Global Roundtable for Sustainable Beef

The Science of Sustainability: It is Not a Monometric Concept

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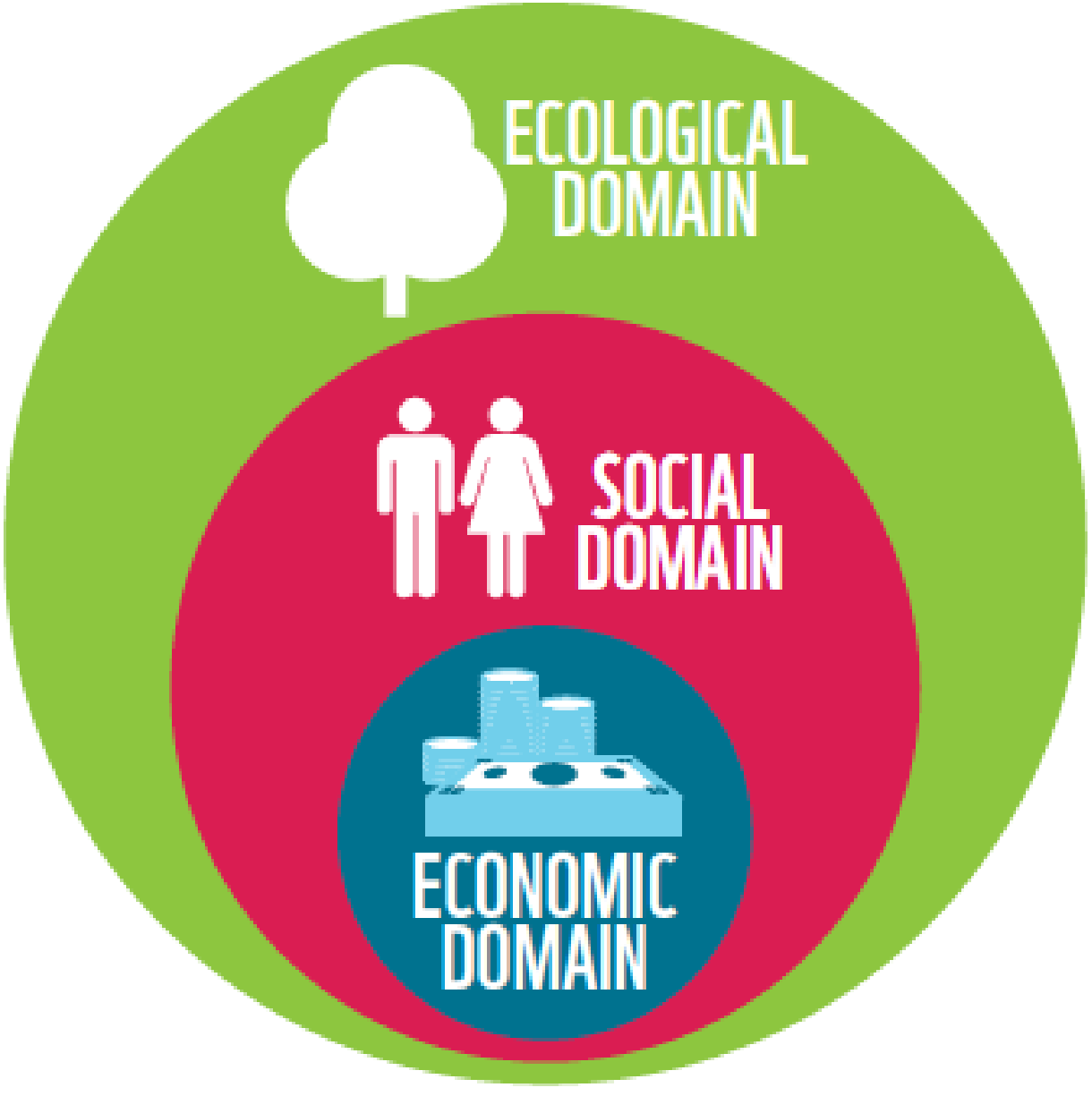
Office for Sustainability

Everything is Connected



Everything is changing

We are all in this together

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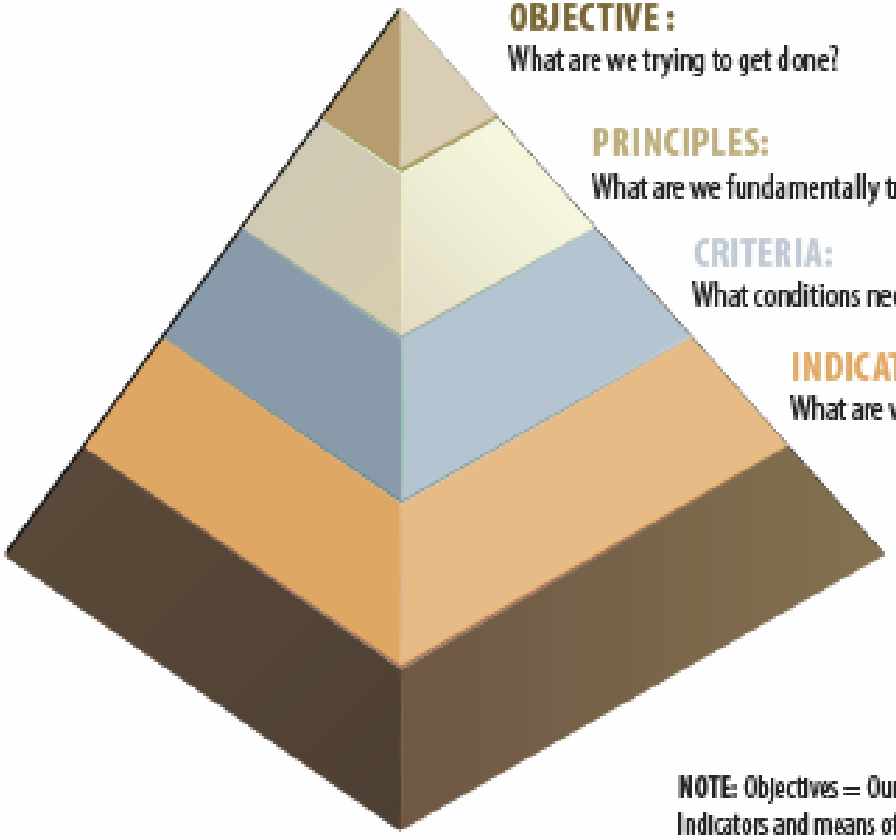
The GRSB Principles and Criteria provides a very clear framework for sustainability programs.



OBJECTIVE :
What are we trying to get done?

PRINCIPLES:
What are we fundamentally trying to do? What is our intent?

CRITERIA:
What conditions need to be met to achieve the principle?

INDICATORS:
What are we going to measure?

MEANS OF VERIFICATION:
How do we verify the outcomes?

NOTE: Objectives = Our Mission. This document focuses on the next two (Principles and Criteria). Indicators and means of verification will be produced by regional groups.

Core Principles for Sustainable Beef Production and Delivery

1. Natural resources (9 KPIs)
2. People and the community (6 KPIs)
3. Animal health and well-being (8 KPIs)
4. Food (4 KPIs)
5. Efficiency and innovation (9 KPIs)

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US Ag Sustainability Initiatives

INNOVATION CENTER FOR U.S. DAIRY

pork checkoff.

USSEC

USPOULTRY
U.S. POULTRY & EGG ASSOCIATION

American Peanut COUNCIL

USA Rice FEDERATION

cotton

Cotton Incorporated

Sustainability is Continuous Improvement

1. Define

A. Define Sustainability for the Enterprise
B. Define Key Performance Indicators
C. Select Metrics for KPIs

2. Measure

A. Benchmark KPI Metrics
B. Set Goals for Each KPI
C. Develop Strategy to Meet Goals

3. Implement

A. Implement the Strategy
B. Measure, Assess and Report Results
C. Adapt Strategy to Improve Outcomes

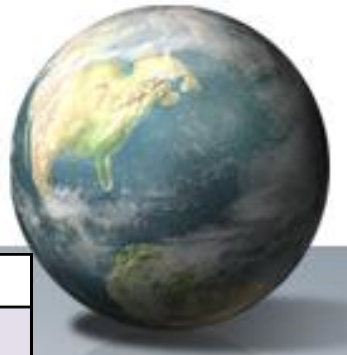
Criteria for Key Performance Indicators of Sustainable Agriculture

Key Performance Indicators (KPIs) are things we measure to inform decisions.

