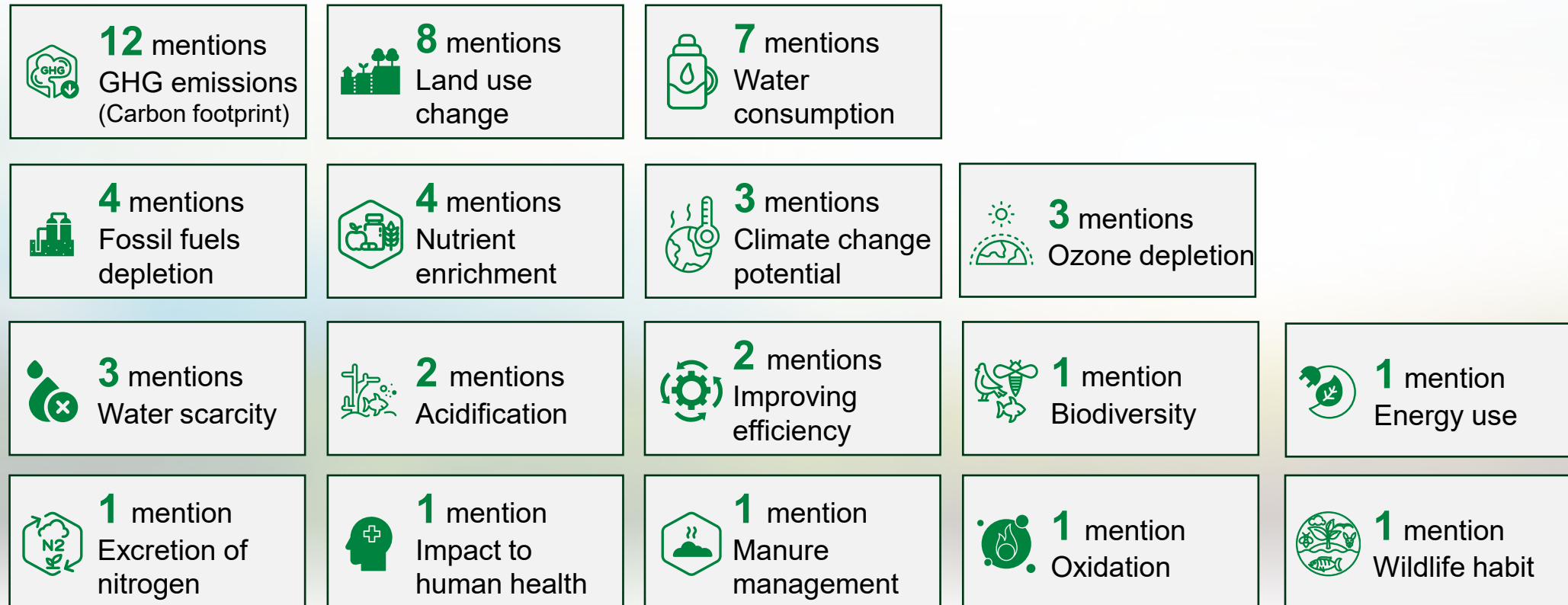
Feed Manufacturing Equipment

Pet Food Manufacturing

Rendering, Co-Products & By-Products

LCA Indicator Mentions

Interviewees who had completed an LCA noted several indicators that they are including in their LCA(s)

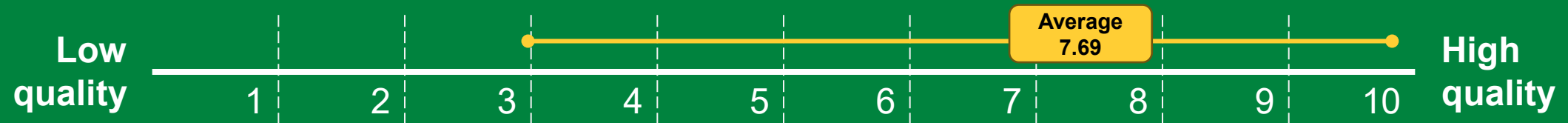


Data Quality

Of the interviewees who had completed an LCA, provide a wide range in their perceived quality in their LCA data

n = 9

What is the quality of the data you using to interface with the LCA?



