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on the

Dairy Promotion and Research Program

and the

Fluid Milk Processor Promotion Program

2023 Activities

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Contents

Contact Information 2

Executive Summary 5

Chapter 1: The Dairy and Fluid Milk Processor Promotion Programs 7

Chapter 2: USDA Activities 10

Chapter 3: Quantitative Evaluation of the Effectiveness of Promotion Activities by the National Dairy Promotion and Research Program and the National Fluid Milk Processor Promotion Program 13

Chapter 4: Qualified State, Regional, or Importer Dairy Product Promotion, Research, or Nutrition Education Programs 42

Additional Information: Approved Contracts and Research Activities 48

Executive Summary

The enabling legislation of the dairy producer, dairy importer, and fluid milk processor promotion programs requires the U.S. Department of Agriculture (USDA) to submit an annual report to the House Committee on Agriculture and the Senate Committee on Agriculture, Nutrition, and Forestry. The dairy and fluid milk promotion programs are conducted under the Dairy Production Stabilization Act of 1983 (7 U.S.C. 4501 *et seq.*) (Dairy Act); the Dairy Promotion and Research Order (7 CFR § 1150) (Dairy Order); the Fluid Milk Promotion Act of 1990 (7 U.S.C. 6401 *et seq*.) (Fluid Milk Act); and the Fluid Milk Promotion Order (7 CFR § 1160) (Fluid Milk Order), respectively. This report includes summaries of the activities for the dairy and fluid milk programs, including an accounting of funds collected and spent, USDA activities, and an independent analysis of the effectiveness of the programs. Unless otherwise noted, this report addresses program activities for January 1 through December 31, 2023, of the Dairy Promotion and Research Program and the Fluid Milk Processor Promotion Program.

Dairy Promotion and Research Program

Mandatory assessments collected under the Dairy Act totaled $350.4 million in 2023. The Dairy Promotion and Research Board (Dairy Board) portion of assessments totaled $123.9 million, and the Qualified Dairy Product Promotion, Research, or Nutrition Education Programs (QPs) totaled $226.5 million. Expenditures by the Dairy Board and many of the QPs are integrated through a joint process of planning and program implementation to work together on the national, regional, State, and local level. The Dairy Board continued to develop and implement programs to expand the consumption of dairy products by focusing on partnerships and innovation, product positioning with consumers, and innovations for dairy product consumption.

Details of the Dairy Board's activities are presented in chapter 1. Details of the QPs' activities are in chapter 4.

Fluid Milk Processor Promotion Program

Mandatory assessments collected under the Fluid Milk Act totaled $78.4 million in 2023. The Fluid Milk Processor Promotion Board (Fluid Milk Board) continued to administer a generic fluid milk promotion and consumer education program funded by America's fluid milk processors. The program is designed to educate Americans about the benefits of fluid milk, increase milk consumption, and maintain and expand markets and uses for fluid milk products in the contiguous 48 States and the District of Columbia.

The Fluid Milk Order requires the Fluid Milk Board to return 80 percent of the funds received from California fluid milk processors to the California Milk Processor Board. Per the Fluid Milk Order requirement, $6.6 million was returned to the California Milk Processor Board. The activities of the Fluid Milk Processor Promotion Program are presented in the Fluid Milk Board section in chapter 1.

USDA Activities

USDA has oversight responsibility for the dairy and fluid milk promotion programs. The oversight objectives ensure the boards and QPs properly account for all program funds and administer the programs in accordance with the respective acts, orders, and USDA guidelines and policies. USDA reviewed and approved all board budgets, contracts, and advertising materials. USDA employees attended all board and committee meetings, monitored all board activities, and were responsible for obtaining an independent evaluation of the programs. Additional USDA responsibilities included nominating and appointing board members, amending the orders, conducting referenda, assisting with noncompliance cases, and conducting periodic program management reviews. The boards reimbursed the U.S. Secretary of Agriculture (Secretary), as required by the acts, for all of USDA's costs of program oversight and for the independent analysis discussed in chapter 3. Chapter 2 details USDA's oversight activities.

Independent Analysis

Chapter 3 describes the results of the independent econometric analysis, conducted by Texas A&M University, on the effectiveness of the programs implemented by the Dairy Board and the Fluid Milk Board. The analysis indicates that the generic fluid milk marketing activities sponsored by the programs have mitigated the decline of fluid milk consumption.
In addition, chapter 3 presents the combined effects of 2023 promotion activities on the consumption of fluid milk, cheese, butter, all dairy products, and dairy exports and includes the benefit-cost ratios (BCRs) for dairy producers, importers, and fluid milk processors. For every dollar invested in demand-enhancing activities, the BCRs for producers were as follows: (1) fluid milk - $1.41; (2) cheese - $3.38; (3) butter - $19.19. The BCR for fluid milk processors attributed to fluid milk promotion activities is $1.10.

Chapter 1

The Dairy and Fluid Milk Promotion Programs

The Dairy Board and the Fluid Milk Board continued to develop and implement programs to expand the human consumption of fluid milk and dairy products. This chapter details the activities of each board.

1. National Dairy Promotion and Research Board

The mission of the Dairy Board is to coordinate a promotion and research program that maintains and expands domestic and foreign markets for fluid milk and dairy products. The Dairy Board is responsible for administering the Dairy Order, developing plans and programs, approving budgets, and monitoring the program results.

The Secretary appoints 37 members to the Dairy Board, 36 of whom are dairy producers, each representing one of 12 geographic regions within the United States, and one representing dairy importers. The appointments are made from nominations submitted by individual applicants, producer organizations, importer organizations, general farm organizations, and QPs. Dairy Board members must be active dairy producers or dairy importers. Members serve staggered three-year terms, with no member serving more than two consecutive terms.

Total Dairy Board income and expenses are provided in the annual independent audit report. The 2023 audit report can be found at: https://www.usdairy.com/getattachment/931d6295-c7f3-4f3e-855b-44728e18c8e4/2401-4409491_National_Dairy_Board_23-22_FINAL-Secured.pdf?lang=en-US&ext=.pdf. The Dairy Board's administrative budget continued to be within the five-percent-of-revenue limitation required by the Dairy Order.

The Dairy Board has one standing committee, the Finance Committee, comprised of the Dairy Board officers and appointees named by the Dairy Board chair. The Dairy Board Treasurer chairs the Finance Committee. The other Dairy Board committees are joint program committees with the United Dairy Industry Association (UDIA).

Dairy Management Inc. (DMI), the management and staffing corporation, is a joint undertaking between the Dairy Board and UDIA. UDIA is a federation of 16 of the 63 QPs under the direction of a board of directors. The mission of DMI is to drive increased sales of and demand for dairy products and ingredients on behalf of dairy producers and dairy importers. DMI works proactively, in partnership with leaders and innovators, to increase and leverage opportunities to expand dairy markets. The DMI Board of Directors comprises all Dairy Board (37) and all UDIA (41) members. Voting is equalized between the Dairy Board and UDIA.

DMI serves the Dairy Board and the UDIA Board and facilitates the integration of promotion funds through a joint process of planning and program implementation so that the programs on the national, regional, State, and local level work together. The Dairy Board and UDIA Board must separately approve the DMI budget and annual plan before these plans can be implemented. During 2023, DMI continued to implement a national staffing structure to plan and execute the

national programs.

DMI funds one to three-year research projects supporting marketing efforts. Six Dairy Foods Research Centers and one Nutrition Institute provided much of the research in 2023. The mission of the research centers is to conduct research, educate professionals, transfer knowledge to the industry, and create dairy products and ingredients with improved health, safety, quality, and functionality. Universities and other industry researchers throughout the United States competed for these research contracts. Additional information can be found at: https://www.usdairy.com/research-resources/dairy-foods-research-centers.

The joint Dairy Board and UDIA Board committee structure provides the framework for DMI program activities. The Dairy Board and UDIA Board Chairs assign their respective board members to the following seven joint program committees: Farmer Relations, Exports, Sustainability, Reputation, Innovation, Fluid Milk and International Partnerships. Each committee elects a chair and vice-chair. The DMI Board and joint committees set program priorities, plan activities and projects, and evaluate results. During 2023, the Dairy Board and UDIA Board met jointly six times both in person and virtually.

For more information on the Dairy Board and UDIA Board activities and initiatives implemented in 2023, see the DMI annual report at: https://www.dairycheckoff.com/DairyCheckoff/files/1c/1c3abdf5-4b5b-48a8-b81b-a761393693ae.pdf.

II. National Fluid Milk Processor Promotion Board

The Fluid Milk Board, as authorized in the Fluid Milk Act, administers a fluid milk promotion and consumer education program funded by fluid milk processors. The program is designed to educate Americans about the benefits of fluid milk, increase milk consumption, and maintain and expand markets and uses for fluid milk products in the contiguous 48 States and the District of Columbia. The fluid milk marketing programs are research-based and message-focused for the purpose of positively changing the attitudes and purchase behavior of Americans regarding fluid milk.

The Secretary appoints 20 members to the Fluid Milk Board. Fifteen members are fluid milk processors who each represent a separate geographical region, and five are at-large members. Of the five at-large members, at least three must be fluid milk processors and at least one must be from the general public. The members of the Fluid Milk Board serve three-year terms and are eligible to be appointed to two consecutive terms. The Fluid Milk Order provides that no company shall be represented on the Fluid Milk Board by more than three representatives. Fluid Milk Board members who fill vacancies with a term of 18 months or less may serve two additional three-year terms. The Milk Processor Education Program (MilkPEP) carries out the activities of the Fluid Milk Board.

The Fluid Milk Board elects four officers: Chair, Vice-Chair, Secretary, and Treasurer. Fluid Milk Board members are assigned by the Chair to the Fluid Milk Board's program committees. The program committees are responsible for setting program priorities, planning activities and

projects, and evaluating results. In addition, the Fluid Milk Board has a Finance Committee to review all program authorization requests for funding sufficiency as well as review the Fluid Milk Board's independent financial audit and the work of the board's accounting firm. The Fluid Milk Board met three times in 2023 to conduct board business.

Total Fluid Milk Board income and expenses are displayed in the annual independent financial audit: https://p-milkpep-website-staticassets.s3.us-west-2.amazonaws.com/wp-content/uploads/2025/02/17053508/FS-Audit-12-31-23.pdf. The Fluid Milk Board's administrative budget continued to be within the five-percent-of-revenue limitation required by the Fluid Milk Order. For more information on the Fluid Milk Board activities and initiatives implemented in 2023, see the MilkPEP annual report at: https://s3.us-west-2.amazonaws.com/externalassets-p.milkpep-production.g43labs.net/MilkPEP+2023+Annual+Report.pdf.

Chapter 2

USDA Activities

The USDA's Agricultural Marketing Service's (AMS) Dairy Program has oversight responsibilities for the Dairy Board and the Fluid Milk Board. AMS Dairy Program's oversight activities include reviewing and approving the Dairy and Fluid Milk Boards' budgets, contracts, investments, and marketing campaigns. Materials are monitored for conformance with provisions of the respective Acts and Orders, the U.S. Dietary Guidelines for Americans, in addition to other legislation. AMS Dairy Program also uses the "Guidelines for AMS Oversight of Commodity Research and Promotion Programs" to govern oversight and facilitate the application of legislative and regulatory provisions of the Acts and the Orders.

The AMS Dairy Program ensures the collection, accounting, auditing, and expenditures of promotion funds are consistent with the enabling legislation and Orders; certifies Qualified Programs; and provides for the evaluation of the effectiveness of both promotion programs' advertising campaigns. The AMS Dairy Program assists the Boards in their assessment collection, compliance, and enforcement actions.

Other AMS Dairy Program responsibilities include facilitating the nomination and appointment process of board members, amending the Orders, conducting referenda, reviewing communications, and conducting periodic management reviews. AMS Dairy Program representatives attend full board and committee meetings and other meetings related to the programs.

Dairy Promotion and Research Program Oversight

Collections
The Dairy Act specifies that each person making payments to a producer for milk produced in the United States and purchased from the producer should, in the manner prescribed by the Order, collect an assessment based on the number of hundredweights of milk for commercial use handled for the account of the producer and remit the assessment to the Dairy Board. The current rate of assessment for dairy producers is 15 cents per hundredweight of milk for commercial use or the equivalent thereof, as determined by the Secretary. In addition, the rate of assessment for imported dairy products prescribed by the Order is 7.5 cents per hundredweight of milk for commercial use or the equivalent thereof, as determined by the Secretary.

Contracts

The Dairy Act and Dairy Order require contracts expending assessment funds be approved by the Secretary. During 2023, the AMS Dairy Program reviewed and approved 686 Dairy Board and DMI agreements, amendments, and annual plans. During 2023, DMI retained the certified public accounting firm of Ernst & Young to audit the records of the following contractors: Mischief@NoFixedAddress Inc., Daniel J. Edelman Inc., NFL Properties LLC, National Milk Producers Federation, and United Dairymen of Arizona. No material exceptions were found.

USDA Foreign Agricultural Service

The Secretary of Agriculture has delegated oversight responsibility for all foreign market development activities outside the United States to the USDA Foreign Agricultural Service (FAS) (7 CFR 2.601(a)(4)). FAS reviews the U.S. Dairy Export Council (USDEC) foreign market development plan and related contracts. The AMS Dairy Program also reviews USDEC contracts to ensure conformance with the Dairy Act, Dairy Order, and established USDA policies. In 2023, the AMS Dairy Program reviewed and approved 91 USDEC agreements, amendments, and annual plans.

Organic Exemption

On December 31, 2015, a final rule was published, with an effective date of February 29, 2016, to amend the organic exemption regulations to allow persons that produce, handle, market, process, manufacture, feed, or import 'organic' and '100 percent organic' products to be exempt from paying assessments associated with commodity promotion programs administered by AMS, regardless of whether the person requesting the exemption also produces nonorganic products (80 FR 82006, published December 31, 2015). In States having mandatory assessment laws, organic dairy producers are exempt only from the Federal assessment. Organic producers are still responsible for remittance of State assessments. In 2023, exempted assessments totaled $1,732,240. The Dairy Order requires organic producers to reapply annually to continue to receive the exemption.

USDA Dairy Promotion and Research Program Expenses

Per the Dairy Board's enabling legislation, the Dairy Board reimburses the AMS Dairy Program for the cost of administrative oversight and compliance audit activities. In 2023, the AMS Dairy Program's oversight expenses totaled $737,546 and the Federal Milk Market Administrators incurred $245,756 in expenses for verification audits conducted on behalf of the Dairy Board.

Qualified Programs

Qualified Programs are State, regional, or importer organizations conducting dairy product promotion, research, or nutrition education programs, authorized by Federal or State law, or were active programs prior to the Dairy Act. In 2023, the AMS Dairy Program reviewed applications for continued qualification from 62 Qualified Programs. A list of Qualified Programs is provided in Chapter 4. Consistent with its responsibility for monitoring the Qualified Programs, the AMS Dairy Program obtained and reviewed income and expenditure data from each Qualified Program, and data reported are included in aggregate for 2023 in Chapter 4.

National Fluid Milk Processor Promotion Board Oversight

Program Development

The Fluid Milk Board contracted with Gale Partners LLC, to develop programs for advertising, promotion, and consumer education in connection with the national fluid milk campaign.

Collections

The Fluid Milk Act specifies that each fluid milk processor shall pay an assessment on each unit of fluid milk product processed and marketed commercially in consumer-type packages. The current rate of assessment is 20 cents per hundredweight of fluid milk products marketed.

Contracts

The Fluid Milk Act and Fluid Milk Order require budgets and contracts expending assessments be approved by the Secretary. During 2023, the AMS Dairy Program approved 252 Fluid Milk Board agreements, amendments, and annual plans. The Fluid Milk Board retained the certified public accounting firm of Snyder Cohn, P.C. in 2023 to audit the records of Gale Partners LLC, New York. No material exceptions were found.

Organic Exemption

On December 31, 2015, a final rule was published, with an effective date of February 29, 2016, amending the organic exemption regulations to allow persons that produce, handle, market, process, manufacture, feed, or import 'organic' and '100 percent organic' products to be exempt from paying assessments associated with commodity promotion programs administered by AMS, regardless of whether the person requesting the exemption also produces nonorganic products (80 FR 82006 published December 31, 2015). In 2023, the amount of exempted fluid milk assessments totaled $3,369,357. The Fluid Order requires organic fluid milk processors to reapply annually to continue to receive the exemption.