KPIs should be:

1. Outcomes Based.
2. Science Driven.
3. Technology Neutral.
4. Transparent.

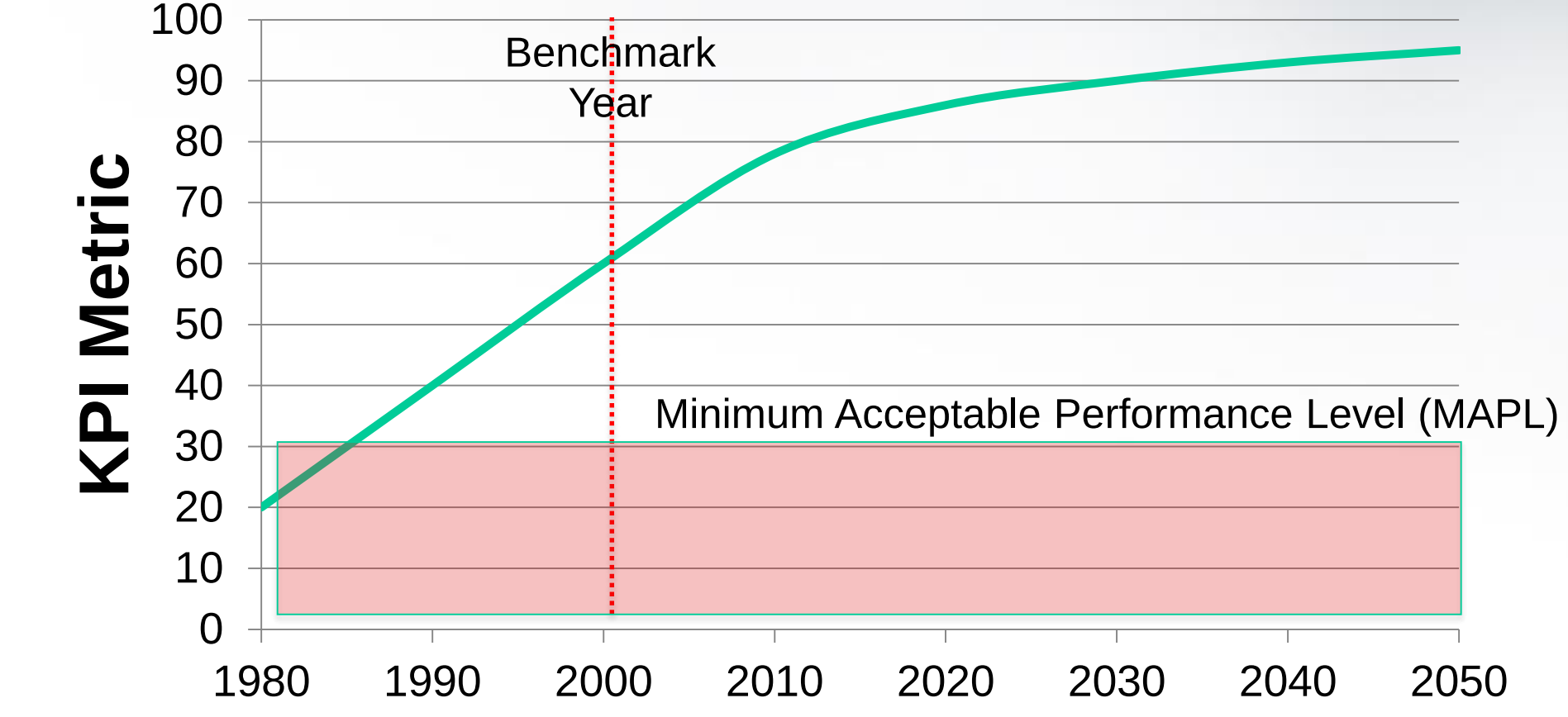
KPIs for three US agricultural programs



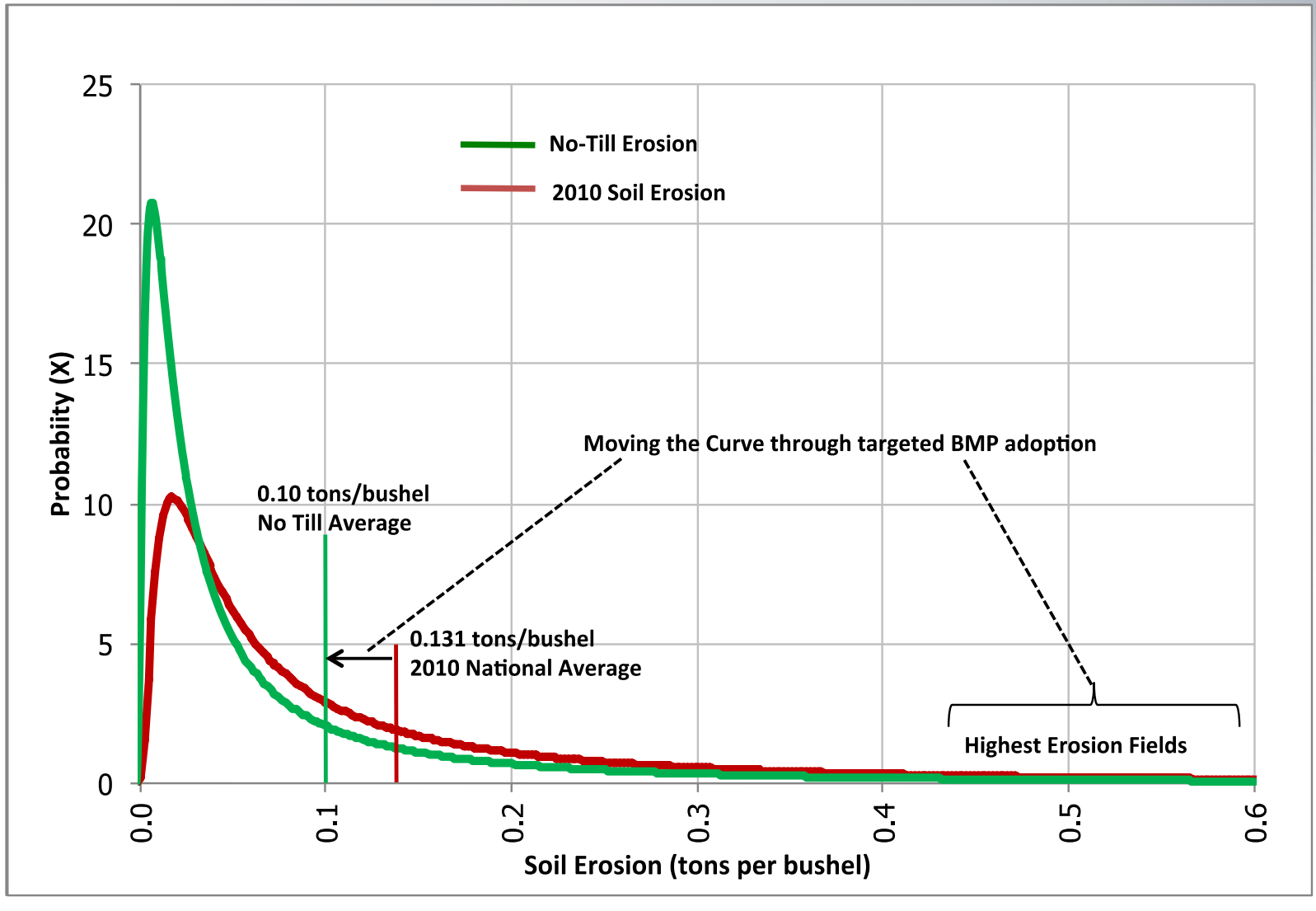
	Field to Market	National Pork Board	Aquaculture
Animal Care & Wellbeing		PQA+	GAA / WWF Certification Programs
		We Care Ethical Principles	
Economic Integrity		Community Economic Benefits	
		Consumer Confidence	
		Food Security	
		Product Quality	
	Production and Yield	Production Efficiency	
	Economic (Financial)	Profitability	
Environmental Stewardship		Air Quality	
	Energy Use	Energy Use	
	Greenhouse Gas	GHG Emissions	
	Land Use / Soil Erosion	Land Use	
		Nutrient Management	
	Water Quality / Biodiversity	Water Quality	
	Irrigation Water Applied	Water Use	
Human Wellbeing	Socio Economic Issues (Injuries / fatalities / education / labor practices / community relations / land ownership)	Community / Neighbor Relations	
		Employee Relations	
		Employee Retention	
		Employee Safety & Health	
		Food Safety / Biodiversity	
	Food Safety	Food Security	
		Product Integrity	

