

FY24 Nitrogen Footprint Report for Colorado State University

With specific considerations for CSU Residential Dining Services

Introduction

Purpose and Scope

This report quantifies the nitrogen emissions of Colorado State University (CSU) operations for FY24. The report also includes a detailed analysis of the nitrogen footprint from food procurement by CSU Residential Dining Services and highlights key areas for reductions.

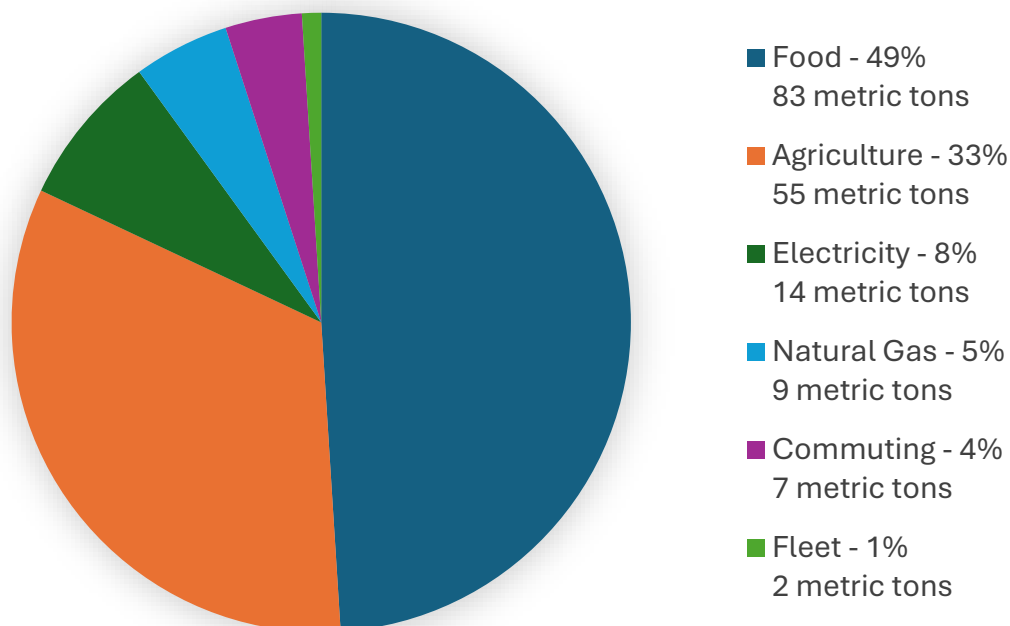
Importance of a Nitrogen Footprint

Nitrogen is essential in agricultural production but can contribute to environmental issues like air and water pollution, climate change, and biodiversity loss when overused. Calculating the nitrogen footprint and focusing on food procurement allows CSU to optimize sustainability efforts, improve resource efficiency, reduce operational costs, and helps cultivate a culture of sustainability across the campus community.

Key Findings and Results

For FY24, the total nitrogen footprint from university operations, including food purchases made by CSU Residential Dining Services (RDS), was 170 metric tons (MT). Food purchases make up the single largest category, which accounted for 83 MT or 49%.

FY24 Nitrogen Footprint for Colorado State University



Since purchased foods represent 49% of the total nitrogen emissions, a closer look each food category for FY24, ranked high-to-low by nitrogen impact (not by dollars spent or total weight of purchased product) is summarized in this table with further analysis to follow.

Food Category	Food Weight kg	Pounds	Total N (kg N)	N by %
Beef	93,472	206,070	31,212	38%
Chicken	167,504	369,283	20,283	24%
Pork	56,788	125,196	7,786	9%
Cheese	54,746	120,694	5,356	6%
Coffee & Tea	69,153	152,456	4,280	5%
Grains	230,371	507,881	4,160	5%
Milk	143,799	317,022	2,960	4%
Eggs	23,445	51,687	1,501	2%
Liquids	264,589	583,318	1,455	2%
Vegetables	154,832	341,346	1,413	2%
Fish	14,031	30,933	1,165	1%
Potatoes	130,139	286,907	835	1%
Fruits	94,972	209,377	293	<1%
Beans	27,894	61,496	189	<1%
Sugars	76,312	168,239	153	<1%
Nuts	5,287	11,656	73	<1%
Spices	2,076	4,577	58	<1%
Oils	67,737	149,334	23	<1%
Totals:	1,677,147	3,697,472	83,195	100%

Meat products account for 71% of the total food nitrogen emissions for FY24. Beef contributes 38%, Chicken 24%, and Pork 9% of the nitrogen emissions. Note that in FY24, Dining Services purchased a total of 317,764 kg, or approximately 701,000 pounds, of these three meat products. Meat products have the highest emissions impacts due to the extensive use of nitrogen-based fertilizers for growing animal feed crops, methane emissions from livestock digestion, and nitrogen waste from manure.