USDA Fluid Milk Processor Promotion Program Expenses

Per the Fluid Milk Act, the Fluid Milk Board reimburses the AMS Dairy Program for the cost of administrative oversight and compliance audit activities. In 2023, the AMS Dairy Program's oversight expenses totaled $531,076 and the Federal Milk Market Administrators incurred $137,404 in expenses for verification audits conducted on behalf of the Fluid Milk Board.

Chapter 3

Quantitative Evaluation of the Effectiveness of Promotion Activities by the National Dairy Promotion and Research Program and the National Fluid Milk Processor Promotion Program – 1995 to 2023

Introduction

The Dairy Act and the Fluid Milk Act require an annual independent analysis of the advertising and promotion programs that operate to increase consumer awareness and sales of fluid milk and dairy products. Dr. Oral Capps, Jr., Executive Professor and Regents Professor, Director of the Agribusiness, Food, and Consumer Economics Research Center (AFCERC), and Holder of the Southwest Dairy Farmers Marketing Endowed Chair, Department of Economics, Texas A&M University, was awarded a competitive contract to conduct this study. This chapter is a summary of the 2023 quantitative evaluation of the effectiveness of the dairy and fluid milk promotion programs.

Background on the Promotion Programs

The Dairy Research and Promotion Program, also known as the Dairy Checkoff Program, is a coordinated national research and promotion program intended to maintain and expand domestic and foreign markets for fluid milk and dairy products. To fund the program, U.S. dairy producers pay a 15-cent-per-hundredweight assessment on milk marketings, and importers pay a 7.5-cent-per-hundredweight assessment, or milk-equivalent thereof, on dairy products imported into the United States. Dairy Management Inc. (DMI), a management and staffing corporation, is a joint undertaking between the National Dairy Promotion and Research Board (Dairy Board) and the United Dairy Industry Association (UDIA). The UDIA is a federation of State and regional dairy-producer-funded promotion organizations referred to as Qualified Programs[1] (QPs). The UDIA operates under the direction of a board of directors of their member organizations. DMI's mission is to drive increased sales of, and demand for, dairy products and ingredients on behalf of dairy producers and dairy importers. DMI works proactively in partnership with leaders and innovators to increase and apply knowledge that leverages opportunities to expand dairy markets.

The Fluid Milk Processor Promotion Program, or Milk Processor Education Program (MilkPEP), develops and finances generic advertising programs designed to maintain and expand markets for fluid milk products produced in the United States. Fluid milk processors marketing more than three million pounds of fluid milk per month pay a 20-cent-per-hundredweight assessment on fluid milk processed and marketed in consumer-type packages in the contiguous 48 States and the District of Columbia.

[1] Qualified Dairy Product Promotion, Research or Nutrition Educational Programs (Qualified Programs or QPs) are State, regional, local, or importer promotion programs certified annually by the Secretary of Agriculture to receive a portion of the funds generated under the Dairy Research and Promotion Program.

The Dairy Research and Promotion Program, funded by dairy producers and dairy importers, and the Fluid Milk Processor Promotion program, funded by fluid milk processors, are hereinafter referred to jointly as the National Programs.

Objectives of the Evaluation Study

The National Programs are evaluated with two key questions in mind: (1) Have the demand-enhancing activities conducted by dairy producers, importers, and fluid milk processors increased the demand for fluid milk and manufactured dairy products? (2) Did those who have paid for the promotions conducted benefit from them?

Historically, these questions have been answered through econometric studies of the relationships between the consumption of dairy products and promotion program demand-enhancing expenditures. These demand relationships are estimated econometrically, accounting for a plethora of impacts of key market forces. Economic returns to dairy producers, importers, and fluid milk processors that result from marketing and promotion activities and the associated changes in consumption are calculated using the parameters obtained from the estimated demand models. The summary indicator of economic return on investment is termed the benefit-cost-ratio (BCR).

The level of the BCR often is taken as an indication of the impact of any program. Due to diminishing marginal returns, the ratio between the incremental revenue generated and the level of funding (i.e., the BCR) declines as funding increases for promotion programs. Consequently, metrics other than the BCR, such as the level of impact on consumption, prices, and exports are also useful indicators of the impact and effectiveness of any checkoff program.

The objectives of this report are to:

1. Statistically measure the combined effects of the promotion activities of the National Programs on the consumption of fluid milk, cheese, butter, all dairy products, and dairy exports.
2. Provide a quantitative analysis of dairy product imports and import assessments.
3. Update the benefit-cost analysis associated with the National Programs for dairy producers, fluid milk processors, and importers.

This project covers the period of 1995 to 2023 and captures the joint efforts of DMI, MilkPEP, and QPs. On average, the shares of each promotion entity in the total demand-enhancing expenditures over this period are as follows: (1) DMI – 26.2 percent; (2) MilkPEP – 22.6 percent; and (3) QPs – 51.2 percent.

Summary of the Findings

The overall finding of this evaluation is that dairy promotion under the National Programs has effectively increased U.S. demand (domestic and exports) for dairy products. Per capita consumption of fluid milk, cheese, butter, and nonfat dry milk were higher by 6.7 percent, 3.8

percent, 4.3 percent, and 1.6 percent respectively. In particular, the downward trend of per capita fluid milk consumption from 1995 and 2023 was mitigated to some extent by the promotional efforts of the National Programs. Exports of butter were lower by 13.3 percent, while exports of cheese were up by 4.9 percent over the same period because of the promotional programs. Exports of nonfat dry milk also increased by 1.2 percent over the period 1995 to 2023.
The returns from the programmatic activities of producers and to fluid milk processors are summarized with BCRs. The BCRs are based on the demand-enhancing expenditures only; therefore, they do not account for certain operating expenses such as administrative expenses, overhead, technical support, and industry relations. This procedure has been standard practice in all checkoff evaluations, not just those indigenous to dairy. Demand-enhancing expenditures accounted for roughly 92 percent of total DMI expenditures, almost 99 percent of total MilkPEP expenditures, and nearly 87 percent of total QP expenditures. Therefore, most of the expenditures associated with the various programmatic activities are accounted for in this analysis.

Over the period from 1995 to 2023, the BCRs (expressed in terms of producer profit or net returns at the farm level) were calculated to be 1.41 for every dollar invested in demand-enhancing activities for fluid milk; 3.38 for every dollar invested in demand-enhancing activities for cheese; and 19.19 for every dollar invested in demand-enhancing activities for butter. For other non-specific or non-delineated promotion activities, the BCR was calculated to be 6.96 for every dollar invested. Over the same period, the BCR of export promotion was 8.52 per dollar invested.

The aggregate all-dairy BCR was 4.58, meaning that, on average, producer profit increased by $4.58 for each dollar invested in demand-enhancing activities. These BCRs are net of the costs associated with the National Programs. Relative to the past four evaluations, wherein the BCRs were estimated to range from 4.30 to 5.23, the current BCR for all dairy products falls within this interval.

The returns-on-investment as measured by the BCR for cheese, butter, other non-specific dairy products, and exports also were within the ranges reported in the past four evaluations. (i.e., the 2019, 2020, 2021, and 2022 Reports to Congress). However, the BCR for fluid milk, reported as 1.41, was lower than the range of 1.63 to 3.26 previously reported in the past four evaluations.

Importers of dairy products have paid assessments to the Dairy Research and Promotion Program since September 1, 2011. Import assessment funds totaled between $3.44 million and $4.90 million per year from 2012 to 2023, averaging $4.12 million. The cumulative import assessment funds totaled $50.50 million from September 2011 to December 2023. On a monthly basis, funds from the dairy import assessment ranged from $210,086 to $563,522, averaging $341,241 over the period of September 2011 to December 2023. The import assessment averaged about 1 percent of the total demand-enhancing expenditures made by DMI, MilkPEP, and the QPs between 2012 and 2023.

Imported cheese levels were higher by 1.95 million pounds over the period 2012-2023 due to promotion funds collected from importers. Unit values of cheese imports amounted to roughly $3.36 per pound on average over the period between 2012 and 2023. Hence, incremental revenue

to importers solely from cheese attributable to the import assessment (on cheese) totaled roughly $6.56 million. In the previous evaluation based on data from 2012 to 2022, incremental revenue to importers solely from cheese attributed to the import assessment totaled about $5.46 million.

The BCR associated with DMI spending was estimated to be 5.20, higher than the 4.58 return on investment for all dairy product promotion investments. The BCR for MilkPEP was estimated to be 1.10, slightly less than the 1.41 return previously mentioned for all fluid milk promotional spending. In the four previous evaluations of National Programs, the BCR associated with DMI spending was calculated to be 6.51 based on data from 1995 to 2022, 6.43 based on data from 1995 to 2021, 5.43 based on data from 1995 to 2020, and 5.59 based on data from 1995 to 2019, while the BCR associated with MilkPEP spending was calculated to be 2.58 based on data from 1995 to 2022, 1.55 based on data from 1995 to 2021, 1.89 based on data from 1995 to 2020, and 3.28 based on data from 1995 to 2019. Bottom line, the BCR associated with DMI spending and the BCR associated with MilkPEP spending were lower than those previously reported over the past four evaluations.

The BCR of fluid milk at the processor level was estimated to be 2.54 over the period 1995 to 2023. In the previous evaluations of the effectiveness of the dairy research and promotion programs, this BCR was estimated to be 2.84 based on data from 1995 to 2020, 2.44 based on data from 1995 to 2021, and 3.24 based on data from 1995 to 2022. The cost of milk was used as a proxy for the cost of production since data concerning the costs of production for fluid milk processors were not available. Initially, we calculated the added total value at the retail level of the marketing channel attributed to MilkPEP promotion. Then we calculated the added total value accruing at the farm level attributed to MilkPEP promotion. The difference is the added total value captured by market participants beyond the farm gate to the retail level. Over the period 1995 to 2023, this cumulative added value amounted to $8.72 billion. Over the same period, the cumulative amount of MilkPEP promotion expenditures totaled $2.46 billion. Hence, the net BCR of fluid milk at the processor level was estimated to be 2.54 over this period.

Comparisons of results from previous evaluations are included in this technical report to provide a prospective view of the effectiveness of the National Programs over time. Caution must be exercised in making comparisons of various Reports to Congress across years. The economic phrase/condition *ceteris paribus*, meaning all other factors invariant, does not hold. The underlying endogenous and exogenous variables which come from various government sources have been revised and updated, and now four additional quarters of data are available not only pertaining to these variables but also pertaining to the data associated with the programmatic expenditures of the National Programs.

DMI, MilkPEP, and QP Promotion Program Expenditures

The expenditure data for this analysis were acquired from DMI, QPs, and MilkPEP. The demand-enhancing expenditures from all three entities were aggregated in the quantitative appraisal. The National Programs use advertising as well as other means to influence consumers. Advertising dollars are directed to media outlets including television, radio, outdoor, print, and internet ads. Marketing activities other than advertising are directed at the retail level of the marketing channel or at intermediaries. The non-advertising marketing expenditures include

health and nutrition education programs, public relations, food service and manufacturing programs, sales promotion programs, school milk programs, school marketing activities, retail programs, child nutrition and fitness initiatives, and single-serve milk promotion.

Certain promotion expenditures are not directed at the retail level of the marketing channel. These types of expenditures include crisis management, trade service communications, and strategic research activities. Because their intent is to directly increase or support sales of dairy products, these expenditures are classified as demand-enhancing expenditures. As stated previously in our introduction of the BCRs, overhead, technical support, industry relations, and administrative expenses are excluded from this analysis also because they are not primarily related to demand-enhancing efforts.

Over the years, the DMI Board of Directors changed their marketing strategies to focus more on partnerships to increase demand for fluid milk, manufactured dairy products, and dairy ingredients. Currently, DMI's strategies include the following: (1) working with and through specific partners to achieve sustainable, category-level sales impacts; (2) attracting partner co-investment to fund demand-enhancing efforts; and (3) maximizing resources and impacts in increasingly competitive markets. These efforts include co-developing marketing information, research, business models, and best practices that can be used by the industry to increase sales of fluid milk and dairy products.

Annual promotion program expenditures made by DMI, MilkPEP, and QPs over the period 1995 to 2023 are depicted in Table 1 and are delineated in Figure 1. On average, roughly $377 million in total was spent annually by the respective entities over this period and between $390 million and $460 million since 2011. Over the period 1995 to 2023, the shares of each promotion entity concerning total demand-enhancing expenditures on average were as follows: (1) DMI – 26.2 percent; (2) MilkPEP – 22.6 percent; and (3) QPs – 51.2 percent.

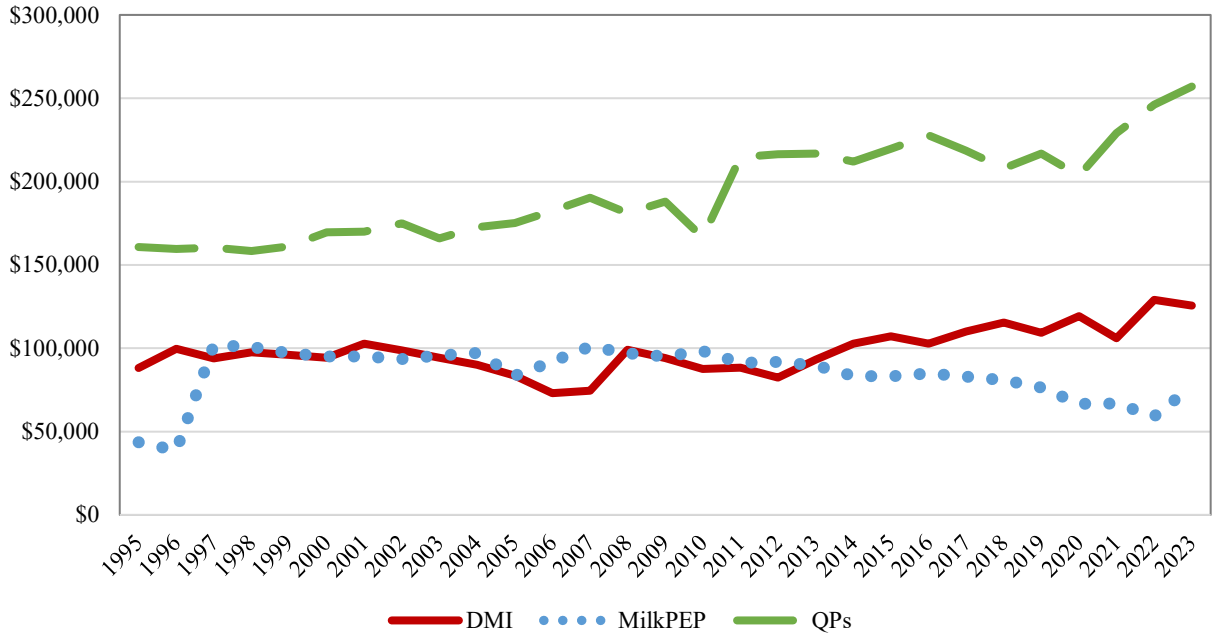
Table 3-1. Annual Dairy Management, Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Program (QP) Promotion Program Expenditures, 1995 to 2023[1]

Year	DMI	MilkPEP	QPs	Total
1995	$88,105	$43,654	$160,832	$292,592
1996	$99,674	$38,690	$159,600	$297,964
1997	$93,859	$101,850	$160,379	$356,088
1998	$97,570	$100,901	$158,348	$356,819
1999	$96,010	$97,023	$161,161	$354,194
2000	$94,260	$95,158	$169,654	$359,072
2001	$102,835	$95,112	$169,967	$367,914
2002	$98,752	$93,511	$174,857	$367,120
2003	$94,256	$95,688	$165,973	$355,917
2004	$90,171	$97,167	$172,667	$360,005
2005	$83,484	$83,527	$175,081	$342,092
2006	$73,067	$92,029	$182,443	$347,539
2007	$74,623	$101,125	$190,289	$366,037
2008	$99,051	$97,003	$181,092	$377,146
2009	$94,071	$95,109	$187,992	$377,172
2010	$87,512	$98,316	$166,459	$352,287
2011	$88,456	$91,289	$214,763	$394,508
2012	$82,360	$91,893	$216,484	$390,736
2013	$93,184	$89,633	$216,844	$399,662
2014	$102,728	$83,426	$211,919	$398,074
2015	$107,133	$83,098	$219,660	$409,891
2016	$102,712	$84,858	$227,834	$415,404
2017	$110,005	$82,910	$218,548	$411,462
2018	$115,442	$80,817	$207,903	$404,163
2019	$109,287	$76,429	$216,867	$402,583
2020	$119,340	$66,712	$203,544	$389,595
2021	$106,086	$66,920	$229,182	$402,188
2022	$129,059	$59,228	$246,198	$434,485
2023	$125,532	$77,100	$257,023	$459,655
Mean	$98,573	$84,834	$193,916	$377,323
Median	$97,570	$91,289	$187,992	$377,146
Std Dev	$13,179	$15,983	$28,122	$35,382
Min	$73,067	$38,690	$158,348	$292,592
Max	$129,059	$101,850	$257,023	$459,655

[1]Thousands of dollars.