Framework of Goals

Trends, Benchmarks and Goals

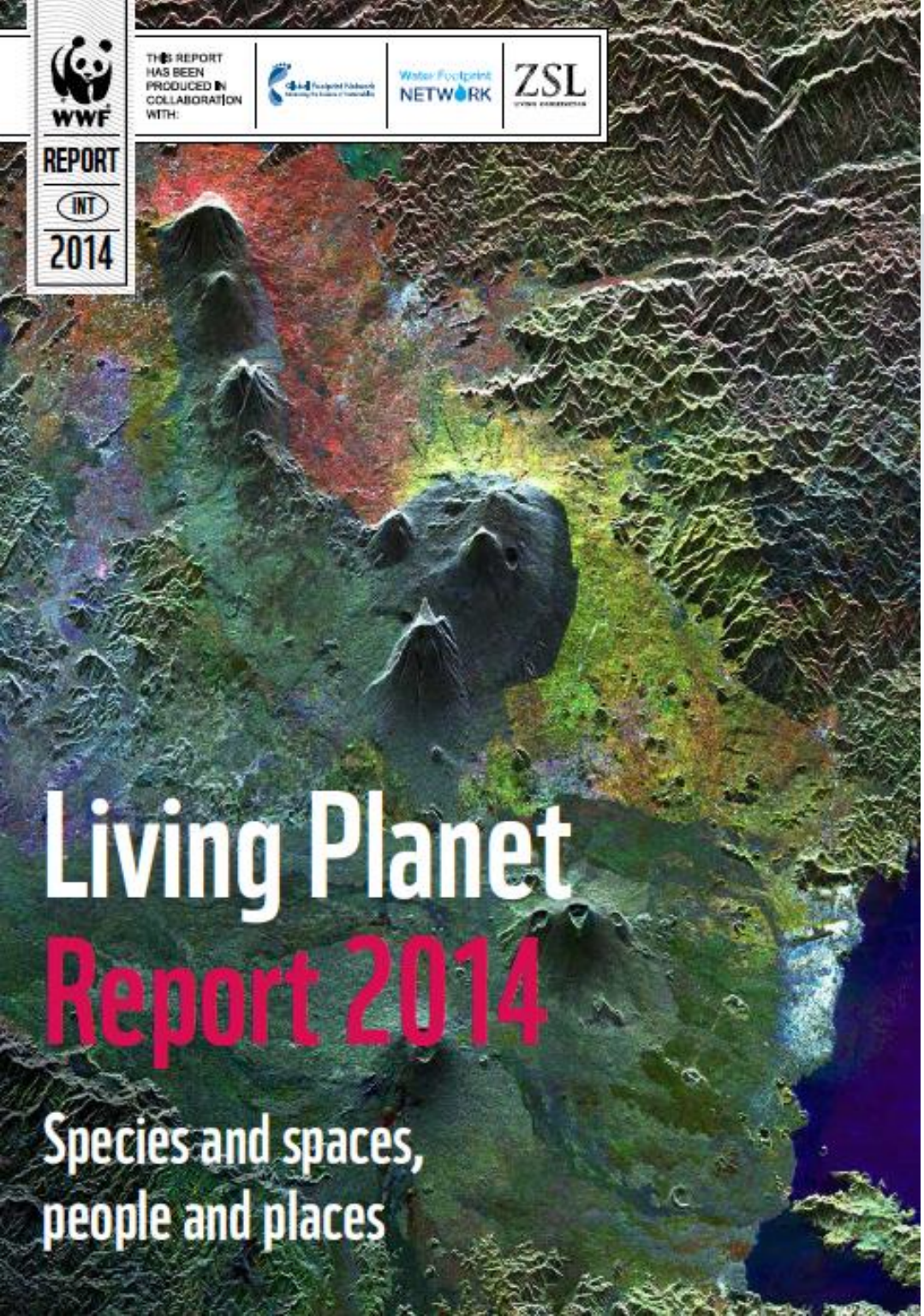


Setting Goals to Move the Curve



What Key Performance Indicator do you start with?

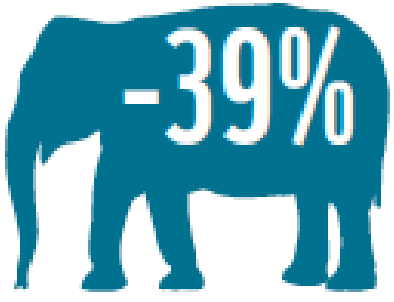
1. Identify what you MUST do.
2. Identify what you KNOW you CAN do.
3. Identify what you THINK you CAN do.



Habitat protection: What we MUST do

WWF issued the Living Planet Report September 30, 2014

39% Loss in Terrestrial Species

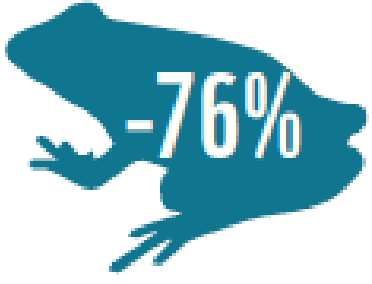


Terrestrial LPI

TERRESTRIAL SPECIES DECLINED BY 39 PER CENT BETWEEN 1970 AND 2010

Terrestrial species declined by 39 per cent between 1970 and 2010, a trend that shows no sign of slowing down. The loss of habitat to make way for human land use – particularly for agriculture, urban development and energy production – continues to be a major threat, compounded by hunting.

76% Loss in Freshwater Species

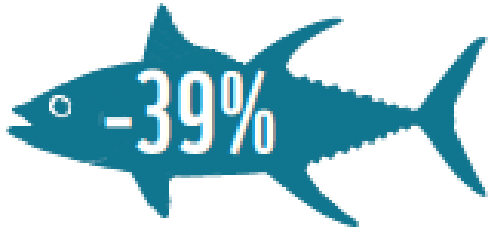


Freshwater LPI

THE LPI FOR FRESHWATER SPECIES SHOWS AN AVERAGE DECLINE OF 76 PER CENT

The LPI for freshwater species shows an average decline of 76 per cent. The main threats to freshwater species are habitat loss and fragmentation, pollution and invasive species. Changes to water levels and freshwater system connectivity – for example through irrigation and hydropower dams – have a major impact on freshwater habitats.

