LIFECYCLE ANALYSIS – BEYOND THE CARBON FOOTPRINT

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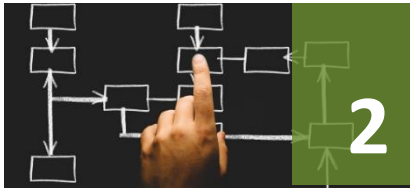
GROUPE AGÉCO

Outline

Context and LCA approach



Beyond the carbon footprint

Discussion

1. Context and LCA approach

Most national commodity groups conducted or are involved in LCA-related projects

LCA CAN PROVIDE ANSWERS TO NUMEROUS QUESTIONS

Environmental challenges

- Climate change
- Air and water quality
- Water and resources availability
- Biodiversity

What is the contribution of the Canadian agricultural sector to these environmental issues?

What are the measures and BMPs to reduce the industry footprint?

Is there an approach to increase the industry "handprint" (positive consequences of the industry)?

LCA CAN PROVIDE ANSWERS TO NUMEROUS QUESTIONS

Environmental challenges

Consumers' expectations

How the industry can increase its transparency and provide science-based information to customers?

Are there environmental trade-offs to these different market demands?

LCA CAN PROVIDE ANSWERS TO NUMEROUS QUESTIONS

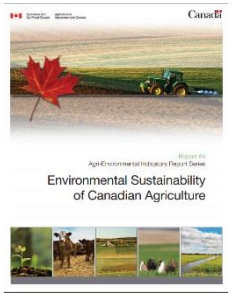
Environmental challenges

Consumers' expectations

Government's response

PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

CFIA·ACIA



Provincial and federal regulations

How can the contribution of the industry to national and provincial objectives on impact reduction be determined?

How can guidelines and regulations be designed to increase environmental benefits, reduce trade-offs and be more cost-effective?

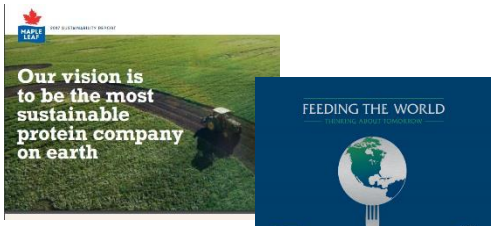
LCA CAN PROVIDE ANSWERS TO NUMEROUS QUESTIONS

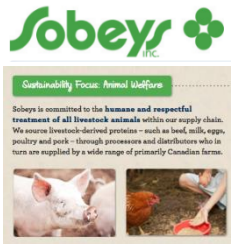
Environmental challenges

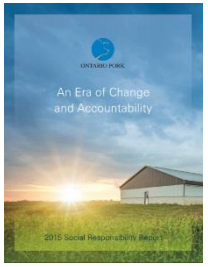
Consumers' expectations

Government's response

Responsible corporate citizens







Loblaw
COMPANIES LIMITED

How can public trust be built?

- Understand your footprint
- Identify and adopt BMPs
- Measure results
- Communicate performance
- Report progress