Source: Data from DMI, MilkPEP, and the U.S. Department of Agriculture.

Figure 3-1. Annual Dairy Management, Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Program (QP) Promotion Expenditures, 1995 to 2023



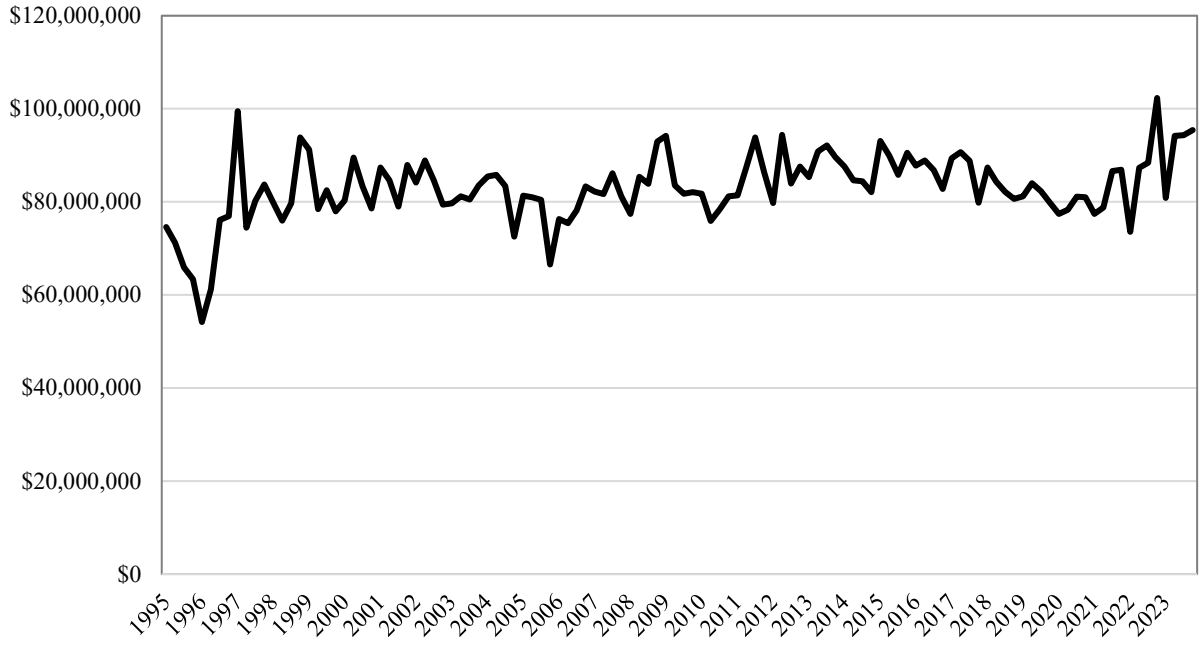
Source: DMI, MilkPEP, and the U.S. Department of Agriculture.

The data associated with the demand-enhancing activities initiated by DMI and MilkPEP are available on a quarterly basis. The QP expenditure data, however, are only available on an annual basis. To impute quarterly QPs programmatic expenditures, the seasonal nature of the DMI and MilkPEP programmatic expenditures are mirrored. That is, the QP programmatic expenditures are assumed to follow the same seasonal patterns as the DMI and MilkPEP programmatic expenditures data. Consequently, the seasonal factors associated with DMI and MilkPEP data are obtained and applied to the annual QP data to arrive at quarterly expenditures. The estimation of these data on a quarterly basis is important in allowing for sufficient observations to conduct the econometric analysis of demand for dairy products.

Nominal, seasonally adjusted demand-enhancing expenditures by DMI, MilkPEP, and QPs for all dairy products (fluid and manufacturing) combined on a quarterly basis from 1995 to 2023 are exhibited in Figure 3-2. These demand-enhancing expenditures varied from $54.2 million to $102.2 million per quarter, averaging $83.0 million over the period of analysis.

Nominal, seasonally adjusted demand-enhancing expenditures for fluid milk from DMI, MilkPEP, and QPs on a quarterly basis from 1995 to 2023 are exhibited in Figure 3-3. Over that period, nominal, seasonally adjusted quarterly promotion program expenditures for fluid milk ranged from roughly $14.7 million to $63.3 million per quarter. On average over the same period, nominal, seasonally adjusted demand-enhancing expenditures for fluid milk were $32.0 million per quarter.

Figure 3-2. Quarterly All Dairy Product Promotion Expenditures (Nominal, Seasonally-Adjusted) by Dairy Management, Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Programs (QPs), 1995 to 2023*



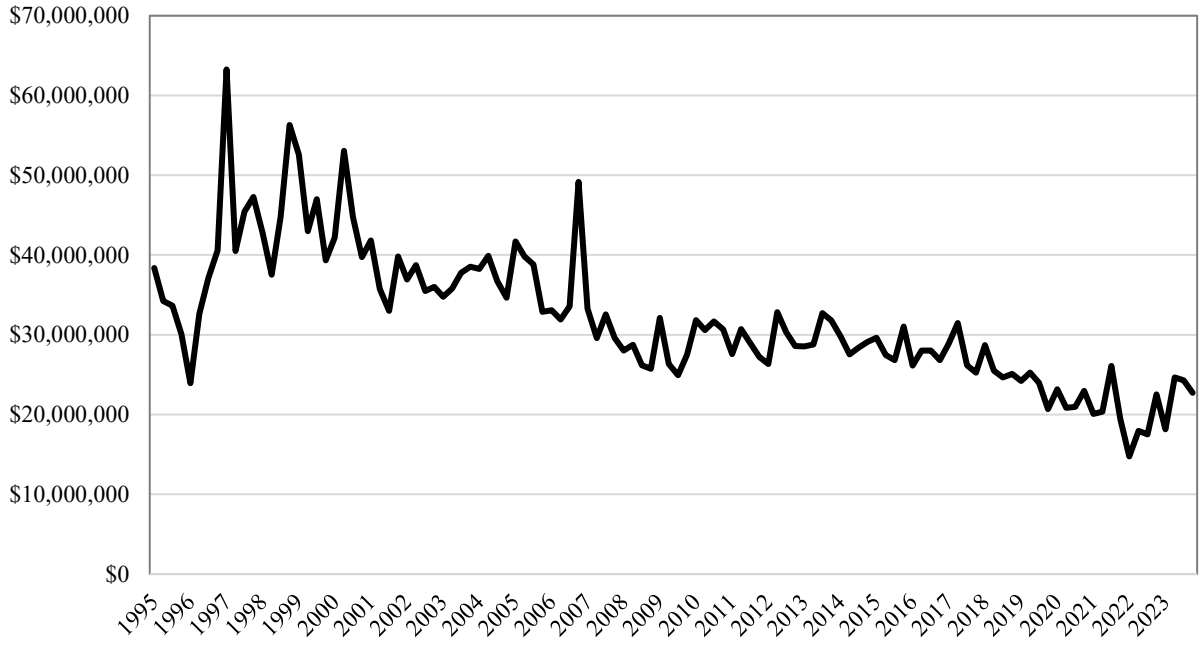
*Includes expenditures for advertising, promotion, dairy foods and nutrition research, nutrition education, and market and economic research.
Source: DMI, MilkPEP, QPs, and calculations by the authors.

As exhibited in Figure 3-4, over the period 1995 to 2023, nominal, seasonally adjusted demand-enhancing expenditures for cheese averaged $15.0 million per quarter, ranging from $8.0 million to $27.7 million. Nominal, seasonally adjusted demand-enhancing expenditures for cheese ranged from $12.8 million to $27.7 million between 1995 and 2004, averaging $21.8 million per quarter. From 2005 to the third quarter of 2008, promotion expenditures associated with cheese were $12.0 million during this period. From the fourth quarter of 2008 through the end of 2023, nominal quarterly expenditures on cheese marketing and promotion activities ranged from $8.0 million to $17.1 million, averaging $11.3 million per quarter.

As shown in Figure 3-5, nominal, seasonally adjusted demand-enhancing quarterly expenditures on marketing and promotion of butter ranged from close to $60,000 to $6.8 million, averaging slightly more than $1.4 million per quarter over the period 1995 to 2023. Marketing and promotion expenditures for butter are a fraction of the expenditures for fluid milk and cheese.

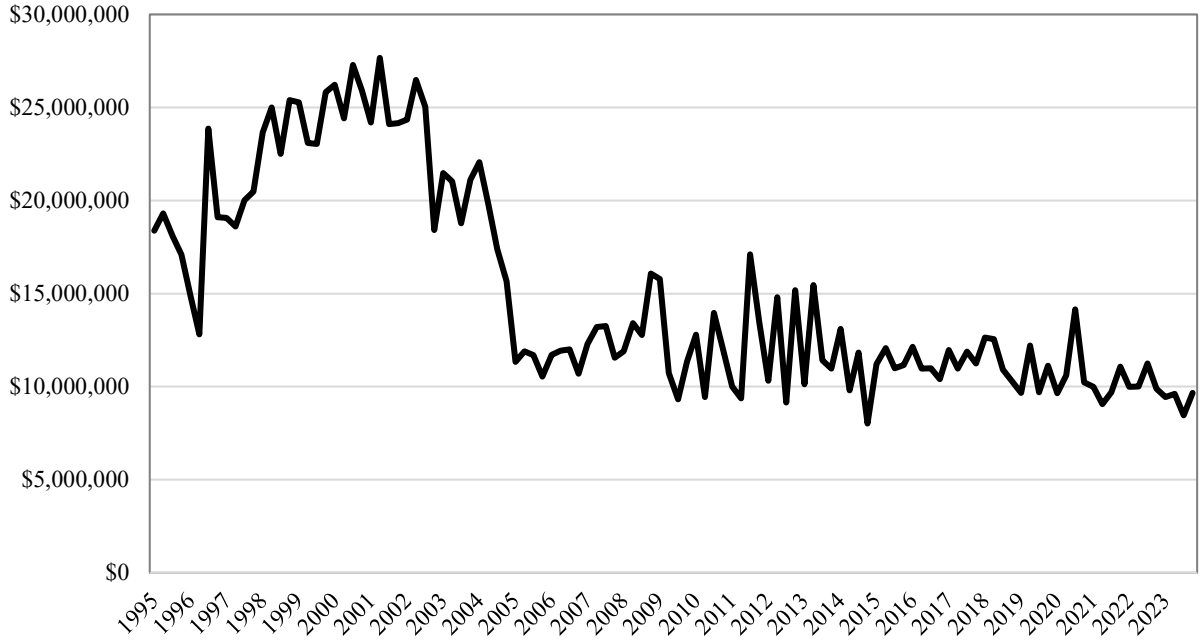
Beginning in 2006, DMI transitioned from featuring milk, cheese, and butter in product-specific promotions to broader campaigns that relate to several dairy products. As a result of an increasing number of campaigns affecting multiple products, assessing demand enhancements for the aggregate of dairy products as well as within specific product classes is important. Programmatic expenditures include a pro-rata share of the expenditures for non-specific promotion efforts.

Figure 3-3. Quarterly Fluid Milk Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management, Inc. (DMI), Milk Processor Education Program (MilkPEP), and Qualified Programs (QPs), 1995 to 2023



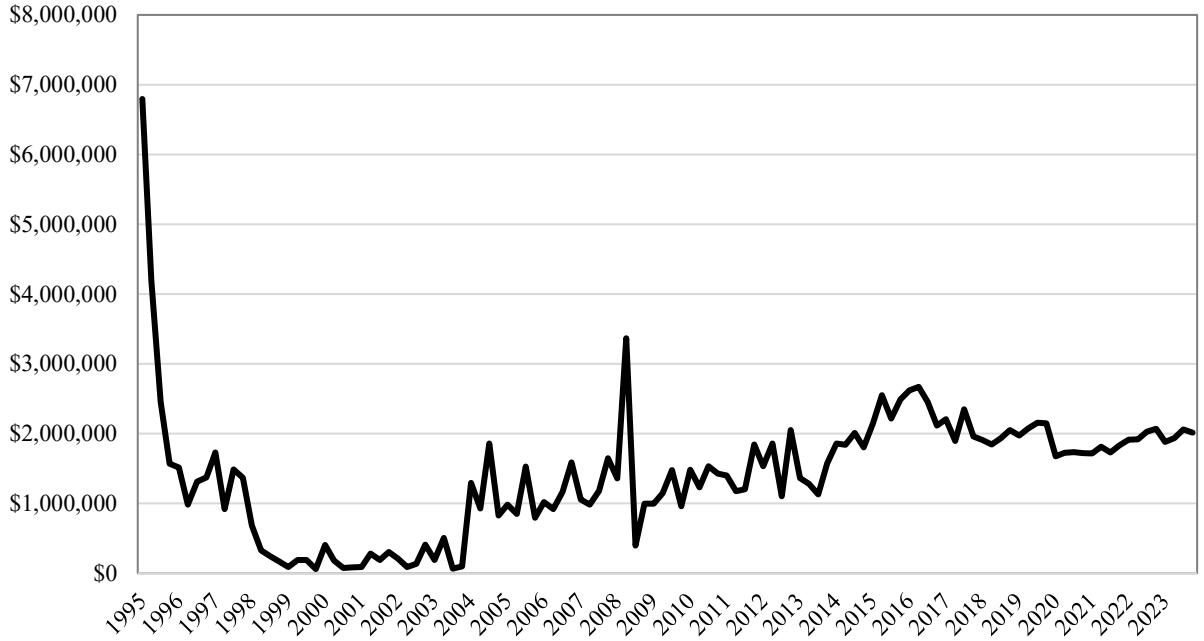
Source: DMI, MilkPEP, QPs, and calculations by the authors.

Figure 3-4. Quarterly Cheese Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management, Inc. (DMI) and Qualified Programs (QPs), 1995 to 2023



Source: DMI, QPs, and calculations by the authors.

Figure 3-5. Quarterly Butter Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management, Inc. (DMI) and Qualified Programs (QPs), 1995 to 2022



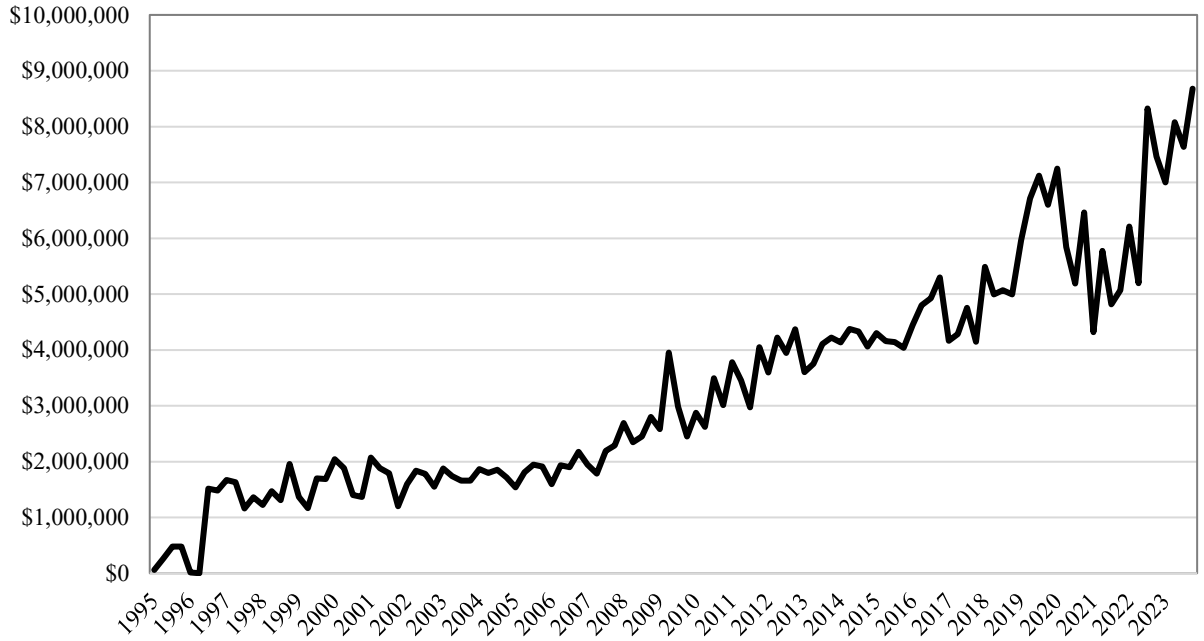
Source: DMI, QPs, and calculations by the authors.