39% Loss in Marine Species



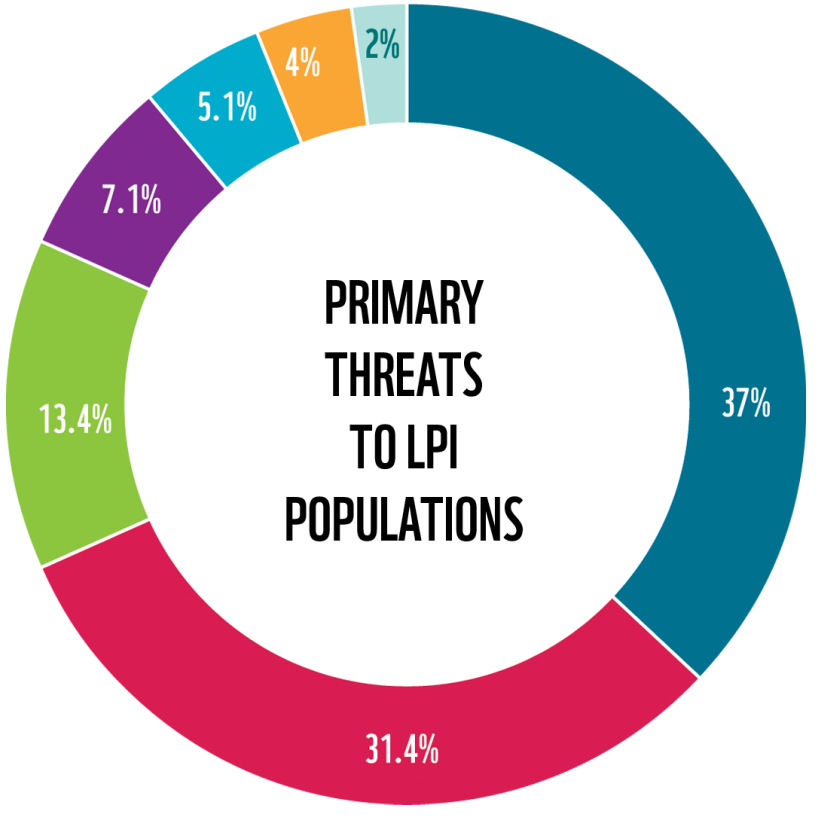
Marine LPI

MARINE SPECIES DECLINED 39 PER CENT BETWEEN 1970 AND 2010

Marine species declined 39 per cent between 1970 and 2010. The period from 1970 through to the mid-1980s experienced the steepest decline, after which there was some stability, before another recent period of decline. The steepest declines can be seen in the tropics and the Southern Ocean – species in decline include marine turtles, many sharks, and large migratory seabirds like the wandering albatross.

PRIMARY THREATS TO LPI POPULATIONS

Informations on threats has been identified for 3430 populations in the LPI assigned to seven categories. Other populations are either not threatened or lack threat information (WWF, ZSL, 2014).



Exploitation (hunting, fishing), habitat degradation, and habitat loss cause almost 82% of species loss since 2007

Feed Sustainability: What you CAN do

Field to Market

The Alliance for Sustainable Agriculture

A Multi-Stakeholder Initiative for US Row Crop Agriculture Sustainability Metrics and Goals

Field to Market Membership

Field to Market™

The Keystone Alliance for Sustainable Agriculture

Field to Market
Keystone Alliance for Sustainable Agriculture

How We Define Sustainable Agriculture

Meeting the needs of the present while improving the ability of future generations to meet their own needs

- **Increasing productivity to meet future food and fiber demands**
- **Improving the environment**
- **Improving the social and economic well-being of agricultural communities**

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Keystone Alliance for Sustainable Agriculture

Environmental Key Performance Indicators

- Greenhouse Gas Emissions
- Energy Use
- Water Use
- Land Use
- Water Quality
- Nutrient Use Efficiency
- Habitat/Biodiversity

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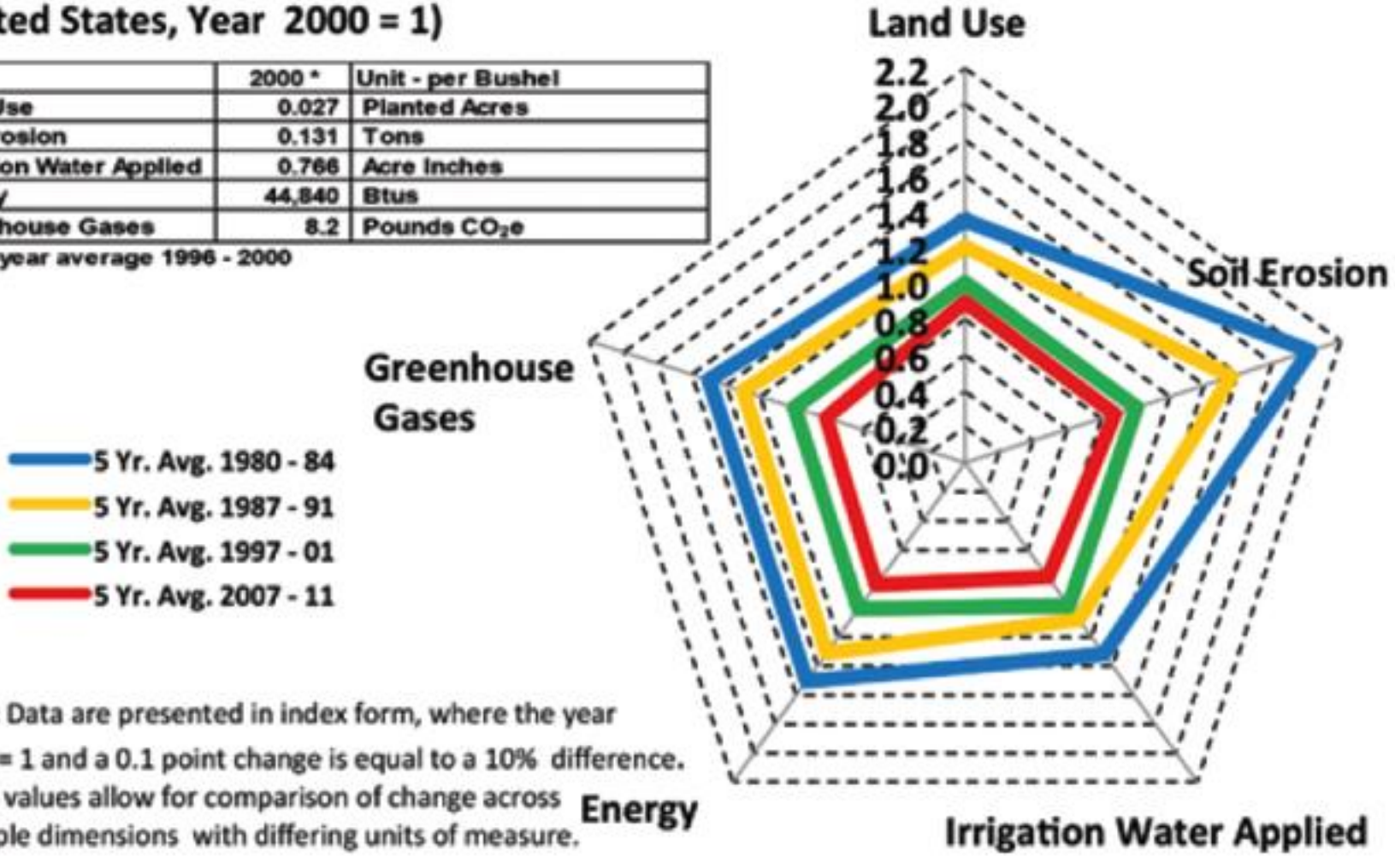
Keystone Alliance for Sustainable Agriculture

Measuring US Soybean Sustainability Metrics

Index of Per Bushel Resource Impacts to Produce Soybeans (United States, Year 2000 = 1)

