

# Data-Driven Sustainable Food Purchasing

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## BACKGROUND & OBJECTIVES

### PURPOSE

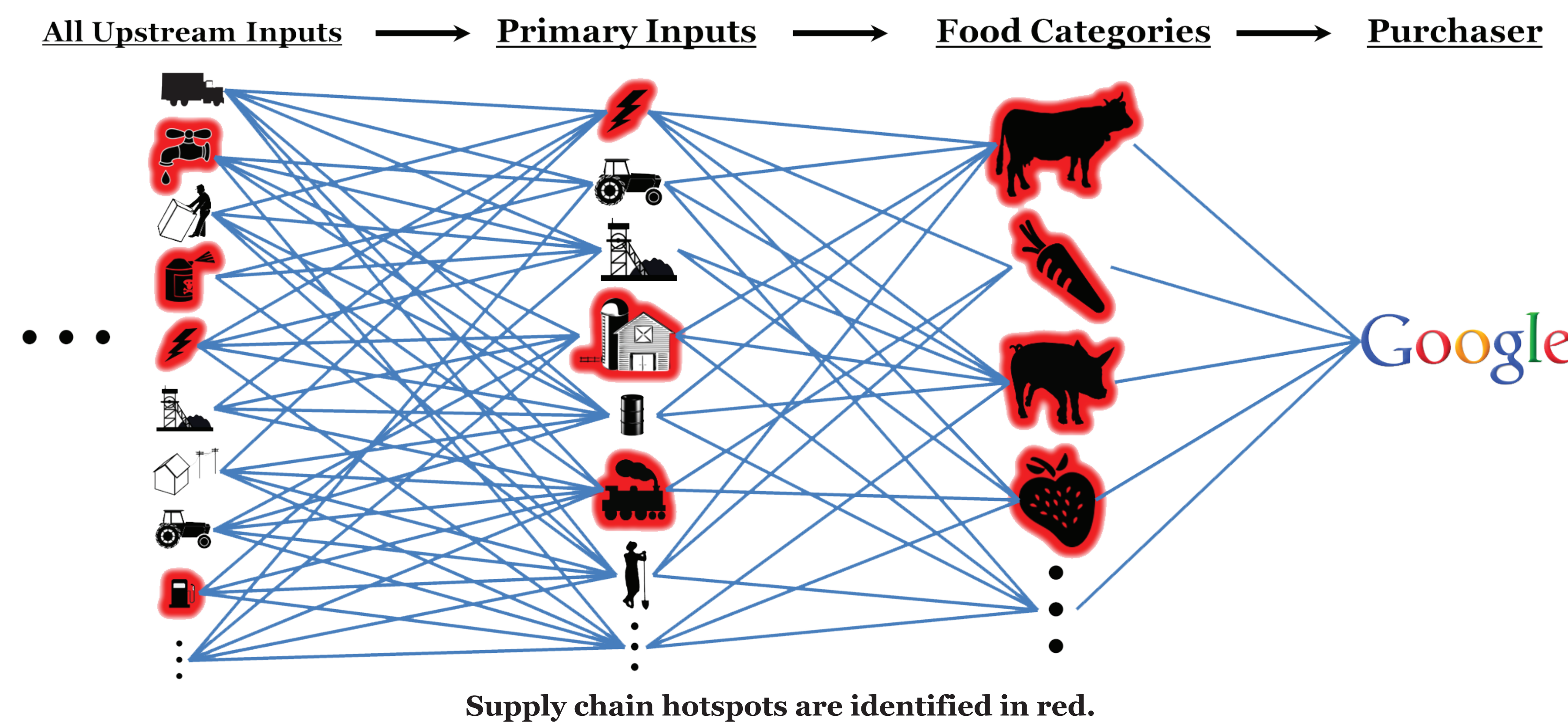
The goal of this project is to provide Google, the project client, with a data-driven method for assessing and reducing the environmental impacts of providing food for the employee cafeterias at its headquarters. Measuring the program's environmental impacts enables the client to implement a sustainability strategy to better manage its environmental footprint, specifically global warming impact and water consumption.