DMI also invests in dairy export promotion through the U.S. Dairy Export Council (USDEC). Nominal, seasonally adjusted DMI expenditures directed to dairy export promotion on a quarterly basis ranged from just under $800 to approximately $8.7 million (Figure 3-6a). DMI expenditures directed to dairy export promotion trended upward from 1995 to 2023, averaging nearly $3.3 million per quarter over this period. Funding is also awarded through USDA's Foreign Agricultural Service to promote dairy exports through the Foreign Market Development (FMD) Program and the Market Access Program (MAP). Under these programs, quarterly contributions to dairy export promotion (nominal, seasonally adjusted) procured from USDEC varied from just under $310,000 to about $2.6 million, averaging nearly $1.2 million per quarter over the period of 1997 to 2023 (Figure 3-6b). The aggregate of DMI and FMD/MAP expenditures (nominal, seasonally adjusted) ranged from $881 to $10.5 million per quarter, averaging $4.4 million on a quarterly basis over the period from 1995 to 2023 (Figure 3-6c).

The assessment that importers of dairy products have paid to the National Dairy Promotion and Research Program became effective August 1, 2011, is based on milk content as follows:

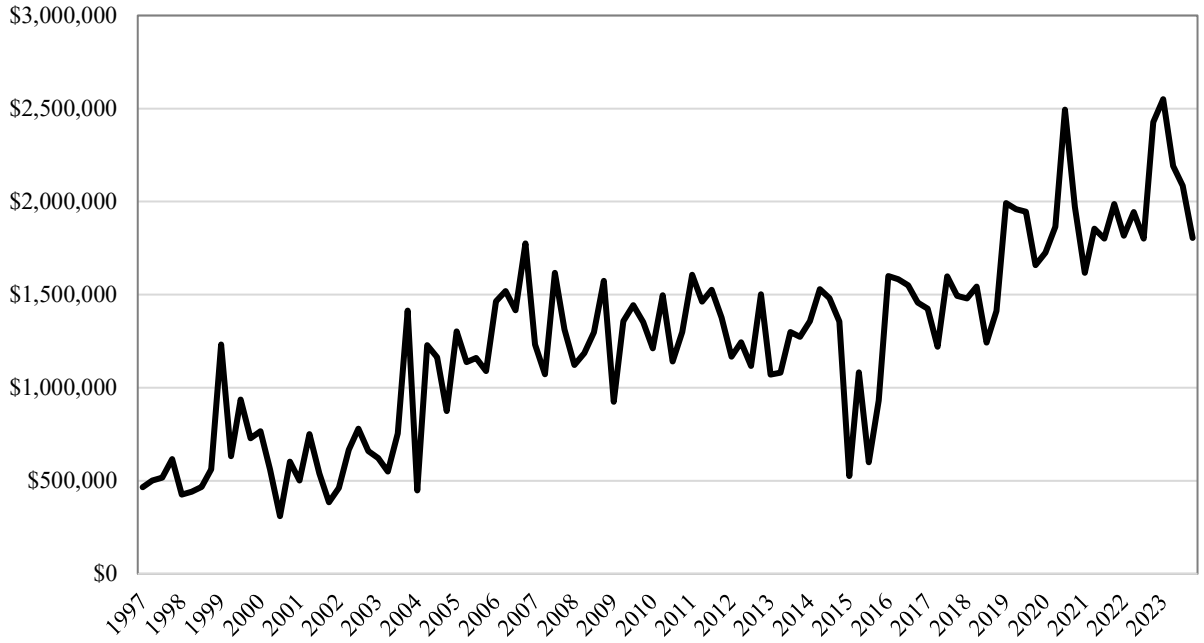
> "This rule requires importers to calculate assessments due based upon documentation concerning the cow's milk solids content of the imported products. Products shall be assessed at the rate of $0.01327 per kilogram of cow's milk solids."
>
> (Agricultural Marketing Service, 2011, "Rules and Regulations," Federal Register, Volume 76, No. 53, page 14479).

Figure 3-6a. Quarterly Dairy Product Export Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management, Inc. (DMI), 1995 to 2023



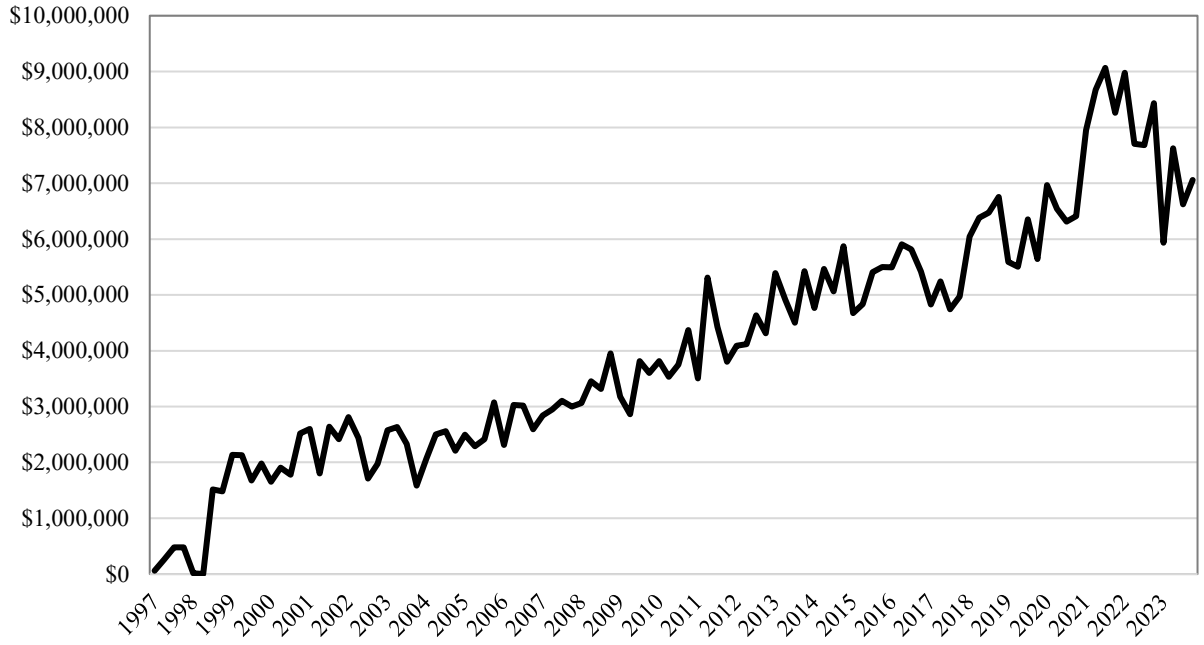
Source: DMI and calculations by the authors.

Figure 3-6b. Quarterly Dairy Product Export Promotion Expenditures (Nominal, Seasonally Adjusted) through the Foreign Market Development (FMD)/Market Access Programs (MAP) Programs, 1997 to 2023*



*Data were not available prior to 1997. Also, only annual data were available for 1997 and 1998. Quarterly interpolations were made for these years.
Source: U.S. Department of Agriculture, Foreign Agricultural Service, and calculations by the authors.

Figure 3-6c. Quarterly Aggregate Dairy Product Export Promotion Expenditures (Nominal, Seasonally Adjusted) by Dairy Management, Inc. (DMI) and the Foreign Market Development (FMD)/Market Access Programs (MAP) Programs, 1995 to 2023

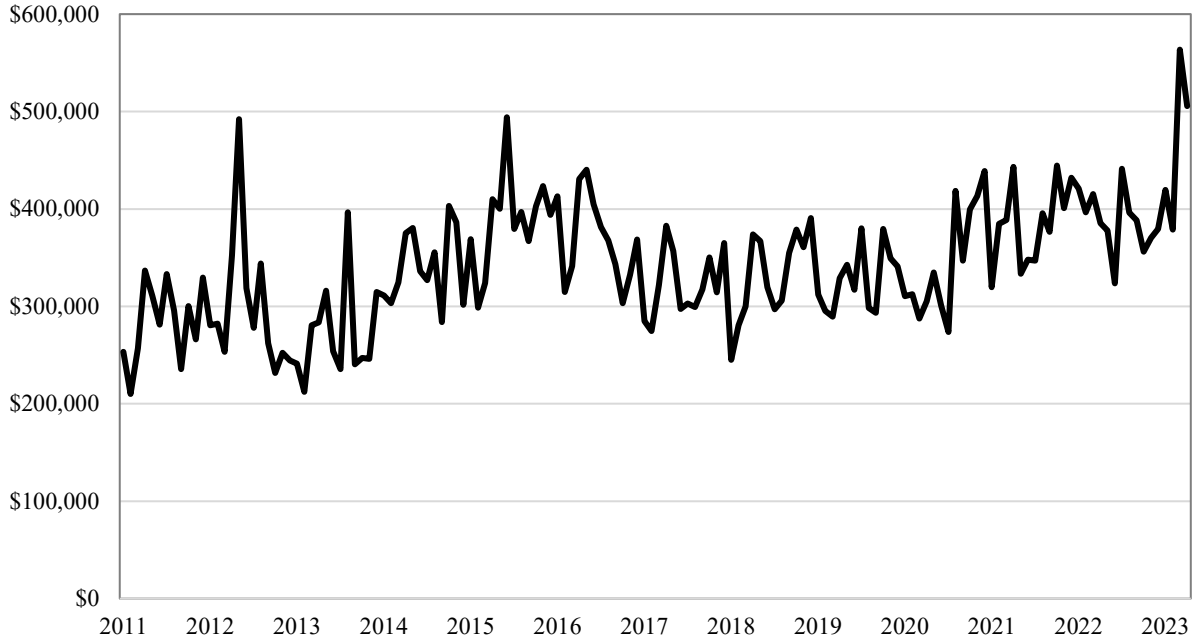


Source: Calculations by authors.

Two-thirds of the import assessment are allocated to the National Dairy Board. The remaining amount can be designated to be used by one of three QPs to support dairy promotion: (1) The Cheese Importers Association of America (CIAA); (2) The Global Dairy Platform (GDP); and (3) The Wisconsin Milk Marketing Board, Inc. (d/b/a Dairy Farmers of Wisconsin). The CIAA is committed to serving the world dairy community by helping to facilitate the efficient import of dairy products from around the world into the United States. The CIAA endeavors to support dairy trade within the context of compliance with international trade agreements and all applicable U.S. regulations.[2] The GDP's membership of dairy companies, associations, scientific bodies, and other partners collaborate to lead and build evidence on dairy's role in diets and show the sector's commitment to responsible food production. For more than a decade, GDP has led the dairy sector's collaborative efforts to encourage the appropriate intake of nutrient-rich dairy foods and demonstrate the sector's role in sustainable agriculture. The GDP aims to demonstrate dairy's contribution to global food systems, and to lead healthy diets and sustainable livelihoods.[3] The mission of The Wisconsin Milk Marketing Board, established in 1983, is to help grow demand for Wisconsin milk by providing programs that enhance the competitiveness of the Wisconsin dairy industry.[4]

[2] https://theciaa.org/
[3] https://globaldairyplatform.com/about-us-lead-dairy/
[4] https://datcp.wi.gov/Pages/AgDevelopment/MilkBoard.aspx

Figure 3-7. Monthly Dairy Import Assessment Funds, September 2011 to December 2023



Source: U.S. Department of Agriculture

Import assessment funds totaled between $3.44 million and $4.90 million per year from 2012 to 2023, averaging $4.12 million. The cumulative import assessment funds totaled $50.50 million from September 2011 to December 2023. On a monthly basis, funds from the dairy import assessment ranged from $210,086 to $563,522, averaging $341,241 over the period of September 2011 to December 2023 (Figure 3-7). The import assessment averaged about 1 percent of the total demand-enhancing expenditures made by DMI, MilkPEP, and the QPs between 2012 and 2023.

Trends in Dairy Use

The U.S. dairy market size is on the order of $111.6 billion in 2025 and is projected to reach $133 billion by 2030. This market is expected to grow at a compound annual rate of 3.57 percent from 2025 to 2030 (Mordor Intelligence, 2025)[5]. The International Dairy Foods Association estimated the annual U.S. economic impact of the dairy industry at $793.75 billion (International Dairy Foods Association, 2023 Economic Impact Study, June 2023)[6].

According to this economic impact study, the U.S. dairy industry currently supports:

- 3.2 million jobs

[5] Mordor Intelligence, "United States Dairy Market Size & Share Analysis-Growth Trends & Forecasts Up to 2023," created by Mordor Intelligence Industry Reports, Available online at: https://www.mordorintelligence.com/industry-reports/united-states-dairy-market, Accessed May 8, 2025

[6] International Dairy Foods Association, 2023 Economic Impact Study, Available online at: https://www.feedstuffs.com/agribusiness-news/economic-impact-of-u-s-dairy-industry-is-nearly-794-billion, June 2023

- $49 billion in direct wages for workers in the dairy industry
- $72 billion in Federal, state, and local taxes (not including sales taxes paid by consumers)
- 3 percent of U.S. GDP

Additionally, dairy products play a key role in the American diet, containing vital nutrients for the health and maintenance of the human body, notably calcium, vitamin D, protein, and potassium (Bailey *et al*., 2010).

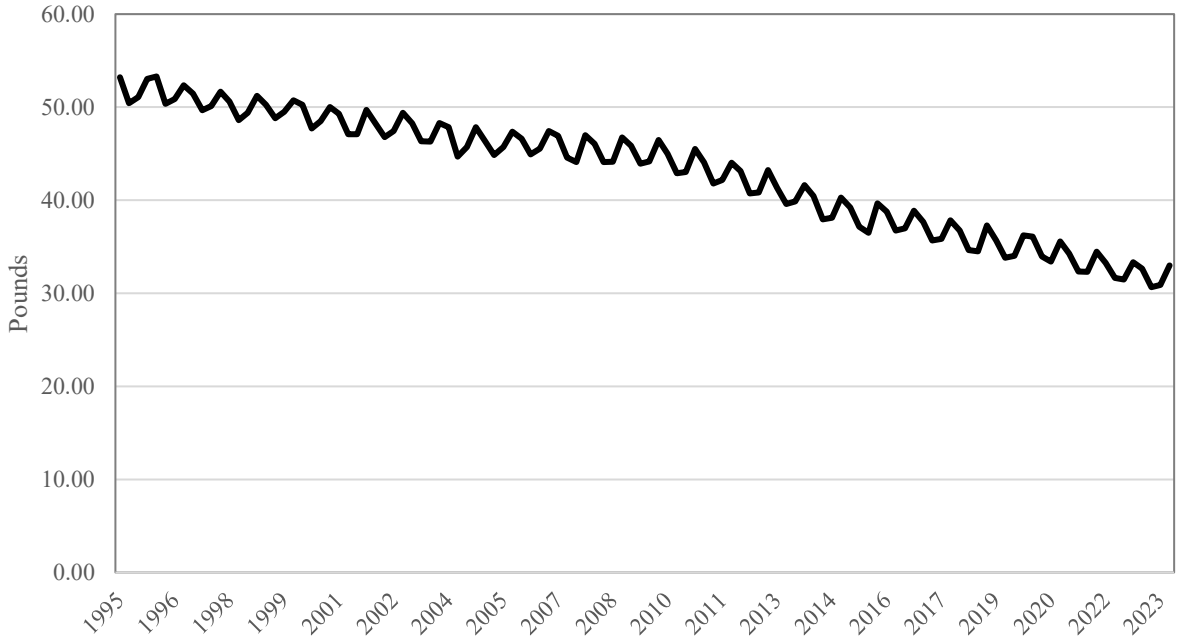
On a per capita consumption basis, the major dairy products in the United States include fluid milk, cheese, butter, yogurt, and ice cream. In this report, the center of attention is on fluid milk, cheese, and butter, as well as on the aggregate of all dairy products on a fat basis and on a skim solids basis. Yogurt (Greek and non-Greek), ice cream (regular and low-fat), and other products are accounted for through the aggregate category of all dairy products.