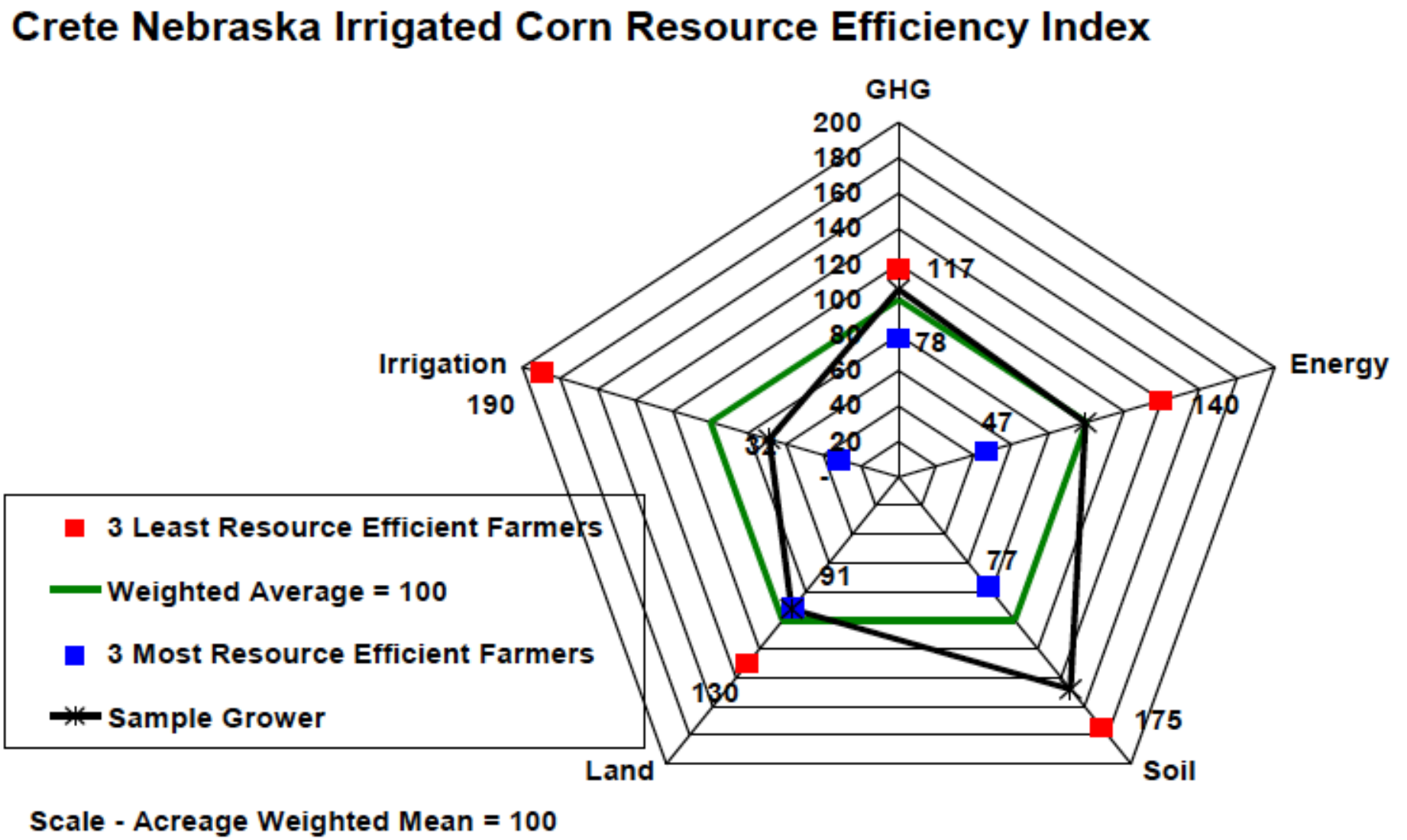
Year	2000 *	Unit - per Bushel
Land Use	0.027	Planted Acres
Soil Erosion	0.131	Tons
Irrigation Water Applied	0.766	Acre Inches
Energy	44,840	Btus
Greenhouse Gases	8.2	Pounds CO_2e

* Five-year average 1996 - 2000



Note: Data are presented in index form, where the year 2000 = 1 and a 0.1 point change is equal to a 10% difference. Index values allow for comparison of change across multiple dimensions with differing units of measure.

The Fieldprint Calculator in action

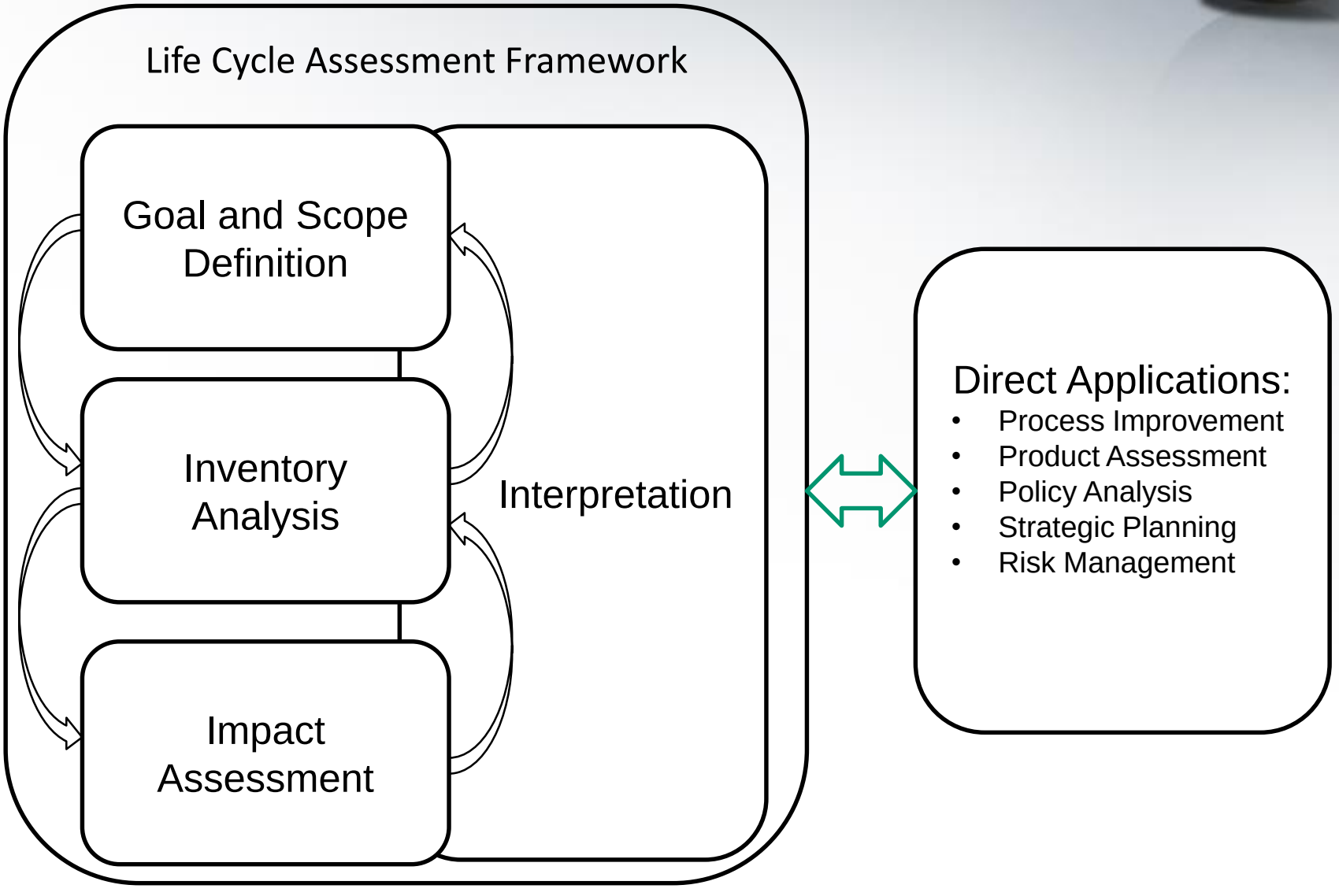


Field to Market™

LCA and Supply Chain Impacts

Using Life Cycle Assessment to Determine what you **might** be able to do.