Methodology of the Nitrogen Footprint

Data Collection and Conversion

The annual CSU Greenhouse Gas (GHG) Inventory, also known as the Carbon Footprint, serves as the foundation for calculating the nitrogen footprint. Every category accounted for in the GHG inventory also has a corresponding nitrogen impact. What distinguishes the nitrogen footprint is the inclusion of food procurement data. This specific food data was obtained from CSU Residential Dining Services and included detailed records of all food purchases made during FY24. The data was organized by total spend, weight, and food category. To standardize the analysis, all weights and volumes were converted into kilograms.

The analysis covers 18 food categories, detailing their contributions to the total nitrogen footprint. By analyzing the results of these categories, RDS can identify key areas where nitrogen emissions have the greatest impact and could be reduced.

Data Entry into SIMAP

The standardized data was entered into the Sustainability Indicator Management and Analysis Platform (SIMAP) food template. SIMAP calculates the nitrogen footprint by applying specific emission factors to each food category, taking into account production and procurement. SIMAP then generates a comprehensive report that provides detailed insights into the nitrogen footprint.

Institutional Context

CSU is a leading public research university in Fort Collins, Colorado. With a commitment to sustainability, CSU aims to reduce its environmental impact through initiatives such as energy efficiency projects, waste reduction programs, and sustainable food procurement practices. During FY24, CSU served a community of more than 33,500 students, and 8,200 employees. Residential Dining Services spent over \$9,000,000 on food procurement and served almost 2.7 million meals.

Housing & Dining Services and RDS play a pivotal role in CSU's sustainability efforts by providing nutritious and sustainable food options, managing dining facilities, and implementing initiatives to reduce the environmental impact of dining services.

Comparative Analysis and Considerations for RDS

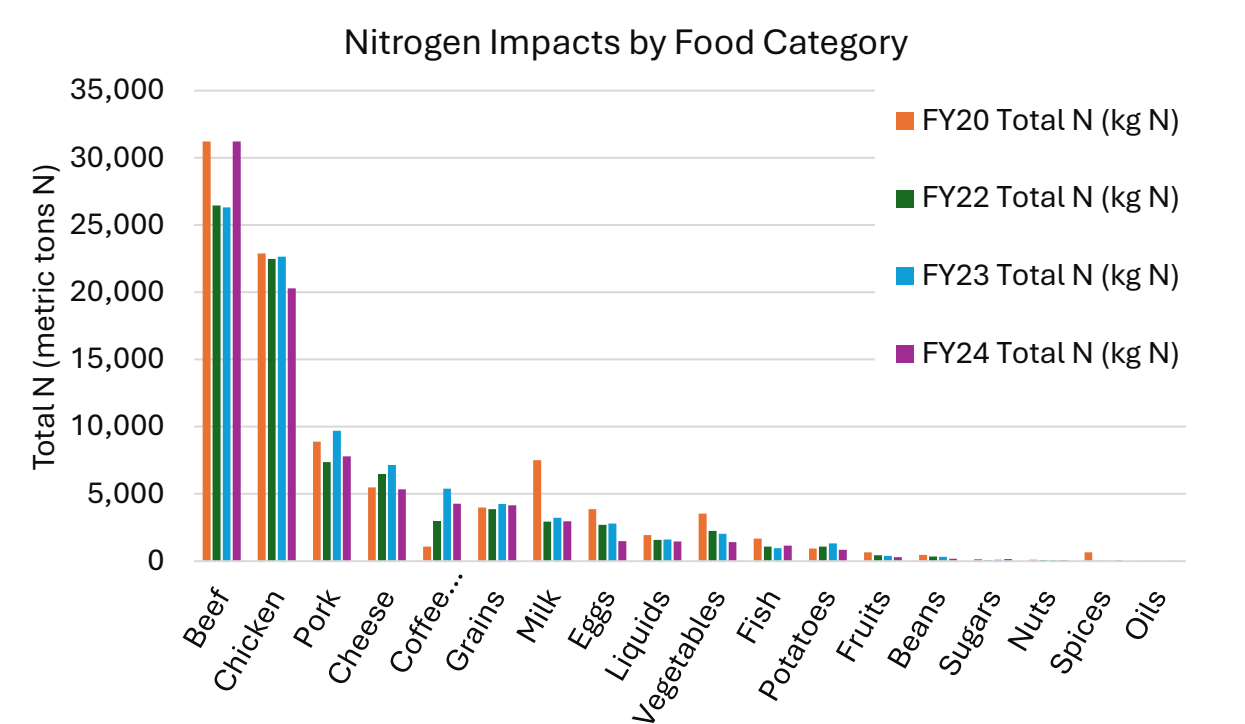
FY24 food procurement inventory reflects a 6% reduction compared to the FY23 data and a 12% reduction from the FY20 data.