Per capita fluid milk consumption trended downward over the period 1995 and 2023 (Figure 3-8). In 2023, quarterly per capita consumption of fluid milk ranged from 30.66 pounds per person to 32.99 pounds per person, down from 50.44 pounds per person to 53.20 pounds per person in 1995. U.S. annual per capita milk consumption has declined roughly 39 percent since 1995 due to changing consumption habits as well as increased competition from other beverages. Seasonality is evident in per capita U.S. consumption of fluid milk.

U.S. per capita fluid milk consumption fell by 7.4 percent in the 1950s, 8.4 percent in the 1960s, 9.9 percent in the 1970s, 5.4 percent in the 1980s, 10.9 percent in the 1990s, 7.9 percent in the 2000s, and 20.2 percent in the 2010s (Stewart and Dong, 2023). A variety of factors have contributed to the persistent downward trend in U.S. per capita fluid milk consumption. Pre-school and pre-adolescent children at present account for a shrinking share of the U.S. population. U.S. consumers purchase more meals and snacks at food service establishments where the menu presence and consumption of fluid milk is less common. Beverages such as bottled water, refrigerated and shelf-stable juices and drinks, sports drinks, and plant-based milk alternatives increasingly compete with fluid milk (Dharmasena & Capps (2012), Okrent & MacEwan (2014), Zhen *et al*. (2014), Heng *et al*. (2018), and Capps and Wang (2024). According to Stewart, Dong, and Carlson (2012) generational differences contributed to the decline in fluid milk consumption. Moreover, U.S. consumers of all ages are drinking less milk and milk drinks (Stewart *et al.*, 2021).

That said, total organic white milk sales have grown from 271 million gallons in 2015 to 343 million gallons in 2024, a rise of roughly 25 percent over the past ten years. The organic milk market is experiencing expansion, with sales growing at a compound annual growth rate (CAGR) of 2.5 percent between 2020 and 2025, with projections to continue growing at a CAGR of 3.0 percent between 2025 and 2035. The demand for organic milk is on the rise, driven by health-conscious consumers and a continued emphasis on sustainable agriculture.

Figure 3-8. Quarterly Per Capita U.S. Consumption of Fluid Milk, 1995 to 2023



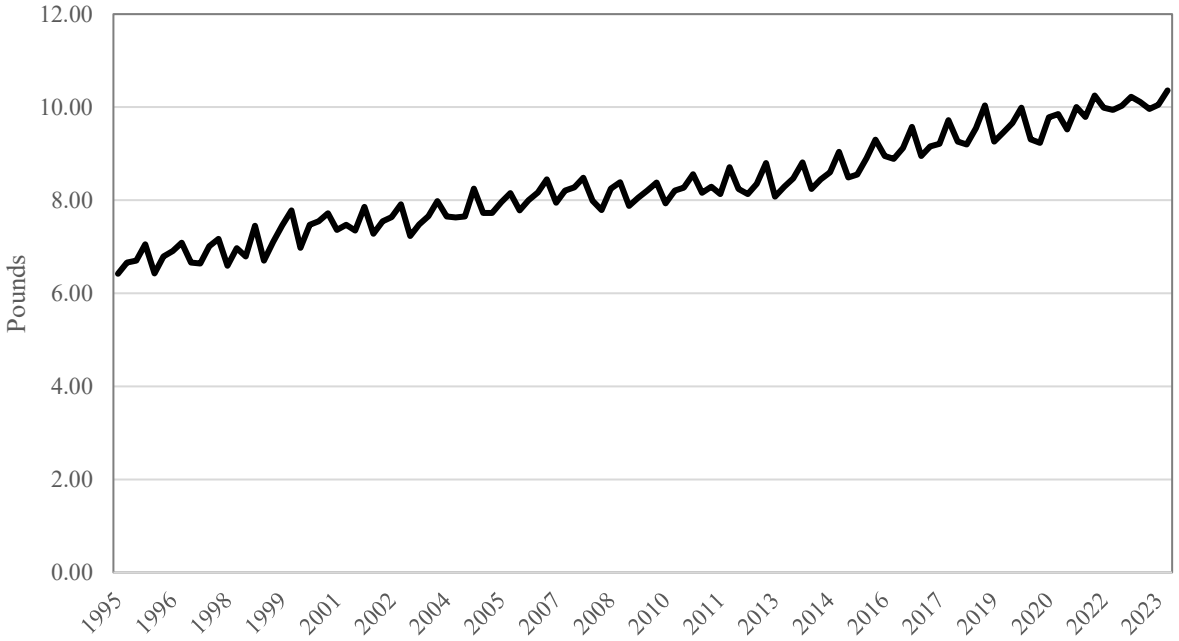
Source: U.S. Department of Agriculture and calculations by the authors.

While overall fluid milk consumption has been declining, lactose-free milk sales are growing. Lactose-free milk volume sales have skyrocketed by slightly more than 40 percent from 215.7 million gallons in 2020 to 304.4 million gallons in 2024. Moreover, whole milk consumption has remained relatively steady ranging from 1,601 million gallons to 1,810 million gallons over the period 2015 to 2024. However, reduced-fat milk (2 percent), low-fat milk (1 percent), and fat free/skim milk consumption have experienced declines over the past 10 years. Bottom line, despite the downward trend in per capita fluid milk consumption, opportunities exist to reverse this trend due to growth in the consumption of organic milk, lactose-free milk, and whole milk.

Increasing sales of plant-based milk alternatives contributed to the accelerated rate at which U.S. per capita fluid milk consumption decreased during the 2010s (Stewart *et al*., 2020). Notably, the consumption of plant-based milk alternatives (PBMA) had been steadily building over the past decade until recently. However, PBMA consumption fell from 6.9 gallons per buyer in 2021 and in 2022 to 6.4 gallons per buyer in 2024. The number of households buying PBMA fell from 52.3 percent in 2021 to 48.6 percent in 2024.

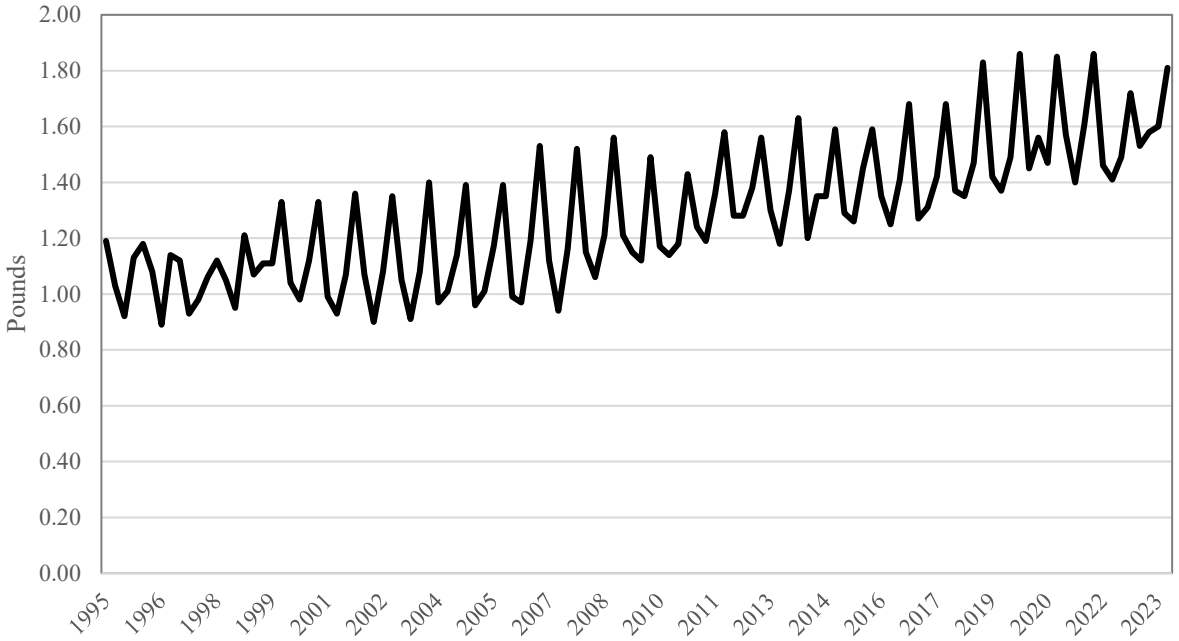
Cheese consumption per capita has grown over time and exhibits seasonal patterns (Figure 3-9). From 1995 to 2023, the commercial per capita disappearance of cheese ranged from 6.42 pounds per quarter to 10.36 pounds per quarter, averaging 8.30 pounds. Over the same period, per capita butter consumption grew modestly and exhibited seasonal patterns as well (Figure 3-10). The commercial disappearance of butter on a per capita basis ranged from 0.89 pounds per quarter to 1.86 pounds per quarter, averaging 1.28 pounds.

Figure 3-9. Quarterly Per Capita U.S. Consumption of Cheese, 1995 to 2023



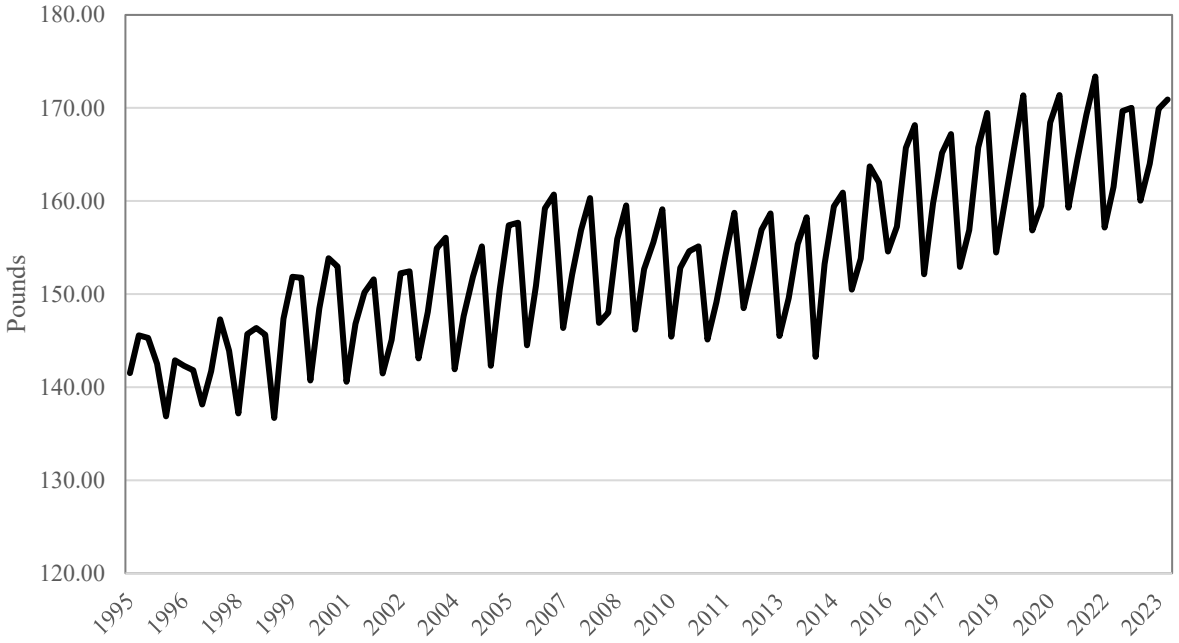
Source: U.S. Department of Agriculture and calculations by the authors.

Figure 3-10. Quarterly Per Capita U.S. Consumption of Butter, 1995 to 2023



Source: U.S. Department of Agriculture and calculations by the authors.

Figure 3-11. Quarterly Per Capita U.S. Consumption of All Dairy Products on a Milk-Equivalent Fat Basis, 1995 to 2023



Source: U.S. Department of Agriculture and calculations by the authors.

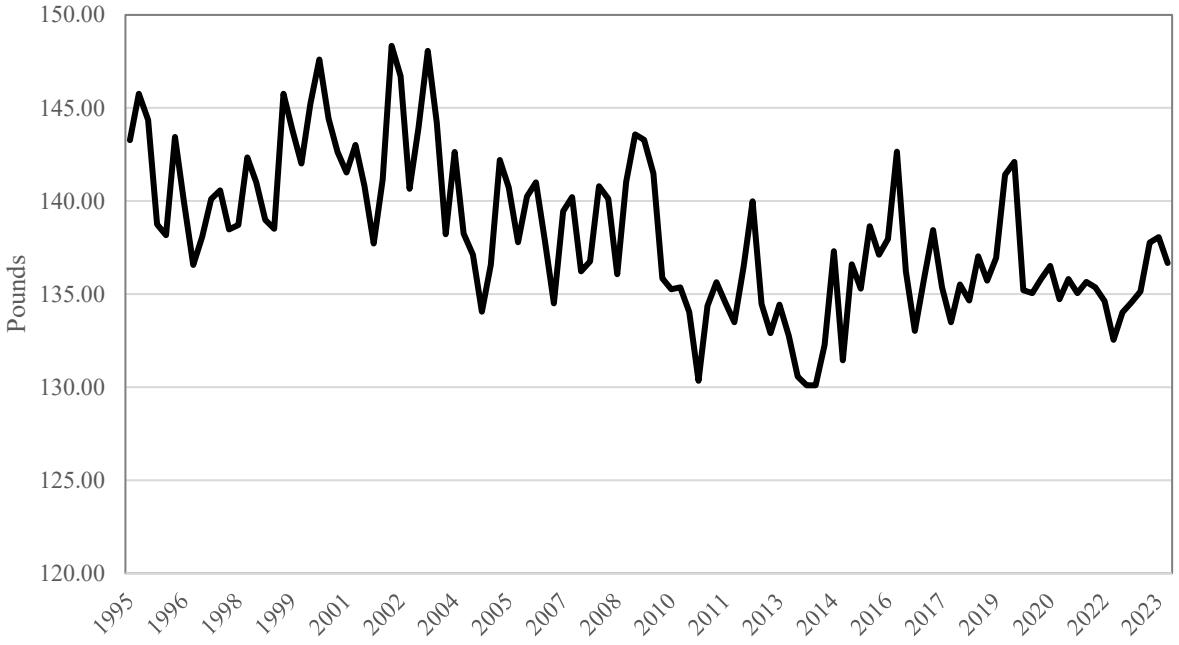
On average over 1995 to 2023, the per capita commercial disappearance of all dairy products on a fat basis averaged 153.71 pounds per quarter, ranging from 136.69 pounds to 173.38 pounds per quarter (Figure 3-11). On a skim-solids basis, the per capita commercial disappearance of all dairy products over that same period averaged 138.22 pounds per quarter, ranging from 130.10 pounds to 148.34 pounds per quarter (Figure 3-12).

Over the period 1995 to 2023, quarterly dairy exports averaged nearly 1,571 pounds on a fat basis and 6,625 pounds on a skim-solids basis (Figure 3-13). Over this period, dairy exports on a skim-solids basis experienced notable growth compared to dairy exports on a fat basis.

The United States imported between $2.801 billion and $5.264 billion in dairy products from 2012 to 2023 (Table 3-2). The import assessment per $1,000 value of all dairy imports ranged from $0.93 to $1.55 over the period 2012 to 2023, averaging $1.17. Cheese products accounted for 31.25 percent to 41.42 percent (by value) of all dairy imports (Figure 3-14). Cheese imports as a percentage of total dairy imports averaged 37.64 percent over the period 2012 to 2023.