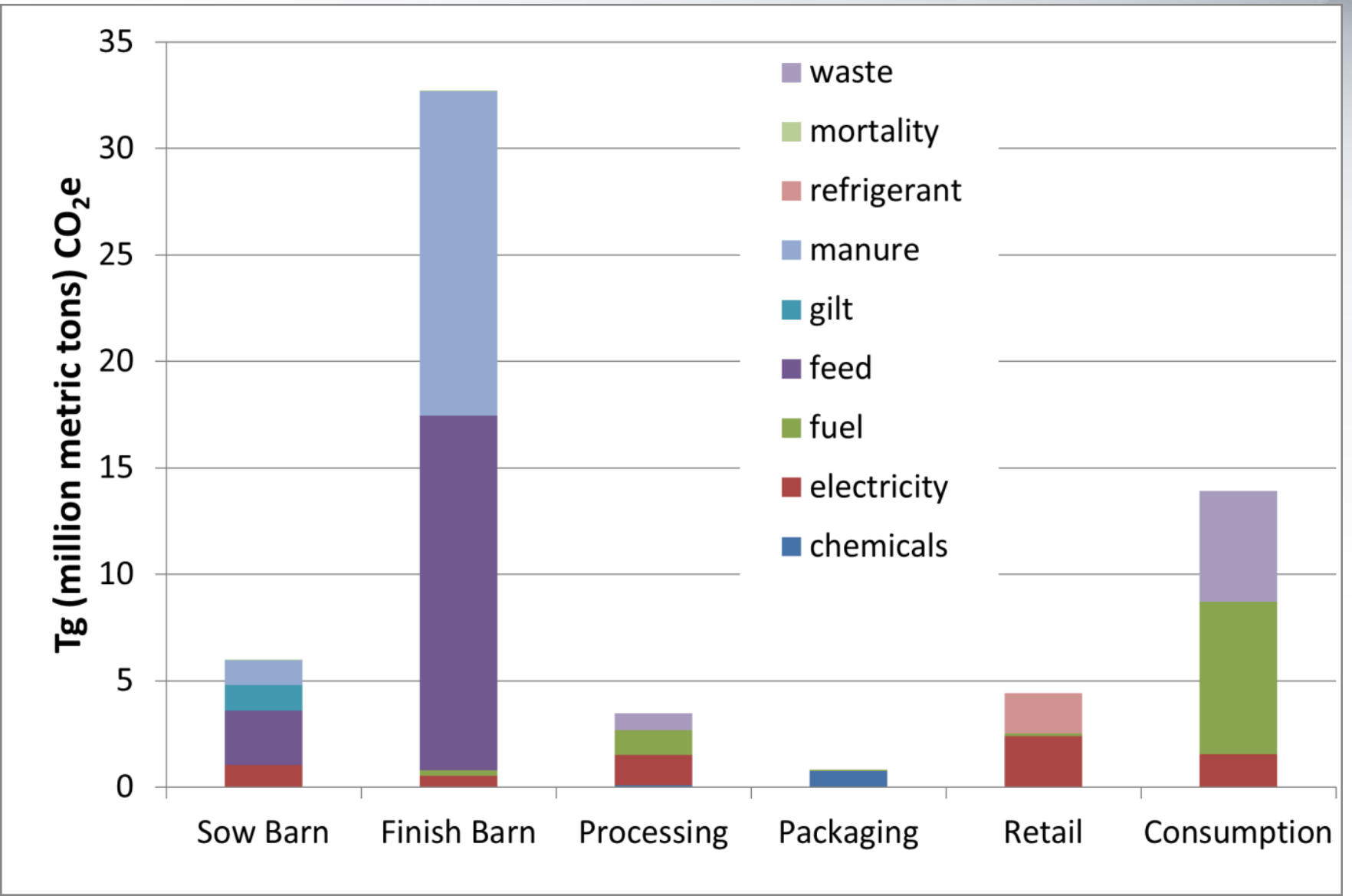
Phases of a Life Cycle Assessment



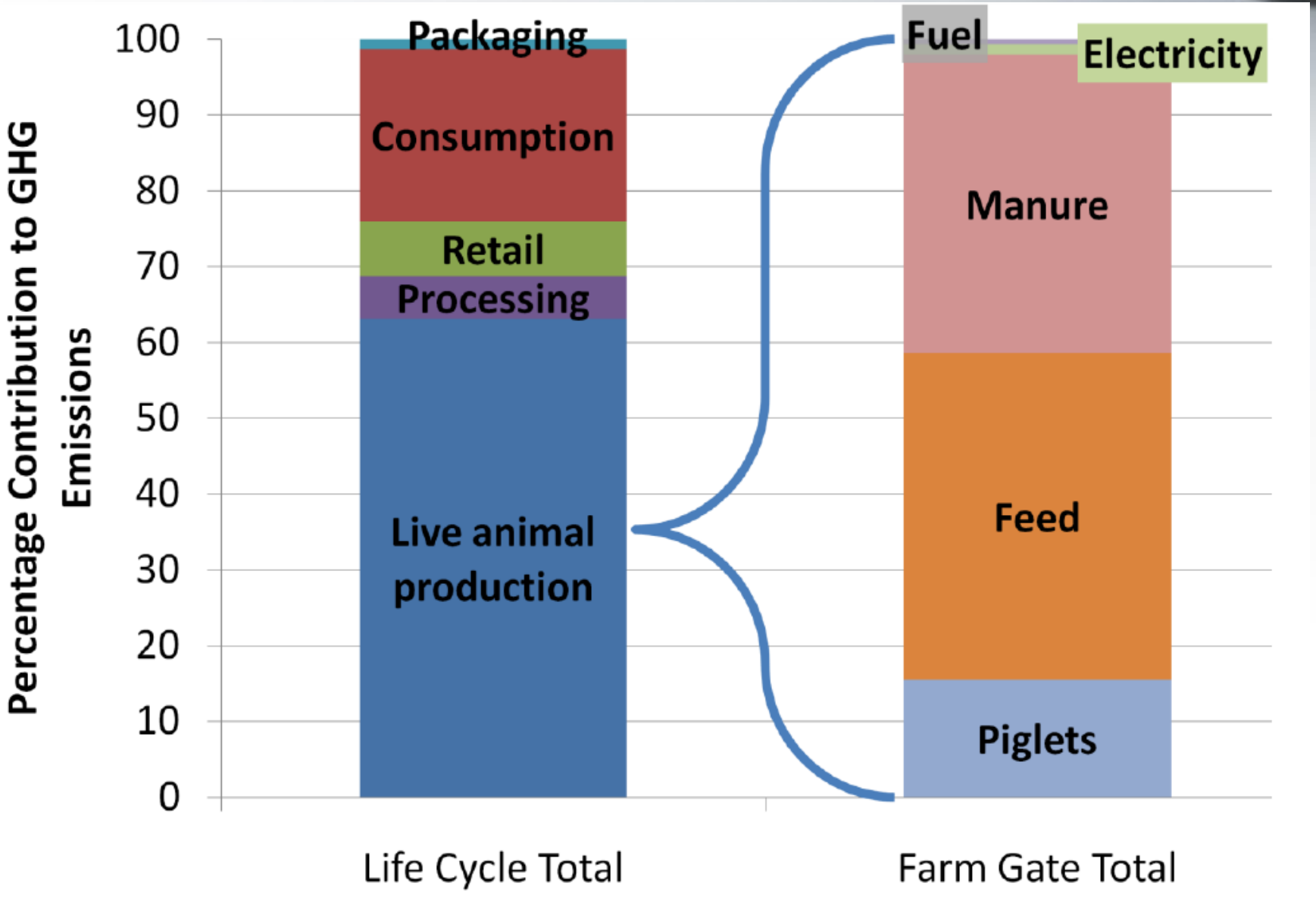
NPB Benchmark KPIs for GHG

- National Life Cycle Carbon Footprint Study for the Production of US Swine
  - Carbon Footprint – 2.48 lb CO_2e per serving
  - Emission Contributions
    - Sow Barn: 9.6%, including feed and manure handling
    - Nursery to Finish: 52.5%, including feed and manure handling
    - Processing and Packaging: 6.9%
    - Retail: 7.54%
    - Consumer: 23.5%

GHG emissions associated with consumption of pork in the US.