What efforts are you making to close the quality gap?

Install the necessary processes to **collect missing primary data**

Use the ISO review process to **highlight and address any data quality concerns**

Use data that **traces back all the way to suppliers** and **avoid industry averages** as much as possible

Most organizations use **primary data first** and **gap-fill with secondary data**

Primary data is collected directly from the commercial system operations. This type of data is original and has not been previously collected, aggregated or analyzed.

Secondary data has been collected, aggregated, analyzed and stored by a third party (e.g., government, association, academic studies, or business reports).

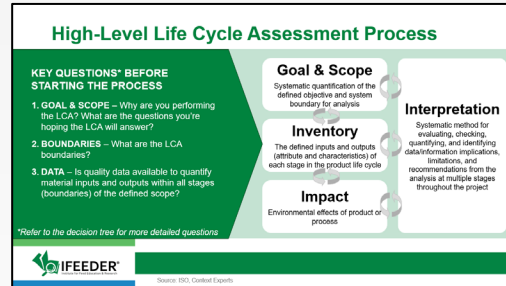
Foreground data – all the necessary raw inputs of your product's lifecycle that are then connected to corresponding impacts in an LCA.

Background data – include energy and materials that are delivered to the foreground system as aggregated data sets in which individual plants and operations are not identified.

For More Details: See the Full Suite of LCA Resources Available

LCA Tools in the IFEEDER Sustainability Toolkit

LCA Process Overview



LCA Glossary

Key Definitions for LCAs

Key Concepts	Definition	Example
Attributional LCA	An LCA modeling approach in which exchanges are attributed to the FU of a product system by taking and/or partitioning the end process of the system according to a normative rule.	Attributional LCA may assess the environmental impacts of different feedstocks used in beefed production based on their production methods and supply chains
Background data	Data that includes energy and materials that are delivered to the foreground system as aggregated data sets in which individual plants and operations are not identified.	N/A
Benchmark	Comparing an organization's sustainability performance to their peers to identify internal opportunities for improvement	N/A
Boundaries	Define the scope of what the Metrics and Targets will cover	Cradle to grave, farm to plate, field to plate, gate to gate
Consequential LCA	An LCA modeling approach in which activities in a product system are linked to that activities are included in the product system to the extent that they are expected to change because of a change in demand	Consequential LCA may evaluate the impacts of shifting agricultural practices to meet market demand on land use change and biodiversity loss
Continuous Improvement	The ongoing measurable improvement of performance outcomes specific to metrics associated with indicators	N/A
Feed Footprint Strategies	The past and present strategies each of the proteins have deployed to assess the economic, environmental, and social outcomes of the footprint associated with their feed production	N/A

Source: ScienceDirect, IFEEDER

LCA: Industry Member Insights

Interview Overview
15 organizations were interviewed to gain their perspectives on the LCA environment

INTERVIEW DETAILS:
The objective of each hour-long interview was to better understand the LCA environment, current and future LCA engagement, and how IFEEDER can support members' needs.

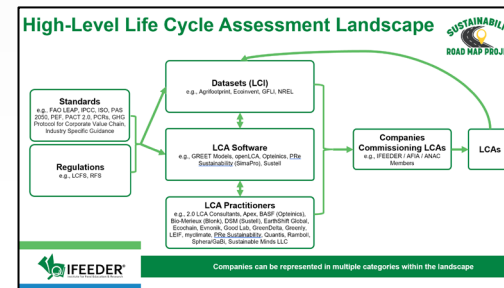
Eleven U.S. organizations and four Canadian organizations were interviewed.