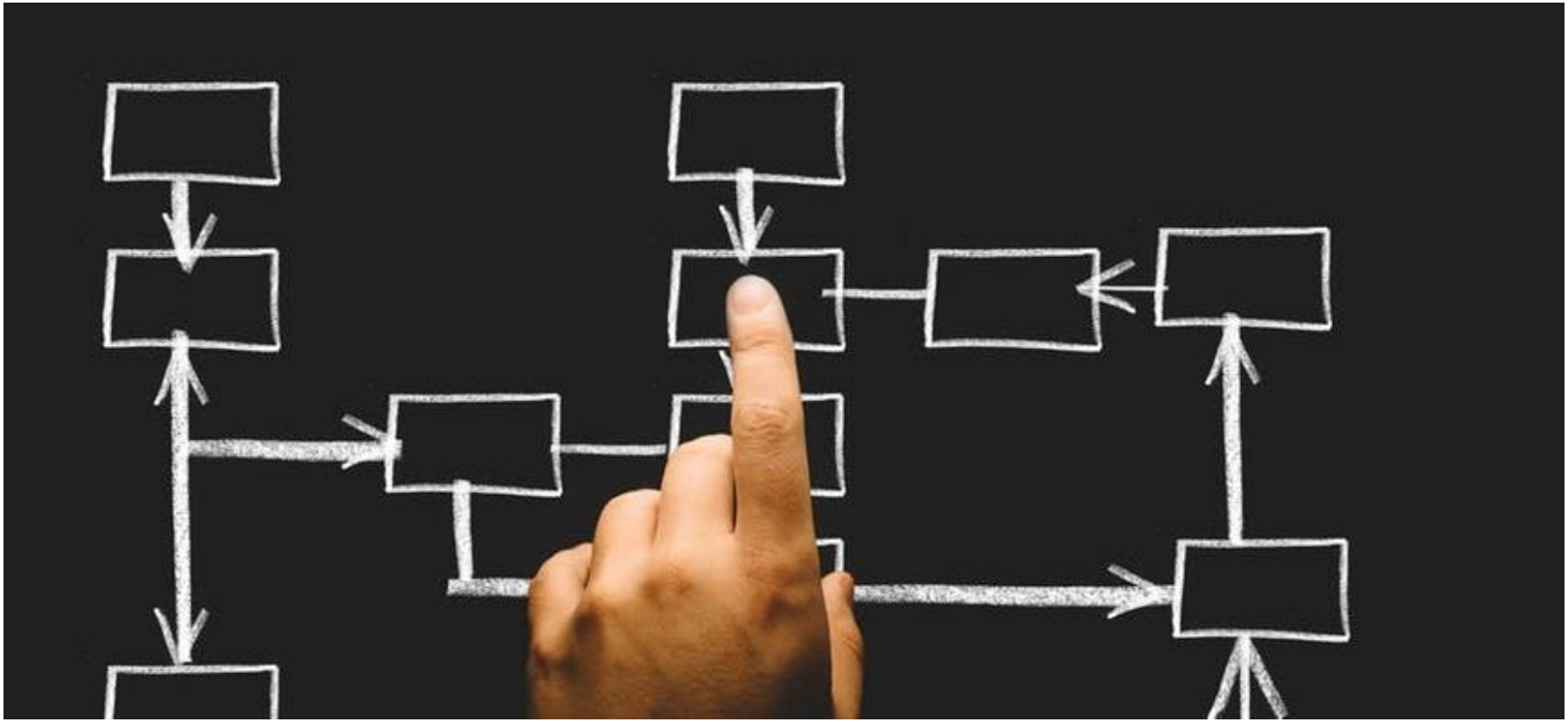
What is an Environmental Footprint?

AKA Environmental Life cycle assessment (ELCA)

Internationally recognized method (ISO 14040-44)

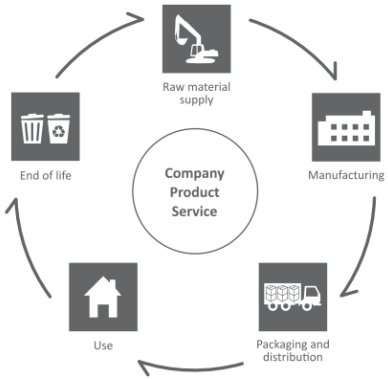
Measure environmental impacts from **cradle to grave**