Benchmark KPIs for GHG



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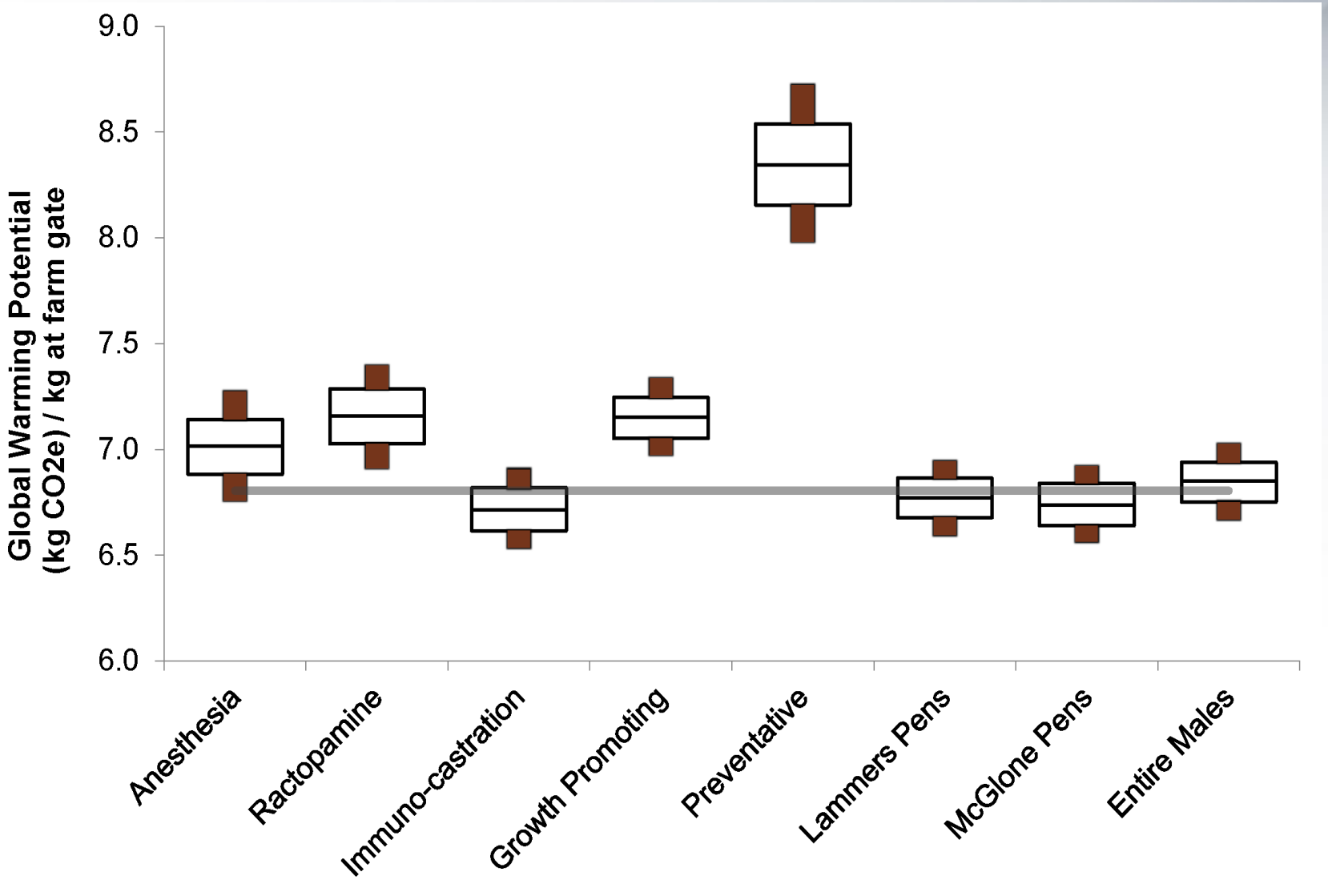
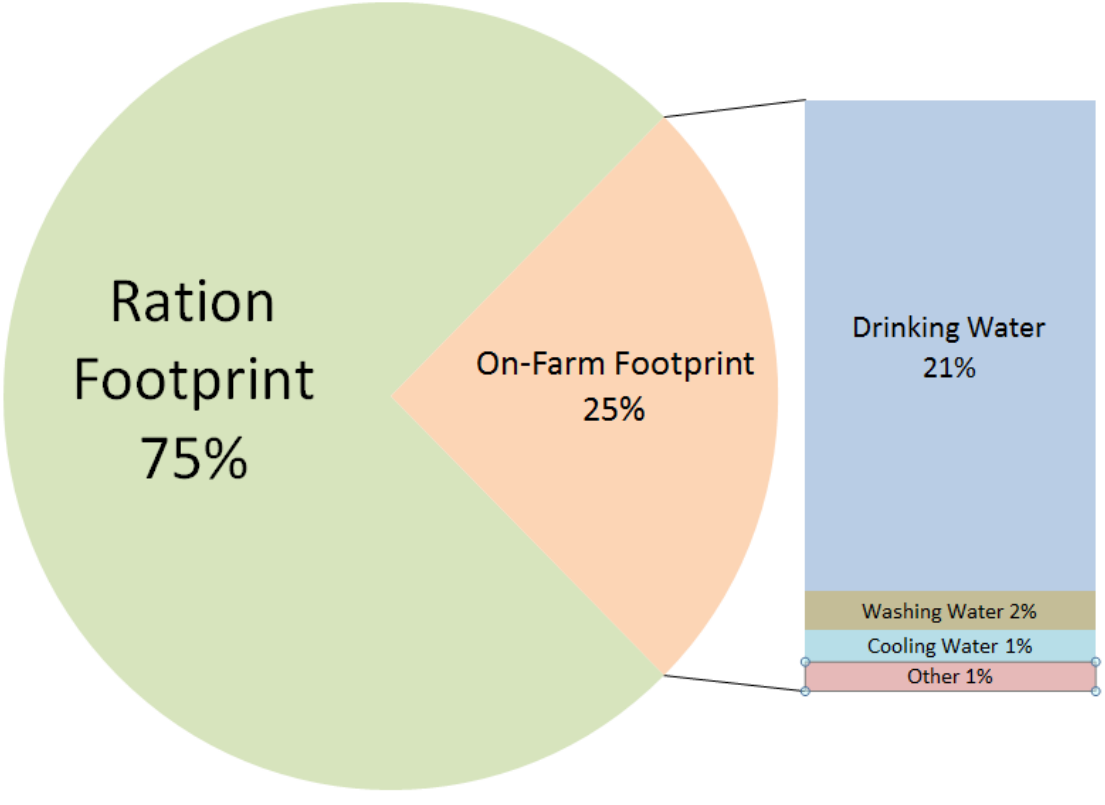
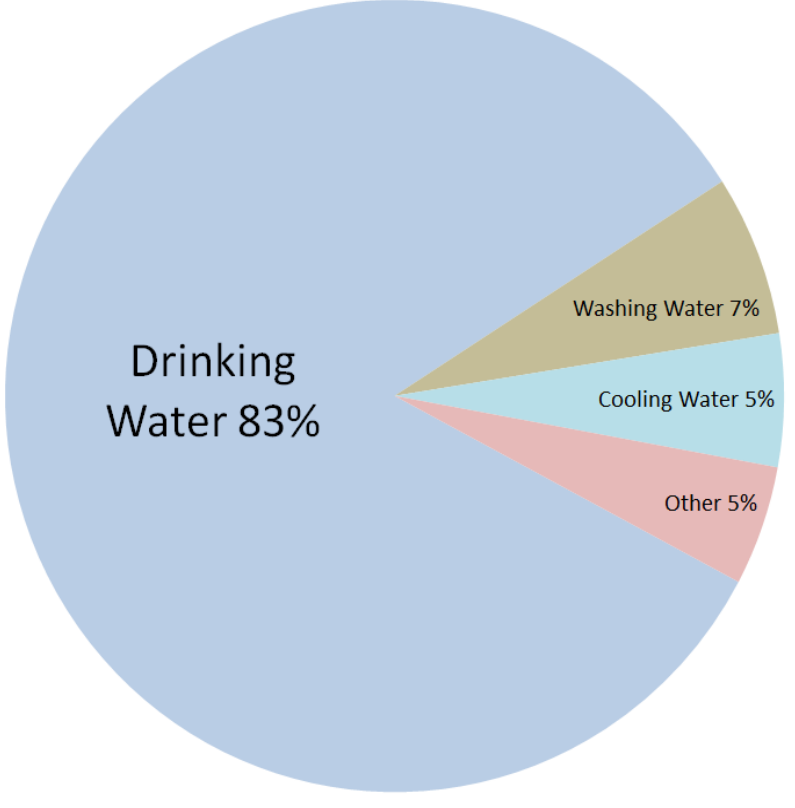