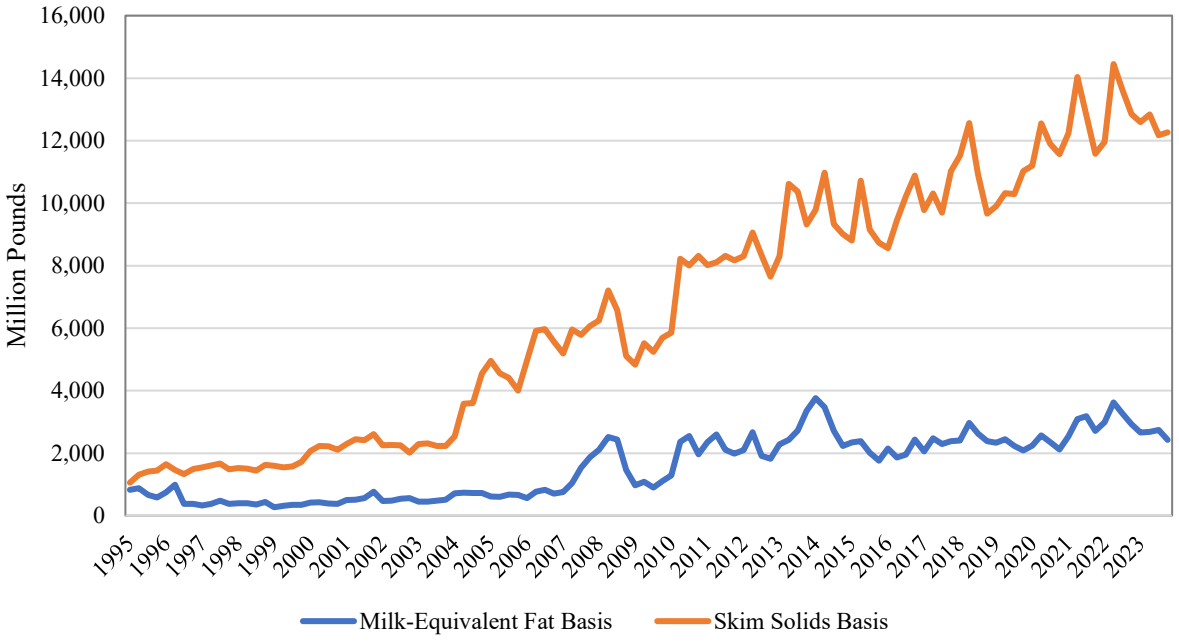
The analysis in the next section addresses the response of consumers to dairy promotion expenditures. Structural econometric models were developed to isolate the effects of those expenditures on consumer demand for dairy products from those of other fundamental economic forces such as price and income.

Figure 3-12. Quarterly Per Capita U.S. Consumption of All Dairy Products on a Skim-Solids Basis, 1995 to 2023



Source: U.S. Department of Agriculture and calculations by the authors.

Figure 3-13. Quarterly U.S. Dairy Commercial Exports on a Milk-Equivalent Fat Basis and Skim-Solids Basis, 1995 to 2023



Source: U.S. Department of Agriculture and calculations by the authors.

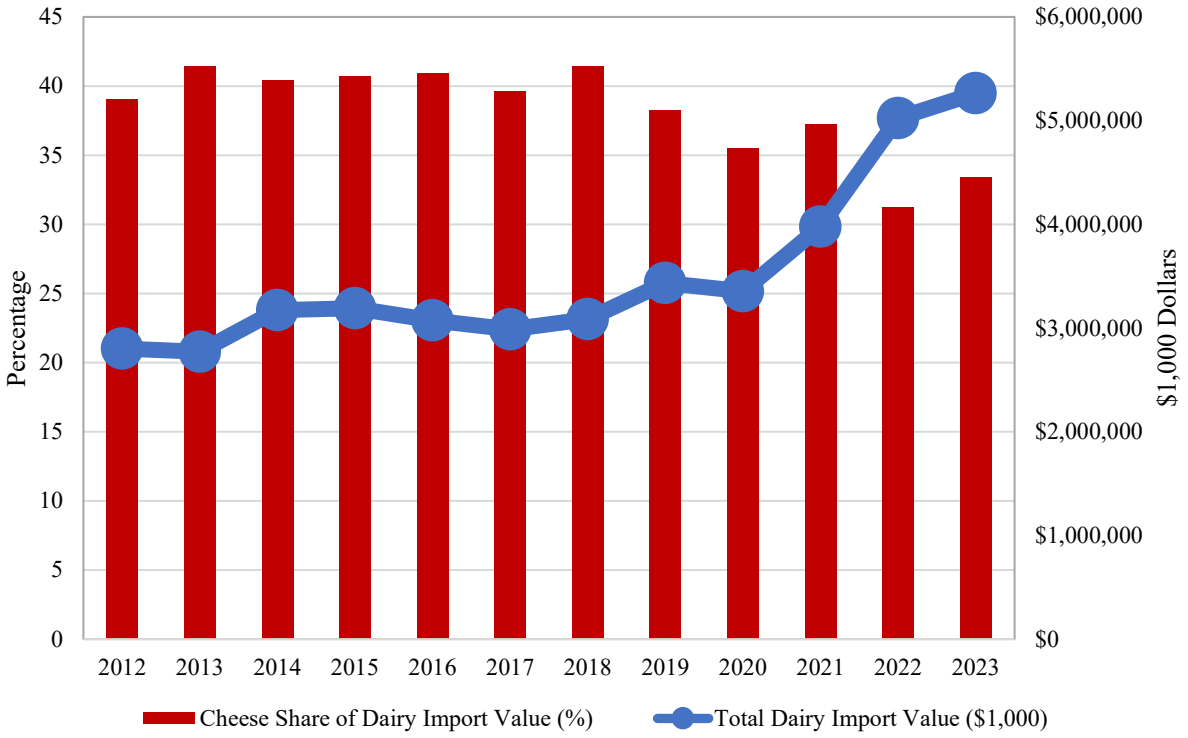
Table 3-2. U.S. Dairy Product Imports and Import Assessment Funds, 2012 to 2023[7]

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Value of All Dairy Imports ($1,000)	$2,801,348	$2,771,258	$3,172,368	$3,190,445	$3,074,188	$2,988,656	$3,086,762	$3,433,453	$3,353,104	$3,976,297	$5,023,471	$5,263,664
Value of Cheese Imports ($1,000)	$1,094,013	$1,147,824	$1,282,190	$1,299,463	$1,258,932	$1,183,858	$1,278,095	$1,312,348	$1,189,780	$1,481,970	$1,569,934	$1,759,448
Quantity of Cheese Imports, (metric tons)	154,008	147,635	165,416	199,578	204,512	183,270	175,829	180,618	165,265	187,969	188,937	193,244
Unit Value of Cheese Imports ($/MT)	$7,104	$7,775	$7,751	$6,511	$6,156	$6,460	$7,269	$7,266	$7,199	$7,884	$8,309	$9,105
Import Assessment Funds ($)	$3,521,054	$3,441,461	$3,564,781	$4,175,783	$4,757,469	$4,205,885	$3,803,099	$4,000,574	$3,917,344	$4,462,577	$4,696,243	$4,900,468
Import Assessment per $1,000 value of all dairy imports	$1.26	$1.24	$1.12	$1.31	$1.55	$1.41	$1.23	$1.17	$1.17	$1.12	$0.93	$0.93

Source: Import assessment data from the Agricultural Marketing Service, USDA. Trade data from the Foreign Agricultural Service, USDA, https://apps.fas.usda.gov/gats/default.aspx

[7] The import assessment went into effect August 1, 2011. Funds have been collected in each month from September 2011, to present. The table shows funds collected from January 2012 to December 2023.

Figure 3-14. Value of Total U.S. Dairy Imports and Cheese Share of Dairy Import Value, 2012 to 2023



Source: U.S. Department of Agriculture, Foreign Agricultural Service.

Findings Concerning Impacts of Promotion Expenditures on the Dairy Industry

The primary objective of the analysis is to answer two key questions regarding the National Programs over time:

1. What have been the effects of dairy promotion programs on domestic consumption of fluid milk, dairy products, and exports?
2. What have been the returns to dairy promotion programs?

In answering the first question, the focus is on the effects of the dairy promotion program on U.S. demand and exports of fluid milk and dairy products. Once those market effects have been determined, the benefit-cost analysis of the dairy program at the producer level and at the fluid milk processor level is conducted to answer the question about returns.

Estimation of Dairy Consumption and Export Changes Due to Promotion Program Expenditures

Like previous evaluations, this study finds a definitive positive association between dairy promotion program expenditures and the demand for dairy products. This association holds for all dairy products in the aggregate as well as for fluid milk, cheese, and butter individually. In addition, this association holds for dairy exports on a skim-solids basis and on a milkfat basis.

Table 3-3. Estimated Dairy Demand Sensitivity to Promotion, Prices, and Income, 1995 to 2023

	Promotion Elasticities		Own-Price	Income
	1995 to 2023	2023 only	Elasticity	Elasticity
Butter	0.040	0.042	-0.087	0.488
Cheese	0.016	0.010	-0.134	0.460
Fluid milk	0.043	0.030	-0.031	-0.080
All dairy				
Skim-solids basis	0.063	0.055	-0.064	0.091
Fat basis	0.041	0.036	-0.055	0.334
Exports				
Skim-solids basis	0.055	0.055	-0.192	0.551
Fat basis	0.105	0.105	-0.292	0.513

Source: Calculations by the authors.
Note: In this analysis, the pandemic is accounted for as well as other factors. All elasticities are significantly different from zero except for the income elasticity associated with fluid milk.

The key indicator of the impact of marketing and promotion expenditures is a measure of the relative sensitivity to demand-enhancing expenditures. This measure, known as the promotion expenditure elasticity, is defined as the percentage change in consumption (or exports) given a 1-percent change in demand-enhancing expenditures, with all other variables held constant.

The estimated dairy demand sensitivity to promotion, price, and income over the period 1995 to 2023 is summarized in Table 3-3. The promotion elasticities for butter, cheese, and fluid milk over the period 1995 to 2023 were, on average, 0.040, 0.016, and 0.043, respectively. The promotion elasticities for all dairy products on a skim-solids basis and on a fat basis were, on average, 0.063 and 0.041, respectively. The estimated promotion elasticities based on data from 1995 to 2023 are slightly lower for the respective products compared to those promotion elasticities based on data from 1995 to 2022. The demand responsiveness to promotion for individual dairy products and for dairy products in the aggregate was allowed to vary over time. Further, the cumulative impact of promotion was also identified. Demand-enhancing expenditures affect the market for cheese for up to 9 quarters. The effect on fluid milk persisted for up to 3 quarters and up to 11 quarters for butter. For the aggregate of all dairy products, the effect persisted for 6 quarters on both a fat and skim-solids basis.

To measure the effects of DMI export promotion enhancement expenditures on U.S. dairy commercial exports, two U.S. dairy export demand models were specified and estimated using two different data series for dairy exports supplied by USDA: (1) dairy exports on milk-equivalent skim-solids basis (SSB), and (2) dairy exports on a milk-equivalent fat basis (FB). The results indicated that when U.S. dairy prices were low (high) relative to Oceania dairy export prices, the United States exported more (less) dairy products.[8] The lag length for SSB export promotion expenditures was estimated to be 9 quarters. The SSB export promotion

[8] Key drivers of dairy demand were found to include the ratio of the Oceania export butter price to the U.S. butter price on a fat basis; the ratio of the Oceania export price for skim milk powder (SMP) to the U.S. nonfat dry milk (NDM) price on a skim-solids basis; a measure of real-world income; seasonality; and inertia or stickiness of dairy exports in world markets.

expenditure elasticity was estimated to be 0.055.(Table 3-3). The lag length for the FB export promotion expenditures was estimated to be 6 quarters. The FB export promotion expenditure elasticity was estimated to be 0.105 (Table 3-3).

Simulation Analysis of the Market Effects of Dairy Promotion

Although the analysis covered the period of 1995 to 2023, for comparison purposes we partitioned the results into four distinct time periods: (1) 1995-2002, (2) 2003-2009, (3) 2010-2016, and (4) 2017-2023. This partitioning was done to ascertain the existence of different effects over the respective time periods. The analysis was accomplished by first aligning the annual model of the U.S. dairy industry maintained at the University of Missouri, the Agricultural Markets and Policy Group Dairy Model (AMAP Dairy Model) as modified to account for dairy promotion, with the observed data over the 1995 to 2023 period. The impacts attributed to the promotion activities associated with the National Programs were obtained by removing demand-enhancing expenditures from the model. The model was initially simulated over history to generate a 'with promotion' scenario representing the effects of the dairy programs over actual history. A second 'no promotion' scenario (the counterfactual scenario) was then generated by setting promotion expenditures to zero. The 'no promotion' scenario results represent the per capita consumption of fluid milk, cheese, butter, and nonfat dry milk, and exports of cheese, butter, and nonfat dry milk that would have existed if the National Programs had not been created and, thus, dairy promotion had not occurred. Hence, the AMAP simulation model quantifies the effects of dairy promotion on U.S. dairy markets, prices, and exports.

The results for selected key variables in the model for the 'with promotion' and 'no promotion' scenarios are presented in Table 3-4 and Table 3-5. These tables provide a comparison of the 'with promotion' levels of each variable (actual historical data) to the 'no promotion' levels (simulated levels without promotion) to show the effects across time from dairy promotion spending. These tables capture average annual effects of dairy promotion on U.S. dairy markets considering supply responses. Note that the 'with promotion' scenario is actual history. Thus, the columns associated with 'promotion' in these respective tables constitute the average observed level of the respective variable during that period. The columns associated with 'no promotion' for each variable in each period is the average level of the variable that would have been observed if there had been no dairy promotion expenditures during those periods. The rows marked as 'change' are the 'promotion' levels minus the 'no promotion' levels and represent the amount of change in each variable in each period that can be attributed to the dairy promotion checkoff program. The columns marked 'percent change' denote the percentage change from the 'no promotion' levels to the 'promotion' levels with the 'no promotion' level as the base.

Various factors are at play, including the level of promotion expenditures in each year and the supply dynamics built into the AMAP structural dairy model. To provide insight into these model dynamics, four sub-periods of results are shown along with the entire period for the selected endogenous variables. The analysis starts in 1995 and, thus, does not include the effects of any dairy promotion that may have occurred prior to that year.

Because no other exogenous variable in the model (e.g., levels of inflation, exchange rates, income levels, government policies, etc.) other than dairy promotion expenditures, is allowed to

change in either scenario, this analytical process effectively isolates the effects of the National Programs on U.S. dairy markets and exports. That is, the simulated differences between the values of the endogenous variables from the 'with promotion scenario and those from the 'no promotion' scenario provide direct measures of the historical effects of dairy promotion expenditures (and only those expenditures) on U.S. dairy markets and exports.

As shown in Table 3-4, per capita consumption of fluid milk, cheese, butter, and nonfat dry milk was higher by 6.7 percent, 3.8 percent, 4.3 percent, and 1.6 percent, respectively, over the period of 1995 to 2023 due to promotion efforts associated with the National Programs, all other exogenous factors held constant. These results indicate that the overall downward trend of per capita fluid milk consumption between 1995 and 2023 was mitigated to some extent by the promotional efforts of the National Programs. Without the promotion programs, fluid milk consumption would have averaged 174.98 pounds per capita instead of 186.69 pounds per capita over the 1995 to 2023 period as actually occurred with promotion. Hence, promotion expenditures associated with the National Programs spending on fluid milk reduced the rate of decline in per capita consumption, controlling for all other factors.

The results also indicate that per capita consumption of cheese would have averaged 32.05 pounds without promotion versus the 33.25 pounds as actually occurred with promotion over 1995 to 2023. For butter, per capita consumption would have averaged 4.93 pounds without promotion versus the 5.14 pounds that occurred with promotion over the same period. Per capita consumption of nonfat dry milk (NFDM) would have been on average 3.01 pounds without promotion versus 3.06 pounds per capita as actually occurred with promotion over the 1995 to 2023 period.

Exports of butter were lower by 13.3 percent, while exports of cheese were up by 4.9 percent over the same period because of the promotion programs. Exports of nonfat dry milk increased by 1.2 percent over the period 1995 to 2023.

In the previous evaluation based on quarterly data from 1995 to 2022, per capita consumption of fluid milk, cheese, and butter was higher by 8.6 percent, 3.8 percent, and 3.2 percent, respectively. In addition, per capita consumption of nonfat dry milk was higher by 1.0 percent over this period. Exports of butter were lower by 17.7 percent, but exports of cheese were higher by 4.3 percent. Exports of nonfat dry milk decreased by 3.4 percent due to dairy promotion over the period 1995 to 2022.

Over the period 1995 to 2002, per capita consumption changes for cheese, butter, nonfat dry milk and fluid milk were positive at 3.4 percent, 2.8 percent, 0.3 percent, and 6.9 percent, respectively. Moreover, exports of butter and nonfat dry milk were lower by 54.8 percent and 79.4 percent, while cheese exports were higher by 3.2 percent during this period.