Multi-indicators



2. Beyond the carbon footprint

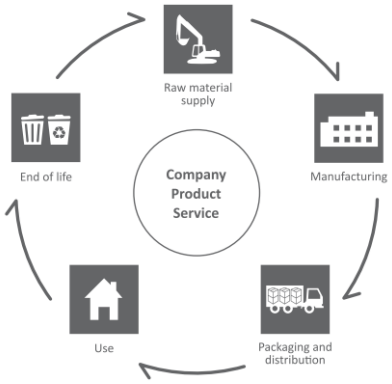
The Life Cycle Impact Assessment Model

Elementary flows	System boundaries	Characterization factors	Midpoint indicators	Endpoint indicator
CO_2		kg CO_2 eq.	Climate change	Ecosystems
PM		MJ primary	Non renewable energy	Human health
PO_4		kg PO_4^- eq.	Eutrophication	
SO_2		kg SO_2 eq.	Acidification	
NO_3		m^2.yr	Land use	Resources
VOC		m^3	Water consumption	
			Etc.	

Uncertainty
Results interpretability

Environmental and Social LCA

A similar logic–different perspective

	Environmental	Social
What is assessed	**Consumption of resources and emission of pollutants**	**The industry's sustainability practices in relation to its stakeholders**
What is considered	**Life cycle stages** 	**Stakeholders** 
Indicators used	• Carbon footprint • Non-renewable energy use • Water consumption footprint • Biodiversity and ecosystem quality • Human health • Other indicators and KPIs	• Governance • Animal welfare • Working conditions • Local engagement • …

The Main Impact or Damage Categories

Environmental issues are usually regrouped in:

Climate change

Water footprint

Natural resources

Biodiversity and ecosystem quality

Human health

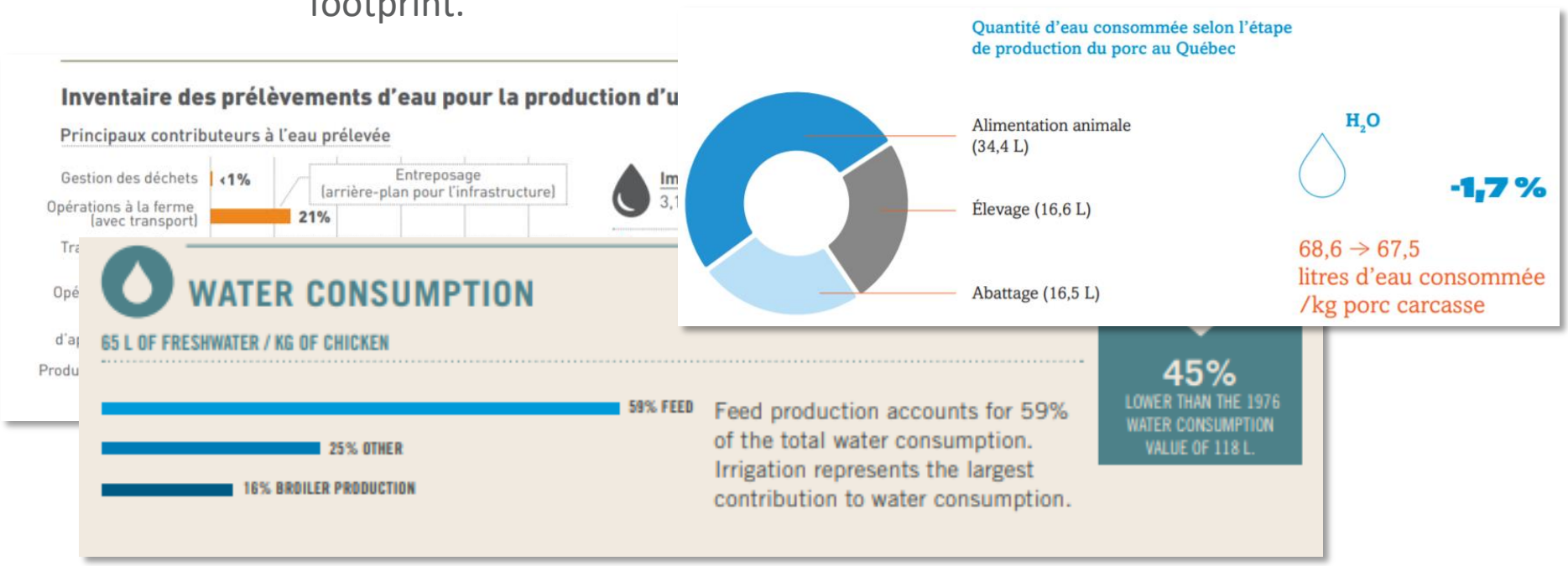
Environmental indicators – Water Footprint