### OBJECTIVES

Google is committed to mitigating environmental impacts throughout its operations with a data-driven approach. This project aims to help the client to improve its food sourcing by quantifying the climate change impacts and water consumption of the food program's supply chain. To meet this objective, we developed the following strategy:

- Quantify the global warming impact and water consumption of the client's recent food purchases to identify and rank the most impactful food categories.
- Analyze the contributions of various agricultural practices to the impacts of individual food items, so the client can selectively source from more environmentally friendly food producers.
- Calculate water supply and demand differences among states to develop a regionalized model for identifying water consumption equivalents.

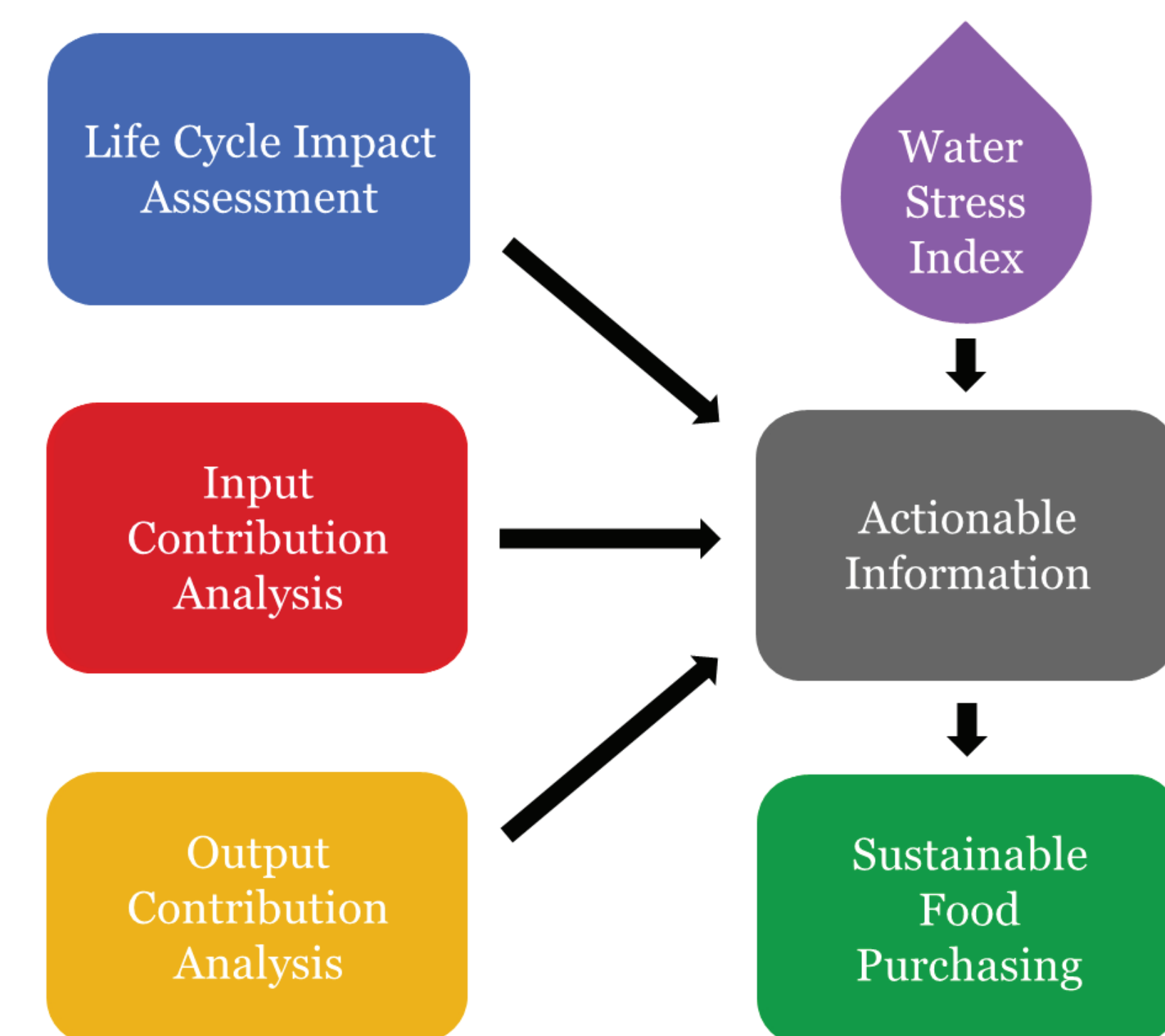
### EXAMPLE SUPPLY CHAIN DIAGRAM



## METHODS

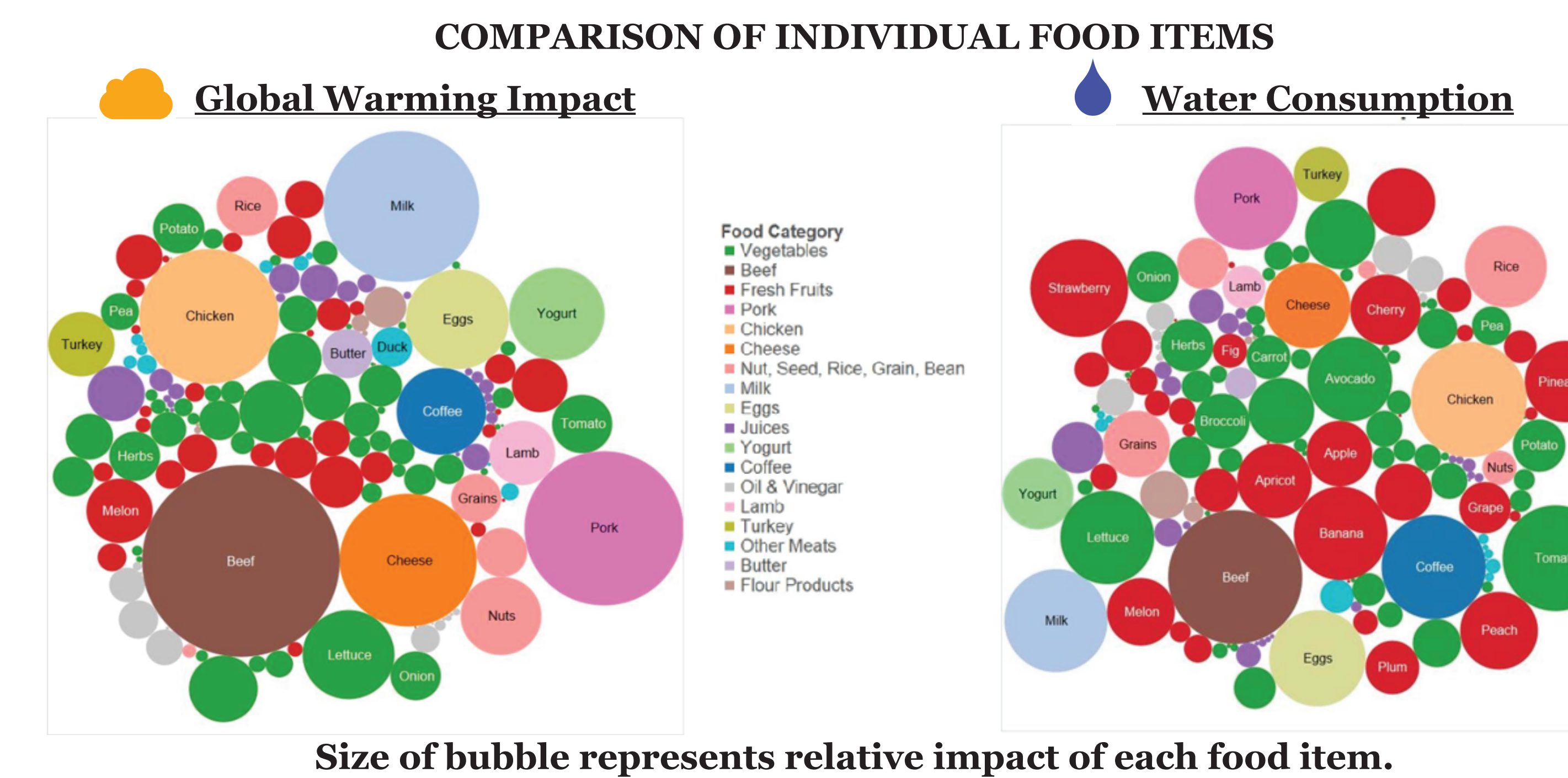
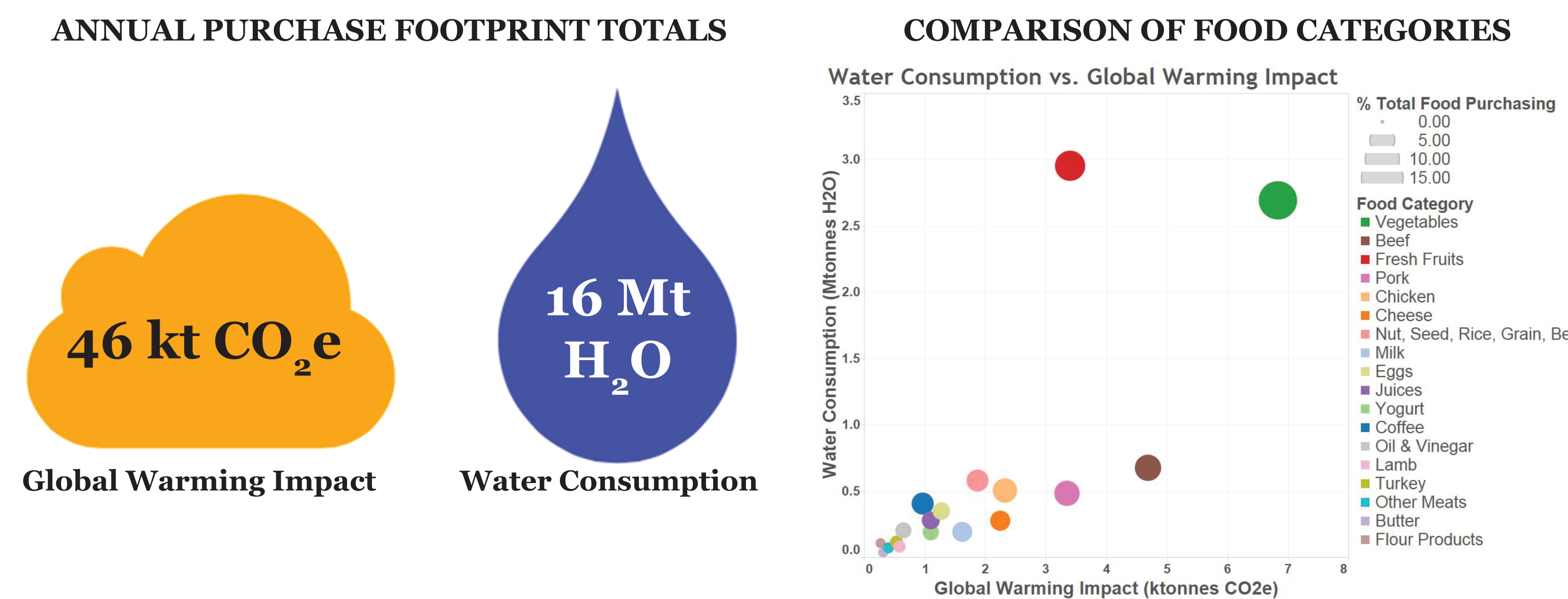
The project utilized economic input-output life cycle assessment to identify hotspot food categories based on the client's purchase data. Each hotspot food category underwent an input contribution analysis to determine which primary inputs have the greatest environmental impacts. An output contribution analysis identified recurring processes throughout the supply chain that contribute the greatest environmental impacts as a result of the client's food procurement practices. Finally, a regionalized water stress index was created as a tool for sourcing agricultural products from states with appropriate water resources. The end result is an analysis tailored to the client which can help guide a data-driven sustainable food purchasing strategy.