Nitrogen Impacts	FY20 Total N (kg N)	FY22 Total N (kg N)	FY23 Total N (Kg N)	FY24 Total N (kg N)
Total N (kg):	95,047	82,300	88,380	83,194
Total N (metric tons N):	95.05	82.3	88.38	83.19
Total meals served:	2,105,245	2,177,094	2,485,826	2,664,077
N impact per meal (kg):	0.045	0.037	0.036	0.031

Note: The data from FY21 has been removed from the table due to the significant impact of COVID-19 on RDS operations and procurement activities.

The food related nitrogen footprint data from FY20 through FY24 reflects a general downward trend. However, no specific changes in any one food category demonstrates a consistent trend to indicate or reflect outcomes of a targeted nitrogen reduction initiative or operational change. Any year-to-year nitrogen impact variability in specific food categories likely indicate areas where procurement patterns may vary.

The following table summarizes the changes in nitrogen emissions for each food category.



Note: The data from FY21 has been removed from the table due to the significant impact of COVID-19 on RDS operations and procurement activities.

Interpretation of Results

In FY24, RDS’s food purchases generated a total of 83 MT of nitrogen emissions, accounting for 49% of the university’s gross nitrogen footprint of 170 MT. Meat products, particularly beef, chicken, and pork, remain the primary contributors to nitrogen emissions, comprising 71% of the total emissions from food purchases. This high percentage underscores the significant impact of meat products on CSU’s nitrogen footprint and highlights the opportunity for targeted reductions in these areas.

By reducing meat consumption, promoting plant-based menu options, and collaborating with suppliers to adopt sustainable farming practices, CSU can make substantial progress in lowering its nitrogen emissions. Initiatives such as sourcing from sustainable suppliers, encouraging organic or locally produced foods, and educating the campus community on the environmental impacts of food choices can further reduce emissions. These efforts align with CSU’s broader sustainability and environmental stewardship goals, demonstrating a commitment to creating a healthier, more sustainable campus environment.

Considerations for RDS to reduce nitrogen impacts

- **Focus on High-Impact Categories / Reduce Meat Purchases:** Target the reduction of beef, chicken, and pork to lower nitrogen emissions significantly.
 - For example – in FY24 purchases of chicken products contributed ~20,000 kg N. If RDS could reduce chicken purchases by 10%, the reduction of N is proportional.
- **Increase / Promote Plant-Based Options:** Increase and encourage the availability of plant-based menu items.
- **Sustainable Procurement / Engage Suppliers:** Work with and encourage suppliers to adopt sustainable farming practices to reduce nitrogen emissions. Also, strive for organic and/or locally sourced products – each have lower nitrogen impacts.
- **Educational Campaigns:** Raising awareness about the environmental impact of food choices can drive behavioral changes that contribute to reducing the nitrogen footprint.
- **Monitor and Report:** Continuously monitor and report on the nitrogen footprint – analyze procurement trends considering categories of food purchases by weight as a proxy for nitrogen impacts. Adjust procurement strategies and menu options based on data and progress relative to a reduction goal.
- **Continue and Enhance Food Waste Reduction Programs:** Continue successful programs and explore additional opportunities to minimize food waste – especially meat products.

Acknowledgments

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