Water footprint

Water consumption

Unit: m^3 of water consumed

- Sum of all fresh water withdrawals in each watershed minus all water returns to the same watershed. Also called “blue water” indicator.
- Based on the recently published ISO 14046 standard for water footprint.



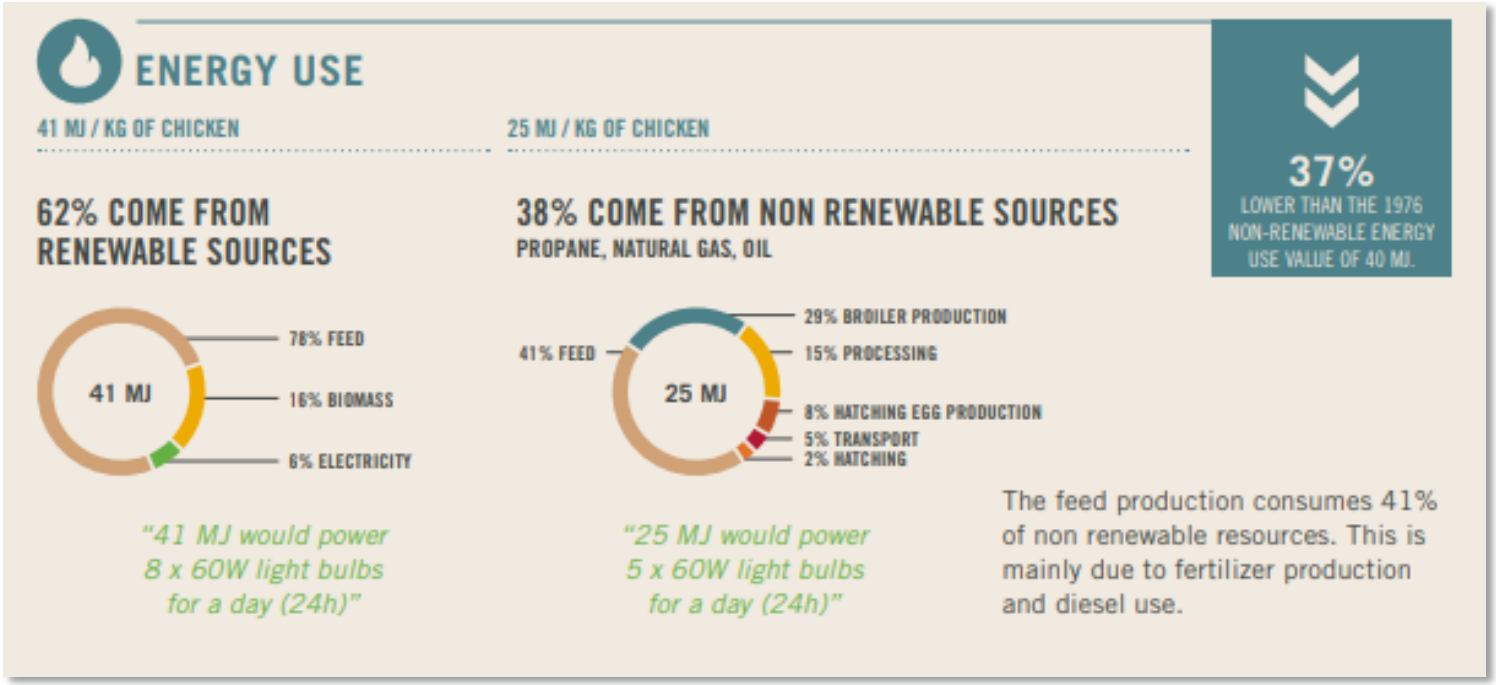
ENVIRONMENTAL INDICATORS – NATURAL RESOURCES

Natural resources

Non-renewable energy use

Unit: MJ primary energy

- Sum of all non-renewable energy resources consumed during the product life cycle.