The diagram to the right shows the process flow of the project. The four deliverables provide actionable information that the client can use to develop a strategy for sustainable food purchasing.

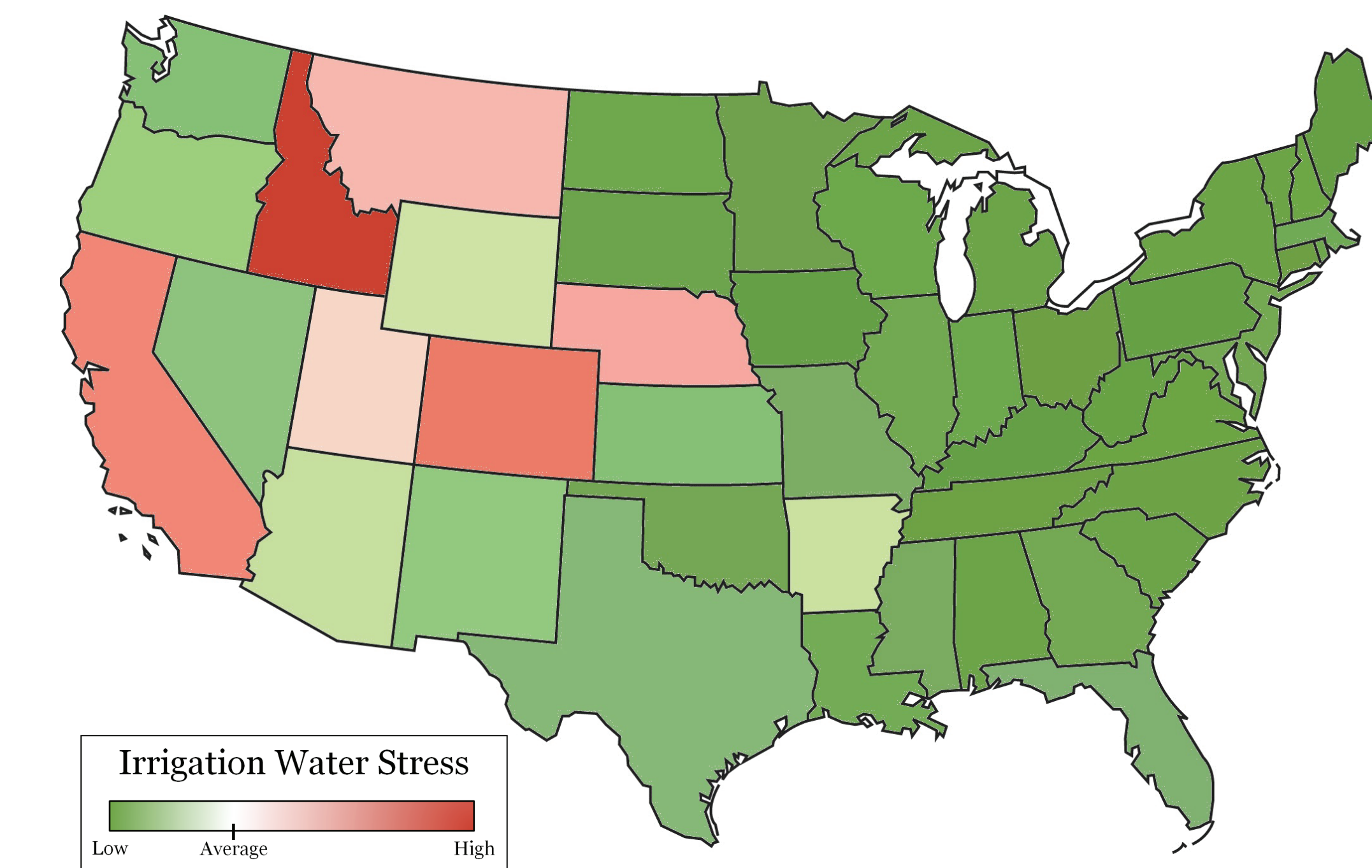


## LIFE CYCLE IMPACT ASSESSMENT

The analysis of broad food categories and individual food items resulted in two important takeaways. First, relatively few food items are responsible for a major portion of global warming impact and water consumption. Second, animal products have proportionally greater environmental impacts than other foods.



## WATER STRESS INDEX



The water stress index quantifies relative water use from regionally sourced agricultural products, based on withdrawals from the environment and irrigation rates.