From 2003 to 2009, on average, per capita consumption changes were positive for all dairy products, 7.0 percent for fluid milk, 3.9 percent for cheese, 3.8 percent for butter, and 1.5 percent for nonfat dry milk. Cheese exports were higher by 8.9 percent during this period, opposite the results for butter and nonfat dry milk, with declines of 19.6 percent and 4.5 percent respectively. Over the period 2010 to 2016, per capita consumption changes were again positive for all dairy

Table 3-4. Average Annual Effects of Dairy Promotion on U.S. Dairy Markets Based on Simulation of Supply Response – Per Capita Consumption of Dairy Products, 1995 to 2023

Period			Fluid Milk Per Capita Consumption (pounds)	Cheese Per Capita Consumption (pounds)	Butter Per Capita Consumption (pounds)	Nonfat Dry Milk Per Capita Consumption (pounds)
2017 – 2023		With Promotion	155.93	38.89	6.17	2.60
		No Promotion	147.13	37.50	5.86	2.53
		Change	8.80	1.40	0.31	0.07
		Percent Change	6.0%	3.7%	5.4%	2.6%
2010 – 2016		With Promotion	182.26	34.29	5.45	3.25
		No Promotion	170.88	32.98	5.18	3.17
		Change	11.38	1.31	0.27	0.07
		Percent Change	6.7%	4.0%	5.1%	2.3%
2003 – 2009		With Promotion	198.11	31.91	4.70	3.28
		No Promotion	185.09	30.70	4.53	3.24
		Change	13.02	1.21	0.17	0.05
		Percent Change	7.0%	3.9%	3.8%	1.5%
1995 – 2002		With Promotion	207.48	28.57	4.36	3.10
		No Promotion	194.10	27.63	4.24	3.09
		Change	13.38	0.94	0.12	0.01
		Percent Change	6.9%	3.4%	2.8%	0.3%
1995 – 2023		With Promotion	186.69	33.25	5.14	3.06
		No Promotion	174.98	32.05	4.93	3.01
		Change	11.70	1.20	0.21	0.05
		Percent Change	6.7%	3.8%	4.3%	1.6%

Source: Calculation by the authors.

products, 6.7 percent for fluid milk, 4.0 percent for cheese, 5.1 percent for butter, and 2.3 percent for nonfat dry milk due to dairy promotion activities. Cheese exports and nonfat dry milk exports rose by 4.5 percent and 3.5 percent respectively over the 2010 to 2016 period, but butter exports fell by 8.3 percent during this period.

From 2017 to 2023, per capita consumption of fluid milk, cheese, butter, and nonfat dry milk were higher by 6.0 percent, 3.7 percent, 5.4 percent, and 2.6 percent, respectively, due to promotion. Exports of butter were 2.5 percent less than would have occurred without promotion, while exports of nonfat dry milk and cheese were 5.5 percent and 4.5 percent higher, respectively, due to promotion.

Since August 2011, per capita cheese consumption was higher by 0.020 pounds with the promotion funds collected from importers, a rise of 0.054 percent. Percentage changes in per capita consumption of butter, nonfat dry milk, and fluid milk were negligible. Finally, other cheese consumption rose 6.256 million pounds or 0.088 percent because of the import assessment. Imports of products largely intended for industrial use, including casein, lactose, and whole milk powder, are not explicitly accounted for in this analysis.

Table 3-5. Average Annual Effects of Dairy Promotion on U.S. Dairy Markets Based on Simulation of Supply Response – Cheese, Butter, and Nonfat Dry Milk Exports, 1995 to 2023

Period			Cheese Exports (million lb)	Butter Exports (million lb)	Nonfat Dry Milk Exports (million lb)
Period	2017 – 2023	With Promotion	845.83	71.01	1,684.92
		No Promotion	809.24	72.87	1,597.39
		Change	36.58	-1.85	87.53
		Percent Change	4.5%	-2.5%	5.5%
	2010 – 2016	With Promotion	612.84	97.78	1,106.97
		No Promotion	586.6	106.67	1,069.87
		Change	26.24	-8.89	37.10
		Percent Change	4.5%	-8.3%	3.5%
	2003 – 2009	With Promotion	164.78	41.78	402.49
		No Promotion	151.24	51.99	421.24
		Change	13.53	-10.20	-18.75
		Percent Change	8.9%	-19.6%	-4.5%
	1995 – 2002	With Promotion	83.15	9.55	15.23
		No Promotion	80.60	21.12	73.97
		Change	2.55	-11.57	-58.7
		Percent Change	3.2%	-54.8%	-79.4%
	1995 – 2023	With Promotion	419.02	54.26	791.24
		No Promotion	399.58	62.60	781.54
		Change	19.43	-8.34	9.70
		Percent Change	4.9%	13.3%	1.2%

Source: Calculation by the authors.

What then is the impact of the assessment on imports of dairy products? Given that cheese occupies a notable share of imported dairy products, we focus attention on the incremental amount of imports of cheese attributed to the importer assessment. Over the period 2012 to 2023, cheese consumption in the United States amounted to 145.49 billion pounds. Because of the assessment from importers, total domestic cheese consumption was higher by roughly 78 million pounds. To arrive at this figure, we multiply 145.49 billion pounds by the percentage change in cheese consumption because of the importer assessment (0.054 percent as noted previously). Further, because cheese imports are roughly 2.5 percent of domestic consumption based on information provided by USDA, then due to promotion funds collected from importers, imported cheese levels were higher by 1.95 million pounds. Further, unit values of cheese imports amounted to roughly $3.36 per pound on average annually between 2012 to 2023. Hence, incremental revenue to importers solely from cheese attributed to the import assessment totaled $6.56 million. In the previous evaluation based on data from 2012 to 2022, incremental revenue to importers solely from cheese attributed to the import assessment totaled about $5.46 million.

Dairy Promotion Program Benefit-Cost Analysis

This section provides a benefit-cost analysis of the National Programs based on the results of the scenario analyses discussed in the previous section. As calculated, the producer profit BCR is the additional industry profits (additional cash receipts net of additional production costs and promotion assessments) earned by producers because of the promotion expenditures (as

measured through the scenario analyses) divided by the cumulative promotion expenditures made to generate those additional profits. The fluid milk processor BCR is calculated similarly to the producer BCR in which the cost of milk is used as a proxy for the cost of production since data pertaining to the cost of production for fluid milk processors are not available.

The level of the BCR often is mistakenly taken as the sole indicator of the level of the market impact of a promotion program. The BCR from a $1 investment that returns $4 is the same (4 to 1) as the BCR for a $1 billion investment that returns $4 billion. Although the BCRs from these two investments are the same, the levels of their market impacts obviously are not. The more that is spent, the larger the market impact of the commodity program. As spending increases, however, each additional dollar spent has a declining effect, so that the total additional revenue achieved increases but at a declining rate. This phenomenon is consistent with the law of diminishing marginal returns in economics. Thus, the ratio between the additional revenue generated by promotion and the additional funds spent on promotion (the BCR) declines as funding increases. Further, a lower (higher) BCR during a particular period relative to another period or for one commodity relative to another does not mean the program is less (more) effective. Other metrics, such as impacts on per capita consumption, prices and exports, typically are more revealing and insightful than the BCR as indicators of market impact.

As exhibited in Table 3-6, over the period from 1995 to 2023, the BCRs expressed in terms of producer profit or net returns at the farm level were calculated to be $1.41 for every dollar invested in demand-enhancing activities for fluid milk; $3.38 for every dollar invested in demand-enhancing activities for cheese; and $19.19 for every dollar invested in demand-enhancing activities for butter. For other non-specific or non-delineated promotion activities, the BCR was calculated to be 6.96 for every dollar invested. Over the same period, the BCR of export promotion was 8.52 per dollar invested.

The aggregate all-dairy BCR was 4.58, meaning that, on average, producer profit increased by $4.58 for each dollar invested in demand-enhancing activities. These BCRs are net of the costs associated with the National Programs. Relative to the past four evaluations, wherein the BCRs were estimated to range from 4.30 to 5.23, the BCR for all dairy products falls within this interval.

The returns-on-investment as measured by the BCR for cheese, butter, other non-specific dairy products, and exports were within the ranges reported in the past four evaluations. However, the BCR for fluid milk, reported as 1.41, was lower than the range of 1.63 to 3.26 previously reported in the past four evaluations.

Because the incremental revenue from all dairy products to importers due to promotion cannot be determined, a BCR for importers cannot be calculated.

To address the effectiveness of the investments made by DMI and MilkPEP separately, we simulated “with promotion” and “without promotion” scenarios for each of the two entities following the same methodology as for the aggregate analysis. DMI promotion expenditures have largely focused on promotion programs for fluid milk, cheese, butter, non-delineated products, and exports. In contrast, MilkPEP promotion expenditures have targeted fluid milk exclusively.

Table 3-6. Calculated Benefit-Cost Ratio (BCRs) at the Producer Level Attributed to the National Programs, 1995 to 2023

Producers	
Product	BCR
All Dairy	4.58; (5.07, 4.30, 4.76,5.23)
Fluid Milk	1.41; (1.63, 1.91, 3.26, 2.68)
Cheese	3.38; (3.23, 3.27, 3.62, 3.87)
Butter	19.19; (23.10, 24.11, 24.40, 17.73)
Exports	8.52; (8.85, 7.43, 6.94, 8.63)
Other Non-Specific Dairy Products	6.96; (9.05, 6.93, 6.79, 8.38)

Source: Calculations by the authors. The first number in parentheses corresponds to the BCRs reported using data from 1995 to 2021, the second number in parentheses corresponds to the BCRs reported using data from 1995 to 2020, the third number in parentheses corresponds to the BCRs reported using data from 1995 to 2019, and the fourth number in parentheses corresponds to the BCRs reported using data from 1995 to 2022.

The BCR associated with DMI spending was calculated to be 5.20, higher than the 4.58 return on investment for all dairy product promotion investments. The BCR associated with MilkPEP was calculated at 1.10, slightly less than the 1.41 return calculated for all fluid milk promotional spending. In the four previous evaluations of National Programs, the BCR associated with DMI spending was calculated to be 6.51 based on data from 1995 to 2022, 6.43 based on data from 1995 to 2021, 5.43 based on data from 1995 to 2020, and 5.59 based on data from 1995 to 2019, while the BCR associated with MilkPEP spending was calculated to be 2.58 based on data from 1995 to 2022, 1.55 based on data from 1995 to 2021, 1.89 based on data from 1995 to 2020, and 3.28 based on data from 1995 to 2019. Bottom line, the BCR associated with DMI spending and the BCR associated with MilkPEP spending were lower than those previously reported over the past four evaluations.

In addition, we calculate the BCR associated with the promotion of fluid milk at the processor level. The cost of milk was used as a proxy for the cost of production since data concerning the costs of production for fluid milk processors were not available. Initially, we calculated the added total value at the retail level of the marketing channel attributed to MilkPEP promotion. Then we calculated the added total value accruing at the farm level attributed to MilkPEP promotion. The difference is the added total value captured by market participants beyond the farm gate to the retail level. Over the period 1995 to 2023, this cumulative added value amounted to $8.72 billion. Over the same period, the cumulative amount of MilkPEP promotion expenditures totaled $2.46 billion. Hence, the net BCR of fluid milk at the processor level was estimated to be 2.54 over this period. In the previous evaluations of the effectiveness of National Programs, the net BCR was calculated to be 2.44 and 3.24, respectively. Hence, the BCR of fluid milk at the processor level aligns with previously reported measures.

Importantly, this measure captures the gross return on investment for fluid milk market participants beyond the farm level. Any additional costs incurred by these market participants from handling the larger volume of fluid milk that occurs due to MilkPEP promotion were excluded because we simply do not know the magnitude of these additional costs. Further, others in the marketing channel besides fluid milk processors capture a portion of this incremental total

value; however, we have no knowledge of the portion captured by processors versus other milk market participants beyond the farm gate. Due to these caveats, we exercise caution in providing this estimate of the BCR attributed to the promotion of fluid milk at the processor level over the 1995 to 2023 period.

Also, caution must be exercised in making comparisons from various evaluations of the dairy promotion and research program across years. The economic phrase *ceteris paribus*, meaning all other factors invariant, does not hold. The underlying endogenous and exogenous variables provided by various government sources have been revised and updated, and four additional quarters of data are now available not only for these variables, but also for the data associated with the programmatic expenditures of the National Programs.

Concluding Remarks[9]

This report provides a continued annual independent evaluation of the effectiveness of the National Programs covering the period 1995 to 2023. The key findings regarding markets for fluid milk and manufactured dairy products over this period include the following:

- The National Programs have effectively increased the demand for promoted dairy products, especially cheese and butter, while moderating the decline in per capita fluid milk consumption.
- The gains in profit at the producer and fluid milk processor level from promotion were larger than the costs of the National Programs. The aggregate BCR (using change in profit net of costs) of the dairy producer promotion program was calculated to be 4.58. That is, for every dollar spent on demand-enhancing activities, dairy producers received an additional $4.58.
- The BCR for fluid milk promotion was calculated to be $1.41 for every dollar invested in demand-enhancing activities. The BCR was calculated to be $3.38 per dollar invested in cheese promotion and $19.19 for every dollar invested in butter promotion. The BCR for dairy export promotion was calculated to be $8.52 per dollar invested.
- The National Programs promotion spending over 1995 through 2023 increased annual per capita consumption of dairy products, and cheese exports:

Fluid milk consumption per capita	+6.7 percent
Cheese consumption per capita	+3.8 percent
Butter consumption per capita	+4.3 percent
Nonfat dry milk consumption	+1.6 percent
Butter exports	-13.3 percent
Cheese exports	+4.9 percent
Nonfat dry milk exports	+1.2 percent

[9] A reference list is available upon request.

- Promotion funds collected from importers boosted the annual average level of cheese imports by 1.95 million pounds. Annual unit values of cheese imports amounted to about $3.36 per pound over the period from 2012 to 2023. Hence, the incremental revenue to importers solely from cheese attributable to the expenditure of the import assessments for cheese promotion totaled $6.56 million.
- The BCR associated with fluid milk at the processor level was estimated to be 2.54. For every dollar contributed, U.S. milk processors received $2.54 in additional receipts, net of incremental costs.

Regarding methodology, the analysis was accomplished by first statistically estimating the relationships between dairy product demands and export demand for dairy products and their respective demand drivers, including prices, income, seasonality, and promotion expenditures. The impact of the COVID-19 pandemic was also accounted for in these demand models. The structural econometric models used for this analysis are statistically valid and consistent with prior studies evaluating generic commodity promotion.

The annual model of the U.S. dairy industry maintained at the University of Missouri, the Agricultural Markets and Policy Group Dairy Model, was modified to include the results of the dairy demand statistical analysis and then aligned with the observed data over the 1995 to 2023 period. The model was simulated over history to generate a 'with promotion' scenario representing the effects of the dairy programs over actual history. A second 'no promotion' scenario (the counterfactual scenario) was then generated with the model over history in which promotion expenditures in the dairy product demand equations were set to zero. The results of the second scenario represent the levels of prices and quantities that would have existed if the National Programs had not been created and, thus, dairy promotion had not occurred.

CHAPTER 4

Qualified State, Regional, or Importer Dairy Product Promotion, Research, or Nutrition Education Programs

The Secretary annually certifies Qualified Programs as part of the Dairy Act and Order. To receive certification, the Qualified Program must meet the following (7 CFR §1150.153):

1. Conduct activities intended to increase human consumption of milk and dairy products generally;
2. Be active and ongoing before passage of the Dairy Act, except for programs operated under the laws of the United States or any State; and except for importer programs;
3. Be primarily financed by producers, either individually or through cooperative associations or dairy importers;
4. Not use a private brand or trade name in its advertising and promotion of dairy products (unless approved by the Dairy Board and USDA);
5. Certify that requests from producers or importers for refunds under the program will be honored by forwarding to either the Dairy Board or a Qualified Program designated by the producer or importer that portion of such refunds equal to the amount that would otherwise be applicable to that program; and
6. Not use program funds for the purpose of influencing governmental policy or action.

The aggregate revenue from the assessment directed to the Qualified Programs in 2023 was $351 million (approximately 10 cents of the 15-cent producer assessment and 2.5 cents of the 7.5-cent import assessment). This chapter provides the aggregate income and expenditure data of the Qualified Programs as well as a list of certified programs in 2023.

2023 Qualified State, Regional or Importer Dairy Product Promotion, Research or Nutrition Education Programs Aggregate Income and Expenditure Data Reported to USDA

(Thousands)

Aggregate Income	**FY 2023**
Carryover from Previous Year [1]	$118,520
Producer Remittances	221,447
Transfers from Other Qualified Programs	78,567
Transfers to Other Qualified Programs	(87,741)
Other Income	21,009
Total Adjusted Annual Income	**$351,801**

Aggregate Expenditures	**FY 2023**
General and Administrative	$8,169
Milk Advertising and Promotion	11,360
Cheese Advertising and Promotion	31,498
Butter Advertising and Promotion	7,252
Frozen Dairy Products Advertising and Promotion	4,058
Other Advertising and Promotion [2]	6,310
Unified Marketing Plan [3]	95,020
Dairy Foods and Nutrition Research	15,730
Public and Industry Communications	35,659
Nutrition Education	19,564
Market and Economic Research	4,835
Other	17,568
Total Annual Expenditures[10]	**$257,023**
Total Available for Future Year Programs	**$92,781**

[1] Differences can occur because of audit adjustments and varying accounting periods.