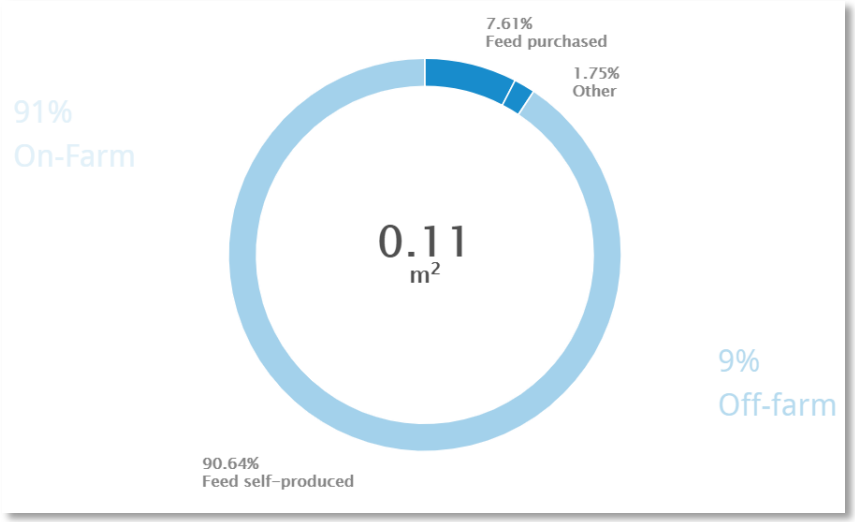
Environmental indicators – Biodiversity and ecosystem quality

Biodiversity and ecosystem quality

Land use

Unit: m^2*y of land occupied

- Sum of the area of all types of land required by the life cycle of the product. Key parameter for assessing the impact on biodiversity.



Other indicators:

- **Freshwater and Marine eutrophication:** Unit: kg PO_4 eq. (freshwater) and kg N eq. (marine)
- **Freshwater and Terrestrial acidification:** Unit: kg SO_2 eq.

Environmental Indicators – Human Health

Human health

Particulate matter formation (Respiratory inorganics)

Unit: kg PM2.5 eq.

- Sum of emissions to air that contribute to particulate matter formation.
- This impact category covers substances such as ammonia, nitrogen oxide and particulates matter, which are damaging to human health.

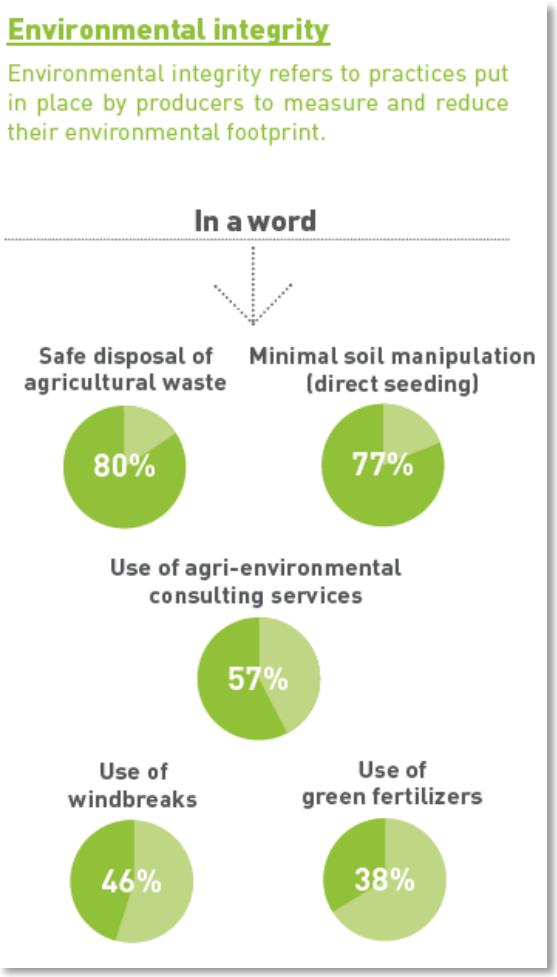
Photochemical oxidant formation (Respiratory organics)

Unit: kg NMVOC eq.