### MOST STRESSED STATES

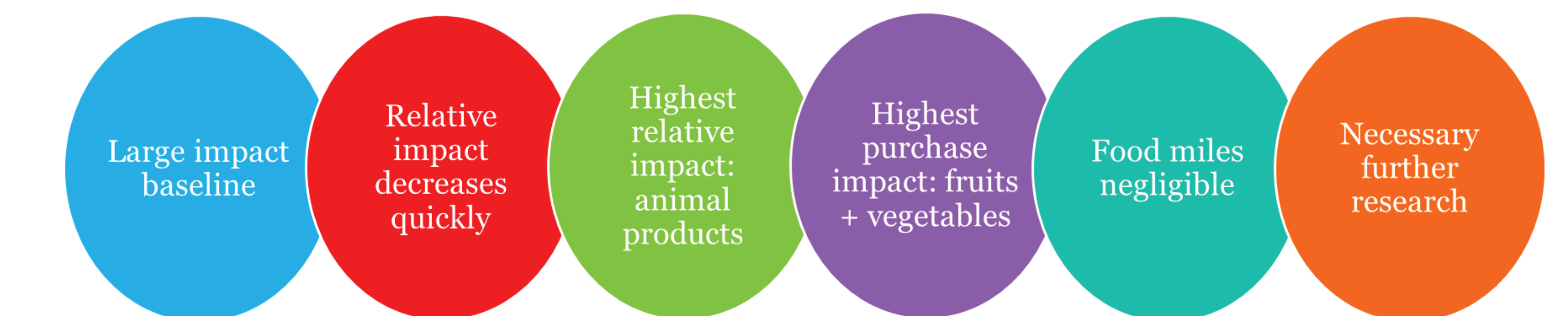
- Idaho
- Colorado
- California
- Nebraska
- Montana

### LEAST STRESSED STATES

- West Virginia
- Maine
- Vermont
- Kentucky
- New Hampshire

## TAKEAWAYS & CONCLUSIONS

The analyses performed in this project serve several purposes for the client. They provide a benchmark for annual global warming impact and water consumption; a prioritized list of food category hotspots, primary inputs, and supply chain processes; and an in-depth comparison of states based on water stress. Below are a few key takeaways:



We recommend four primary approaches to reducing global warming impact and water consumption:

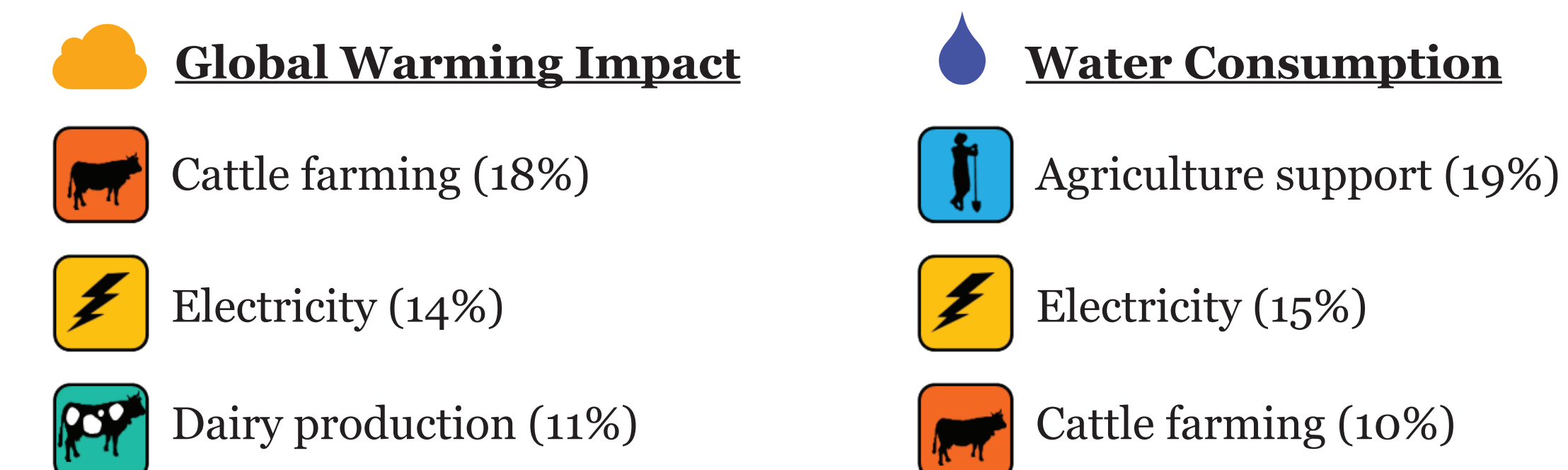
- Product substitution, the replacement of highly impactful items, such as red meat, with less impactful alternatives, such as poultry or vegetarian options. This strategy should be implemented with caution, as employees may object to reducing the availability of high-impact foods.
- Development of a supplier scorecard based on input contribution analysis results to compare production practices among suppliers.
- Source foods from states that are less water-stressed.
- Undergo a process-based life cycle assessment to study highly impactful foods in greater detail.