NPB Benchmark KPIs for Water

- A Life Cycle Analysis of Water Use in U.S. Pork Production
  - 19-144 gal water per pound boneless pork
  - 75% from feed irrigation
  - 20% for drinking water

NPB Benchmark for Water





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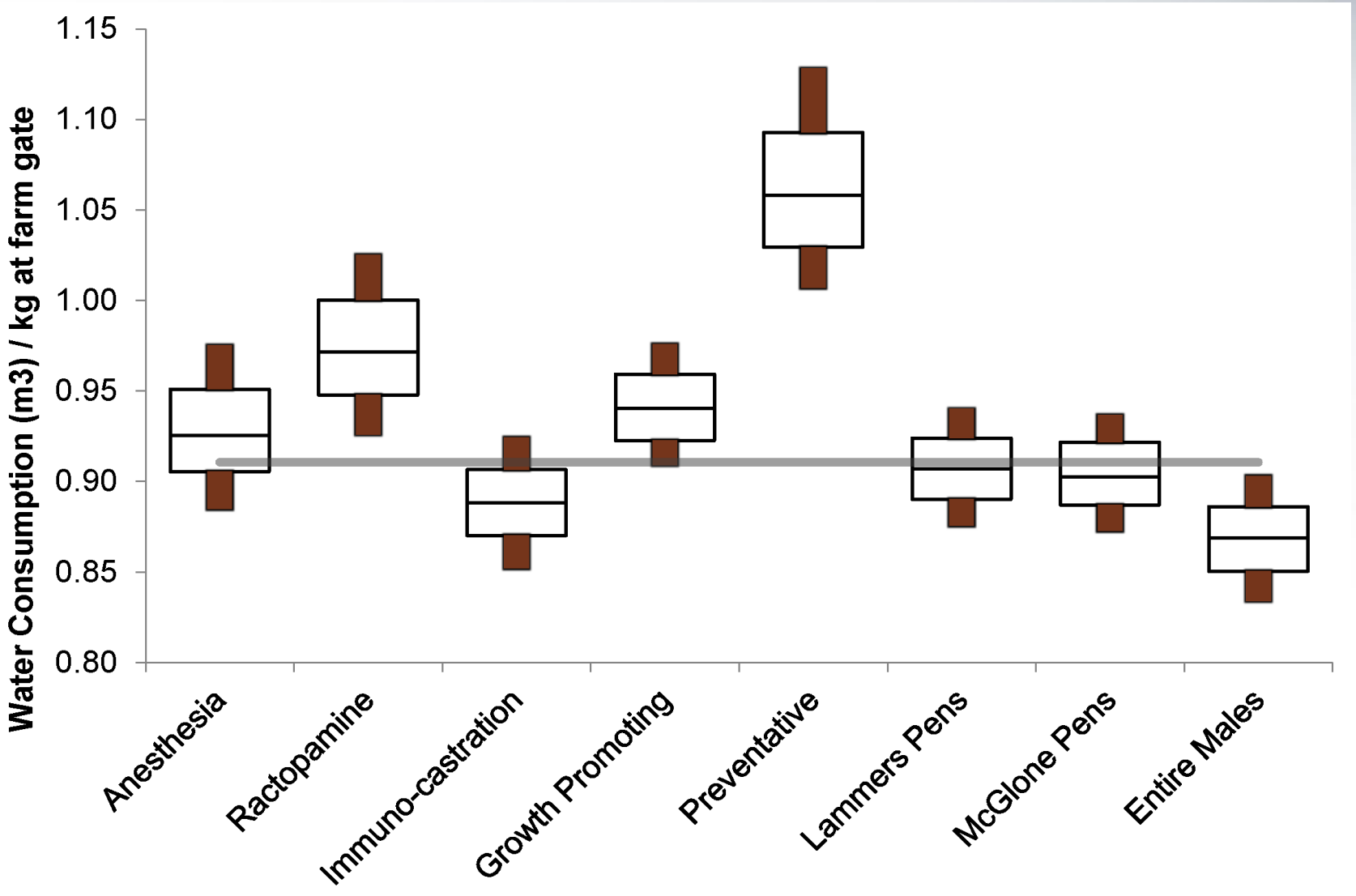

For GHG, Energy, and Water:

- Improving effective feed utilization (conversion of feed into product) reduces environmental metrics.
- Feed mixture optimization is a key element for enhancing sustainability of animal agriculture sustainability:
  - Nutrient digestibility
  - Gut function
  - Immune system

Sustainability Framework

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Principle 1: Natural Resources

1. Adaptive management to achieve continuous improvement natural resource management outcomes.
2. Improve air quality.
3. Minimize net greenhouse gas emissions on a per unit of product basis.
4. Protect native forests grasslands and other native ecosystems.
5. Enhance the health of ecosystems.
6. Responsibly and efficiently manage water resources (including quality and quantity attributes).
7. Maintain or improve soil health.
8. Maintain or enhance native plant and animal biological diversity.
9. Where available, feed sources are sustainably-produced.

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Principle 2: People and the Community

1. Respect human rights in accordance with the UNGPBHR1 through policies, regulation and due diligence.
2. Business is conducted with integrity, in compliance with applicable laws and regulations. \
3. A safe and healthy work culture is adopted.
4. Employment provides for the legal minimum wage (where applicable), and opportunities for career development, where possible
5. The cultural heritage and way of life of all parties are recognized and respected throughout the value chain.
6. Land and property rights are acknowledged and respected throughout the value chain.

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Principle 3: Animal Health and Welfare

1. Adequate feed and water are provided to meet cattle's physiological needs.
2. Animal caretakers provide cattle with health care to control and treat disease.
3. All veterinary pharmaceuticals and vaccines are used responsibly and in accordance with labeling.
4. Minimize undue pain, injury and disease.
5. Good animal welfare is ensured, including the freedom for cattle to express normal patterns of behavior.
6. Stocking density, air quality and surfaces are conducive to good health and normal behavior and minimizes physical discomfort.
7. Transport and handling procedures are consistent with OIE guidelines.
8. Animal welfare procedures at processing plants are in line with the OIE terrestrial animal health code.

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Principle 4: Food

1. Food safety is ensured through the development, adoption, documentation, maintenance and, where applicable, third-party validation of practices throughout the value chain.
2. Beef quality is ensured through the adoption, documentation, maintenance and validation of management systems throughout the value chain.
3. Information should be shared both up and down the value chain to provide opportunities for participants to improve their businesses, while respecting confidentiality.
4. Food waste is reduced throughout the value chain, reusing and recycling wherever practicable.

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Principle 5: Efficiency and Innovation

1. Cattle are selected and managed to continually optimize available resources and suit their environment, while meeting market demand and consumer preferences.
2. Waste is reduced and opportunities to reuse and recycle are maximized throughout the value chain.
3. Product value and carcass utilization are maximized throughout the value chain.
4. Water and land resources are managed throughout the value chain to ensure responsible and efficient use.
5. Energy use is optimized for efficiency and productivity throughout the value chain.
6. Feed and forage use is optimized for production and welfare goals throughout the production chain.
7. Pharmaceutical, nutrient and chemical use is executed safely and responsibly, optimizing efficiency and productivity throughout the value chain.
8. Beef value chain stakeholders continually innovate, and responsibly use technologies and leading practices to adapt to changes in climate, resource and market conditions.
9. Sustainable beef production is enhanced through education, extension and partnerships where appropriate opportunities exist.