

RI Food Data Discrepancies: Available Information, Their Methodologies, and Differences

Introduction

In preparation for the release of the “RI Food System Metrics Dashboard,” the Rhode Island Food Policy Council reviewed derivation of the data available in the state, sourced mainly from published studies performed by the National Agricultural Statistics Service as well as former University of Rhode Island researcher, Dr. Tom Sproul. In analyzing both available datasets, differences in both the researchers’ methodologies and their resulting findings are clear. In order to better understand where these numbers and their disparity comes from, the Rhode Island Food Policy Council has been charged with delving into both entities’ processes for gathering information and isolating factors in these procedures that could result in such variability. A better understanding of this knowledge and how it has been found will allow the Council to publish metrics for the lay public that are clear, accurate, and founded in reliable approaches.

Census of Agriculture

The United States Department of Agriculture’s Census of Agriculture, performed under the National Agricultural Statistical Service (NASS), is a complete count of U.S. farms, ranches, and the people who operate them conducted every 5 years in each state. The study includes small growers and examines land use and ownership, operator characteristics, production practices, income and expenditures. NASS uses capture-and-recapture methods, also known as dual system estimation and often found in the study of conservation biology, in order to represent what it believes to be the complete picture of the American agricultural industry. Essentially, NASS counts farms each five years in the Census of Agriculture, but it also counts them each year in their June Area Survey (JAS). While the JAS surveys a much smaller pool of farms, USDA utilizes its findings to match those two datasets and identify what proportion of farms were counted twice in each study. The JAS does not take place everywhere—NASS only visits 0.6% of land area from their census—however the USDA asserts that dual system estimation has the capacity to account for the remaining 99.4%. From there, the USDA claims it is able to calculate an estimation of the total number of farms. Once this research is conducted, NASS produces a report for each state and county that details the character of its agricultural industry, providing

figures that describe its economic impact, scope, and key demographic characteristics of its operators. In Rhode Island, the 2017 Agricultural Census reported a decrease in number of farms (1043, -16%) and farm size (58,864 acres, -18%) but an increase in farm income (\$5,733,000, +66.8%) (Appendix A).

Dr. Tom Sproul 2012 Study

Concurrently with the administration of the 2012 Census of Agriculture, former University of Rhode Island researchers, agricultural economist Dr. Tom Sproul and Brandon Elsner, performed their own measures of the economic impact of Rhode Island agriculture, as compared to the 2007 census. At this study's outset, the public offered indication that there were no locally performed estimates of agricultural production and the plant-based industry's economic impact, and the numbers from the federal government appeared to be too low. Sproul highlights a few reasons for perceived inaccuracies in the Federal data: USDA's objective is not to evaluate the economic impact of the sector, rather, the organization is interested in counting the "market value of agricultural products sold" which does not include value-added products and farmer-provided services. To encompass these neglected portions of the industry, this study integrates statistical estimates and aggregated listings of businesses at the state level with qualitative observations of individual businesses. Observations were sourced from a questionnaire administered in 2011 by the RI Nursery and Landscape Association, the RI Turfgrass Foundation, the RI Agricultural Partnership and the URI College of Business and supplemented by business listings downloaded from the ReferenceUSA database as well as aggregate data from 2007 Census of Ag, RI Secretary of State's Office (for landscape and other contractors), and the RI DEM (for retail nurseries, farm and garden supply stores, and florists). Utilizing their sample of 2014 agricultural firms, Sproul and Elsner calculated conservative estimations of number of jobs, value of gross sales, and value of farm revenues, with value-added products now accounted for. They found that Rhode Island's gross farm sales approximately amounted to over \$100,000,000 greater than USDA estimates (\$161,855,500) and that Rhode Island farms employed almost 10% more workers than the NASS had calculated (1790 jobs) (Appendix A).

2015 Update to Sproul's Study

Two years after publishing his prior study, Dr. Sproul conducted a second round of research that updated 2012 figures and provided estimates that were not confined to the lower bound. Utilizing 2007 and 2012 Census of Agriculture data, purchased marketing research data, and the Bayesian statistical inference model (Appendix B), Sproul attempted to fine-tune the 2012 numbers in order to prioritize accuracy over conservatism. The results: a 47 percent increase in gross sales/farm revenues (\$238,900,000), , and a 43 percent increase in jobs (2563 jobs). The calculations amount to four times the agricultural output estimates and one point four times the

jobs estimates provided by the 2012 Census of Agriculture, putting forth a claim that the NASS data grossly underestimates the facts and figures of Rhode Island agriculture's economic impact.

Discrepancies and Possible Causes

These two sets of research contain notable disparities in their resulting figures: Dr. Sproul's estimates—the first round of which he asserts are conservative in their computation, and the second, more realistic—present a state food system far larger in scope than that which the USDA and NASS offer in their data. Just in gross sales, this URI research surpasses the Census of Agriculture figures by over *\$150 million*. While the causes for these differences cannot be isolated for certain, the two studies' contrasting methodologies provide some clarity. While the NASS relies on dual system estimation, Sproul combines local surveys, state official numbers, industry-standard databases, and Bayesian statistical modeling. Perhaps the expanded scope in data sourcing in Sproul's research can account for the expanded scope of his results.

Additionally, the Census of Agriculture excludes certain aspects of the agricultural industry that Sproul does take into account: the USDA does not count sales and income from value-added products, which, according to Sproul, Rhode Island farms are highly dependent on “to overcome tax rates and agricultural land values that are among the highest in the country.” In conversation with Dr. Sproul, the economist provided further justification for the gaps in numbers. He shared that in not counting family members as employees, in misconstruing certain operations as farms, and in conducting surveys with a high nonresponse rate where extensive data extrapolation is utilized, the USDA could be painting a very inaccurate picture of Rhode Island farms. Sproul provided the example of nonresponding vineyards, which the Census of Agriculture often counts as wholesale table grapes—a very different type of farm operation that is not nearly as lucrative.

Another important distinction between the two data sources described in this report are their aims. Dr. Sproul is interested in producing an overview of the economic impact of the state's plant-based industries, which include agriculture along with other green-related sectors, such as landscaping services. The USDA on the other hand, in conducting the Census of Agriculture, strives to provide a comprehensive count of United States farms and their operators. In doing so, the Census of Agriculture provides demographic information about producers that go beyond the scope of Sproul's work. In developing our own data dashboard, the Rhode Island Food Policy Council is committed to centering equity and diversity in our state's foodscape, and therefore could benefit from the expanded breadth of the Census. However, the perceived inaccuracies in the NASS's economic and operational data prompt the council to question a complete reliance on the Census of Agriculture for these more community-oriented indicators. Fortunately, engagement with organizations in our community, such as the Rhode Island Food Bank, the African Alliance of Rhode Island, and the Narragansett Food Sovereignty Initiative, may be able to supplement this data.

Appendix A

	Sproul 2012	Sproul 2015	NASS 2012	NASS 2017
# of farms	1790	229	1243	1043
gross sales	\$161,855,500	\$238,900,000	59,652,000	\$57,998,000
employment	954	2563	1831	NA

Appendix B

<https://seeing-theory.brown.edu/doc/bayesian-inference.pdf>