Method	Hotspot Identified	Strategic Action
Life Cycle Impact Assessment	Food Categories	Benchmarking & Product Substitution
Input Contribution Analysis	Primary Inputs	Supplier Scorecard
Output Contribution Analysis	Supply Chain Inputs	Cradle-to-Gate Perspective
Water Stress Index	Stressed States	Regional Sourcing

## INPUT CONTRIBUTION ANALYSIS

The input contribution analysis of all purchases shows the primary inputs that contribute to global warming impact and water consumption of overall impacts. For overall purchases, the top primary input contributing to global warming impact is cattle farming, while the top primary input contributing to water consumption is agriculture support.

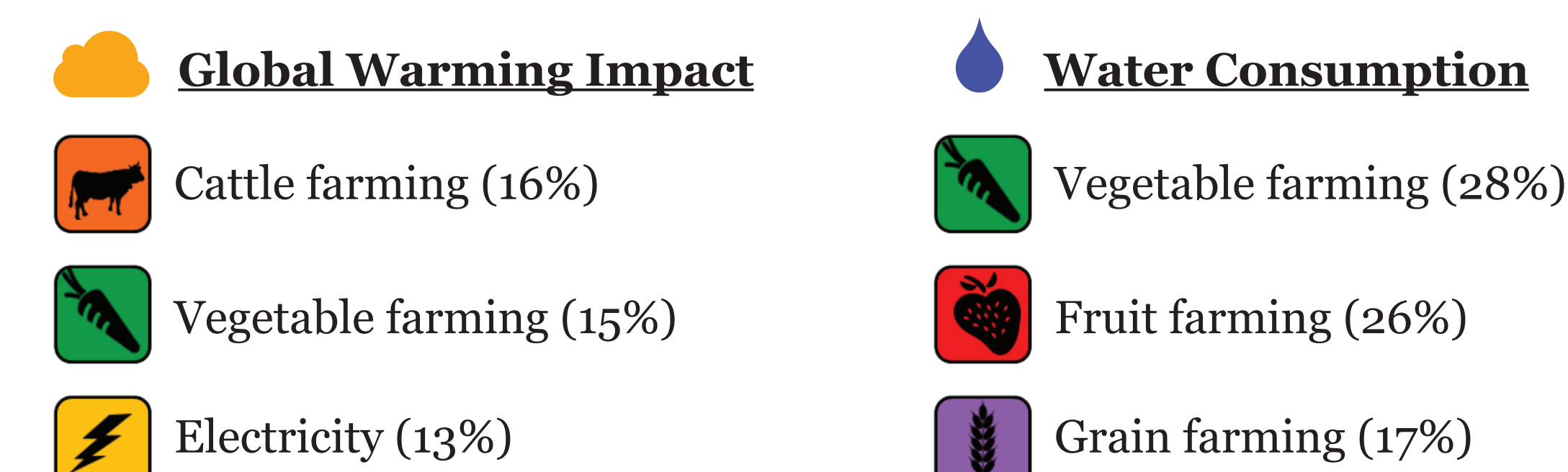
### TOP CONTRIBUTING PRIMARY INPUTS



## OUTPUT CONTRIBUTION ANALYSIS

The output contribution analysis of all purchases identifies processes that are responsible for the emission of greenhouse gases and consumption of water as part of the procurement supply chain. The process that contributes the most to global warming impact is cattle farming, while vegetable farming contributes the most to water consumption.

### TOP CONTRIBUTING SUPPLY CHAIN PROCESSES



## ACKNOWLEDGMENTS

We would like to thank the following people for their assistance in this process. Bren School: Sangwon Suh, David Tilman, Gary Libecap, Yi Yang, Eric Edwards, and Aubrey Dugger. IERS LLC: Shivira Tomar. Google: David Bennett and Victoria Ho. ETH Zurich: Stephan Pfister. Bon Appétit Management Company: Helene York, Joe Dominguez, and Charlie Liao.