- Sum of emissions to air that contribute to smog formation.
- This impact category covers substances such as nitrogen oxide, non-methane volatile organic compounds, which are damaging to human health.

Social Indicators – Business Performance

Measuring the adoption rate of BMPs at the business-level



3. Discussion

Building on Sound Models and Comprehensive Databases

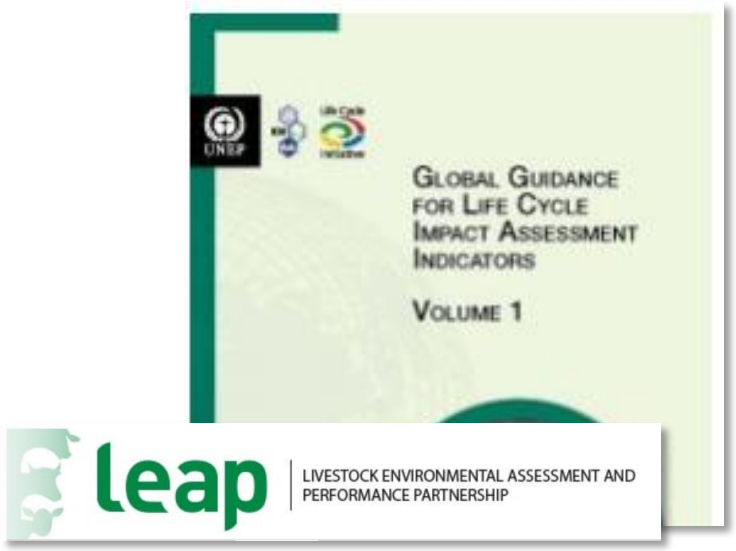
An Ongoing Development Process

Models based on sound science and global consensus are required to conduct LCAs

Efforts are made in that regard at the international level

Examples of existing or developing guidelines:

- GHG and energy use
- Soil carbon stock changes in grasslands and rangelands
- Biodiversity indicators
- Water footprint
- Eco-toxicity indicators
- Nutrient flows and associated environmental impacts



More research is however still needed on sensitive topics

(e.g. pesticide toxicity)

Building on Sound Models and Comprehensive Databases

An Ongoing Development Process

Access to sufficiently detailed and representative data remains an on-going challenge

- Initiatives such as GFLI are underway to facilitate access to the data to practitioner and industry members

- Industry (e.g. Fertilizer survey; CRSC survey) and governmental (e.g. FEM survey) efforts are also instrumental in providing sound data to practitioner
- However significant data gaps still need to be filled (e.g. pesticides | fertilizer production & use; energy use)

LCAs and the Canadian Ag Sustainability Story

Reinforced collaboration, **sustained investments** and **further research** would help strengthening the Canadian ag sustainability story

ENHANCING LCA RESULTS	REPORTING AND COMMUNICATION	EMPOWERING FARMERS
• Fill data gaps (pesticides | fertilizer production & use; energy use) • Maintain | enhance existing sources of data (fertilizer use survey; CRSC survey; FEM) • Explore how on-farm BMPs impact ag footprint (EFP; 4R)	• Streamline visions and definitions • Document the baseline • Ensure consistency by connecting groups and professionals	• Promote existing tools and platforms • Document barriers and incentives, as well as needs and opportunities • Assess the (economic) benefits of adopting BMPs (i.e. business case)

Thank you

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