Source: IFEEDER

LCA Decision Tree

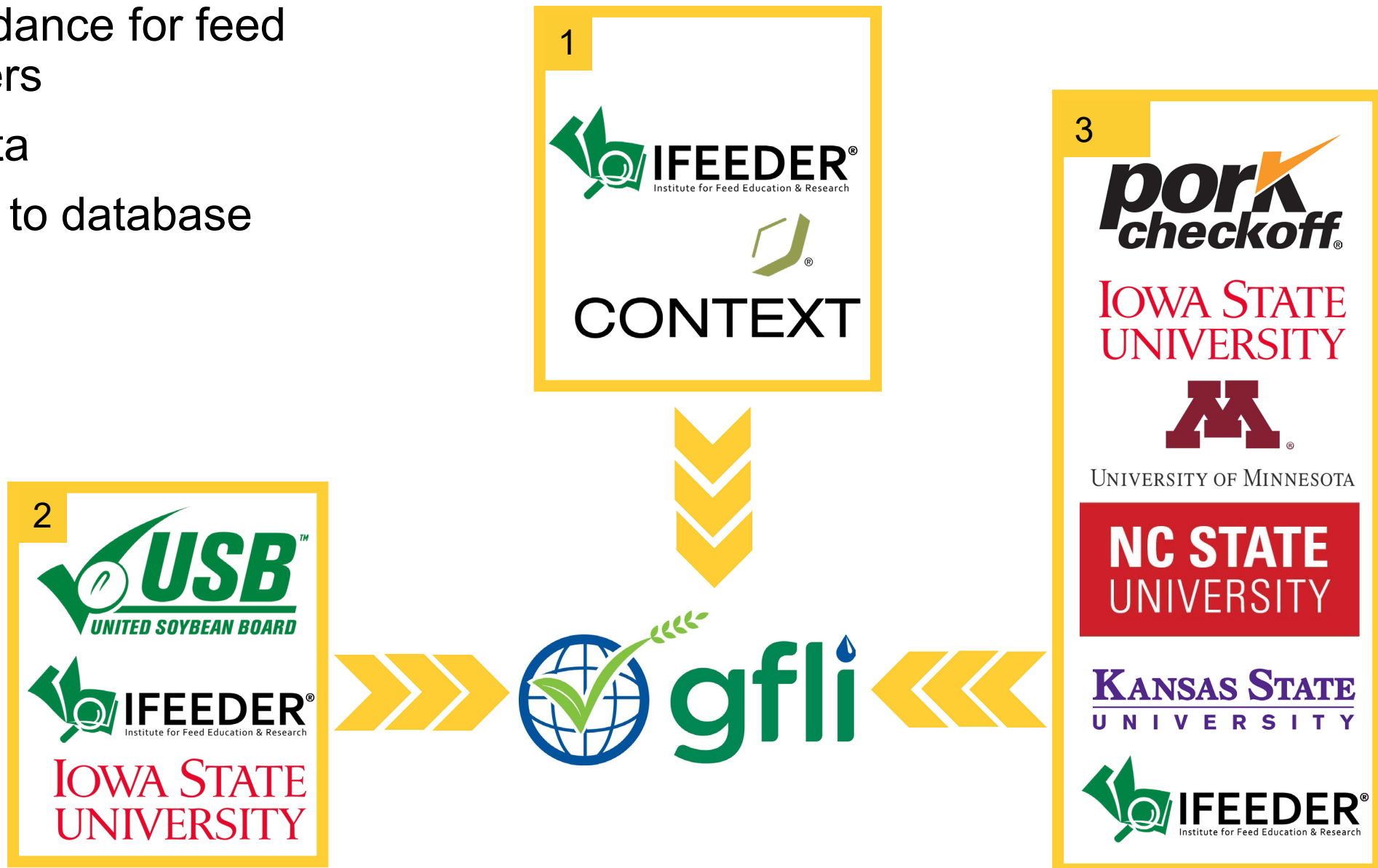


LCA Landscape Mapping & Profiles



3 Projects: Improving Feed LCAs

1. Create LCA guidance for feed industry members
2. Update crop data
3. Add ingredients to database
 - DDGS
 - Hominy
 - Wheat Middlings
 - Soybean Meal
 - Sorghum



Learn More!