[2] Other includes "Real Seal," holiday, multi-product, calcium, foodservice, product donations at State fairs, and other promotional activities.

[3] Unified Marketing Plan: Reported local spending by participants in the Unified Marketing Plan to fund national implementation programs.

Source: Data Reported by Qualified Dairy Product Promotion, Research, and Nutrition Education Programs.

2023 Qualified State, Regional or Importer Dairy Product Promotion, Research or Nutrition Education Programs

Alabama:
American Dairy Association of Alabama Inc.
(Dairy Alliance)

Arizona:
Dairy Council of Arizona
(Dairy Management West)

California:
California Milk Advisory Board
Dairy Council of California

Connecticut:
Connecticut Milk Promotion Board

Florida:
Florida Dairy Farmers Inc.

Georgia:
Georgia Agricultural Commodity Commission for Milk
Southeast United Dairy Industry Association
(Dairy Alliance)
American Dairy Association of Georgia
(Dairy Alliance)

Idaho:
Idaho Dairy Products Commission
Dairy West

Illinois:
Illinois Milk Promotion Board

Indiana:
American Dairy Association of Indiana
Indiana Dairy Industry Development Board

Kansas:
Kansas Dairy Commission

Kentucky:
American Dairy Association of Kentucky
(Dairy Alliance)

Louisiana:
Louisiana Dairy Industry Promotion Board

Maine:
Maine Dairy and Nutrition Council
Maine Dairy Promotion Board

Massachusetts:
Massachusetts Dairy Promotion Board
New England Dairy and Food Council Inc.
(New England Dairy)
New England Dairy Promotion Board
(New England Dairy)

Michigan:
American Dairy Association of Michigan
Dairy Council of Michigan
Michigan Dairy Market Program

Minnesota:
Midwest Dairy Association (Midwest Dairy)
Midwest Dairy Council (Midwest Dairy)
Minnesota Dairy Research and Promotion
Council (Midwest Dairy)

Mississippi:
American Dairy Association of Mississippi Inc. (Dairy Alliance)

Missouri:
Dairy Promotion Inc.
Promotion Services Inc.
St. Louis District Dairy Council

Nebraska:
Nebraska Dairy Industry Development Board
(Midwest Dairy)

Nevada:
Dairy Council of Nevada (Dairy Management
West)

New Hampshire:
Granite State Dairy Promotion

New Jersey:
New Jersey Dairy Industry Advisory Council

New York:
American Dairy Association & Dairy Council
(American Dairy Association Northeast)
Milk for Health on the Niagara Frontier Inc.
New York State Department of Agriculture,
Division of Milk Control and Dairy Services
Rochester Health Foundation Inc. (American
Dairy Association Northeast)

North Carolina:
American Dairy Association of North Carolina
(Dairy Alliance)

North Dakota:
North Dakota Dairy Promotion Commission
(Midwest Dairy)

Ohio:
American Dairy Association Mideast

Oregon:
Oregon Dairy Products Commission

Pennsylvania:
Allied Milk Producers' Cooperative Inc.
Mid-Atlantic Dairy Association
(American Dairy Association Northeast)
Pennsylvania Dairy Promotion Program
(American Dairy Association Northeast)

Puerto Rico, Commonwealth of:
Milk Industry Development Fund of Puerto
Rico (Fondo Fomento Industria Lechera)

South Carolina:
American Dairy Association of South Carolina
(Dairy Alliance)

South Dakota:
American Dairy Association of South Dakota
(Midwest Dairy)

Tennessee:
American Dairy Association of Tennessee
(Dairy Alliance)
Tennessee Dairy Promotion Committee
(Dairy Alliance)

Texas:
Dairy MAX Inc.
Western Dairy Association
(Dairy MAX Inc., Inactive)
Southwest Dairy Museum Inc.
(Southwest Dairy Farmers Southland Dairy Farmers)

Utah:
Utah Dairy Commission (Dairy West)

Vermont:
Vermont Dairy Promotion Council

Virginia:
American Dairy Association of Virginia
(Dairy Alliance)

Washington:
Washington State Dairy Council
(Dairy Farmers of Washington)
Washington Dairy Products
(Dairy Farmers of Washington)

Wisconsin:
Wisconsin Milk Marketing Board Inc.
(Dairy Farmers of Wisconsin)

Qualified Importer Programs:
Cheese Importers Association of America (Importer)
Wisconsin Milk Marketing Board (Dairy Farmers of Wisconsin)
Global Dairy Platform (Importer)

Dairy Management Inc., Dairy Research Institute, and U.S. Dairy Export Council Contracts Approved by USDA, 2023

84.51, LLC
Agribusiness-Connect Asia
Alamar Foods Company
Alliance Dairies LLP
American Butter Institute
American Dairy Association Indiana Inc.
American Dairy Association Northeast
American Eagle.com
American Farm Bureau Foundation for Agriculture
American Society for Nutrition
American Society of Agronomy Inc.
Andexler, Rebecca
Antenna Group Inc.
Arab Marketing Finance Inc.
Aramark
Associated Milk Producers Inc.
Avant, Jason
Bates, Matthew
Baxter Communications Inc.
BCS Food Consulting LLC
Beekuba
Biofiltro USA Inc.
Black Swan Data Ltd.
BR Bock Consulting
Brainyak Inc. d/b/a GutCheck
Brigss, Kaitlyn
Britt, Jack
C&R Research Inc.
CadmiumCD LLC
Cady, Roger
California Dairy Foods Research Center
California Milk Advisory Board
Canon USA Inc.
Carlye Fallon Communications LLC
CB Information Services Inc.
Center for Generational Kinetics
Ceres Dairy Risk Management LLC
CFE Solutions Inc.
Charlotte Convention Center
Cheese Market News
Cheese Reporter
Circanna Inc.
C-Lock Inc.
Compass Group USA Inc.
Complete Power Foods LLC
ConferenceDirect LLC
Conley, Christopher
Context Network LLC
Costco Wholesale Corporation
CRA Inc.
Culinary Sales Support Inc.
Cultivating the Future LLC
CustomED
Cvent Inc.
Dairy & Food Market Analyst Inc.
Dairy Farmers of America
Dairy Farmers of Canada
Dairy Farmers of Washington
Dairy Girl Network
Dairy Insights LLC
Dairy Strong Sustainability Alliance
Dairy West
DairyBusiness LLC
Daniel J Edelman
DARI LLC
Darigold Inc.
Datassential Inc.
DeCandio, Jaclyn
DellaValle Laboratory Inc.
Direct Dairy Nutrition Service LLC
Dish LLC
Domino's Pizza Enterprises – Japan
Domino's Pizza LLC
Dorantes International Trade and Regulatory Law Advisors
EarthShift Global LLC
Eastern Trade Media Pte Ltd., publisher of Asia Pacific Food Industry
Ecosystem Services Market Consortium LLC
Edelman Public Relations Worldwide

Emerging Ag Inc.
Empist LLC
Emplifi Inc.
EpidStrategies, A Division of ToxStrategies LLC
Ernst & Young Global Limited
Esser, John
Esty & Associates LLC
Euromonitor International
Expo Pass LLC
Eventbrite Inc.
Fair Oaks Farms LLC
Farm Journal Foundation
Farmers for Sustainable Food
Feeney, Emma
Fieldfischer LLP
Flock Associates USA Inc.
Florida Dairy Farmers Inc.
Flowers Communication Group Inc.
Food Allergy Research and Education
FoodMinds, A Division of Padilla Speer Beardsley Inc.
Foodsense LLC
FoodTrition Science
Foundation for Food and Agriculture Research
Fuelcomm Inc. d/b/a Stackline
Futerra Sustainability Communications Limited
Gaalswyk, Dennis
Gardner, Emily
Gartner Inc.
General Mills Inc.
GenYouth Foundation Inc.
Getty Images (US) Inc.
Girag & Associates SARL
Global Child Nutrition Foundation Inc.
Global Dairy Platform Inc.
GlobalData Plc (Canadean Consumer)
Godfrey & Kahn S.C.
Good Sport Nutrition LLC
Gravity Marketing LLC
Grendall, Leah
Harbor Environmental LLC
Harper, Caleb
Harper, Lowry
Herbert, Justin
HJG Communications LLC
HotSpex Media Inc.
Houston Engineering Inc.
Hruska, Cindy
Hudson Grey Sky Productions LLC
IdeaMilk LLC
Igloo Inc.
Illustra Inc.
Industrial Economics Inc.
Information Resources Inc.
Ingredient Inc.
Inmar Analytics Inc.
Innova Market Insights
Inspire11 LLC
Institute for the Future
Inter-American Institute for Cooperation in Agriculture (IICA)
International Dairy Foods Association
Ipsos Insights LLC
Iron Mountain Inc.
ISOS Group LLC
J Wallace Consulting
JHG Global Economics LLC
Jiangnan University
John Roach Productions Inc.
Johnson, Rachel
Joslin Diabetes Center Inc.
Kantar Retail d/b/a Kantar Worldpanel
Kantar LLC d/b/a Kantar TNS
KCoe Isom LLP
Keenan, Judy
Keller & Heckman LLP
KJ Marketing Consulting
Lane, Tonya
Leading Authorities Inc.
LEIF LLC
Lightspeed Research Ltd.
Lindsey, Briaunna
Lisa Kay Creative Photography
Lovelytics LLC
Lumanity Clinical and Regulatory Inc.
Lux Research Inc.

Maine Dairy Promotion Board
Mandell, Laura
Manifest LLC
Market Makers Inc.
Mayo Clinic
MB Clinical Research and Consulting LLC
McClelland, Alyssa
McDonald's USA LLC
Meltwater News US Inc.
Messina Group Inc.
MEXCAM Mercadotecnia SA DE CV
Microsoft Corporation
Midwest Dairy Association
Midwest Dairy Foods Research Center
Midwest Mechanical
Mischief@NoFixedAddress Inc.
MMS Education Inc.
Montazar, Aliasghar
Myant Research Centre of Canada Inc.
National Fluid Milk Processor Promotion Board
National Football League Inc.
National Football League Players Inc.
National Football League Properties
National Medical Association
National Milk Producers Federation
New England Dairy & Food Council Inc.
New Hope Network
Newport LLC
Newtrient LLC
Novak Birch
Nutrichicos LLC
Nutrition Impact LLC
Nutrition Insights LLC
Nutrition On Demand LLC
Ohlhorst, Sarah
On the Go Marketing Corp.
Paradox Nutrition LLC
Parenti Partners d/b/a Culinary Garage
Paulsen Marketing Inc.
Pinion LLC
PIPA LLC
Pizza Hut LLC
Pizza Hut Japan Ltd
Pizzavest Co. Ltd.
PR Consultants Limited
Prime Consulting of Florida
Privacy Vaults Online Inc., d/b/a PRIVO
Production Plus Technologies
Promar International Limited
Provoyant Corporation
PT Sarimelati Kencana
PublicPolicyAsia Advisors Pte. Ltd.
Quaife, Tom
Quarterra LLC
Quinn, Jason
Queue Brand Communications Inc.
Quest Audio Visual
Raising Cane's Restaurants LLC
Ravindran Associates LLP
Ready Ink Communications
Reid Miller Creative Group LLC d/b/a 3 MAD FISH
Research Resources
Results Direct
Rise Interactive Media & Analytics LLC
River Global LLC
Rogers, Paul
Rowe, Sylvia
RTI International
Ruby Do Inc.
Shamrock Foods Company
Shelford, Timothy
Sidley Austin LLP
Sikand, Vadna
Smith-Schuster, Juju
Socialbakers a.s.
Sohn's Market Makers
Soil Health Institute
Sopexa
Southeast United Dairy Industry Association
sparks & honey LLC
Spins LLC
Spire Research & Consulting Pte. Ltd.
SR Strategy LLC
Stanback, Isaiah
Strategic Conservation Solutions LLC

Strategic Growth & Ventures LLC
Strategy Muse
Steiber, Alison
Sustainable Conservation
Sustainable Environmental Consultants
Taco Bell Corporation
Taylor, Tammy
Team Services LLC
Technomic Inc.
Terry Jones with On Inc.
Texas A&M AgriLife Research
The Cambridge Group LLC
The Center for Generational Kinetics
The Context Network LLC
The DuPuis Group
The Economist Intelligence Unit NA Inc.
The Fresh Approach Inc.
The Hartman Group LLC
The Kroger Company
The McCully Group
The Nature Conservancy
The NPD Group Inc.
Toby Amidor Nutrition PC
Tomlinson Consulting LLC
TradeMoves LLC
TSM Nutrition Consultants LLC
Tutwiler, Ann
United Dairymen of Arizona
United States Farmers and Ranchers Alliance
USI Insurance Services
VerdanaBold
Verizon Communications Inc.
Villacorta, Manual
Viral Nation Inc.
Vivayic Inc.
Volp, Lori
Wallace, James
Washington, James
Washington Dairy Products Commission
Watkinson Miller PLLC
Watson Green LLC
Weaver, Connie
Weber Shandwick
Western Dairy Research Center
Whey Protein Research Consortium
White, Jim
White, Richard
Wilken, Edith
William Westman & Associates LLC
Williams, Alexandra
Williams, Robert
Wilson, Norrie
Winchell, Mike
Wright, Nahshon
Xerox Corporation
Ypulse Inc.
Zenith International Ltd.
ZS Associates Inc.

National Fluid Milk Processor Promotion Board Contracts Approved by USDA, 2023

A Worthey Media LLP
AdAdapted Inc.
Adams, Kay
Amato, Olivia
AIFOS Entertainment Inc.
ARK MB Inc.
Association of National Advertisers Inc.
Bamberger, Daisy
Baumann, Kristy
Beatrix, Lucie
Be Honest Productions Inc.
Benson, Violetta
Billie Jean King Enterprises Inc.
Bird Projects LLC
Bridge
Brink, Cameron
Brooke, Hailey
Bui, Anh
Bybee, Nicole
California Milk Advisory Board
California Milk Processor Board
Cannon, Rebekah
Capital Bank N.A.
Capito, Isaac
Carlilloyd.com LLC
Champion, Cari
Chandler, Brandon
Charli D'Amelio LLC
Chavez, Amber
Cheers Harrisburg LLC
Chiles, Jordan
Coastline Creatives LLC
Coburn, Emma
CRA Inc.
Crispin LLC
CPGCatNet Inc
D'Amato, Keira
Dadds, Taylor
Dad's Cookies LLC
Dairy Management Inc.
Davis, Tara
Dixson-Griggs, Alexa
Doing Things Inc.
Dunn, Crystal
eatbigfish LLC
EatMoreBaltimore LLC
Evil Hag Enterprises Inc.
Ebiquity Inc.
Egg Strategy LLC
Elena, Viancy
Emma Coburn LLC
ExtraEmily LLC
Feret, Emily
Flynn, Alysha
Food For Thought Consulting Inc.
Foudy, Julie
Fowler, Paige
Fuelcomm, Inc. d/b/a Stackline
Gale Partners LLC
Garcia, Starla
Gaul, Iridyan
General Mills Inc.
GENYouth Inc.
Gerson, Hannah
Gichrist, Kaleigh
Girls on the Run International
Graviet, Mada
H.A. Knight Inc.
Harris, Jayuanna
Hartford Financial Services Group Inc.
He, Lily Muni
Hearst Media Inc.
Heise, Taylor
Heller, Jordyn
Hernandez, Molly
Hoang, Amanda
Huff, Candice
IamDytto LLC
Information Resources Inc.
InMarket Media LLC
InTech Integrated Marketing Services
International Dairy Foods Association
Jane Lee LLC
Jeans, Ashley
Jordan Chiles Inc.
Jones, Jerlyn

Joyo LLC
Julian 10-11 Inc.
Kantar LLC
Kelis
Kim, Angela
Klineman, Alix
Knight, Hilary
KR1 LLC
Krezonoski, Kim
Krieger, Alexandra Blaire
Kyla Marie Charles LLC
LeCoumpte, Kristen
Lawson, Sashea
Leroux, Sydney Rae
Levels Unlocked Enterprises LLC
Lichy, Erin Dana
Linn Nicole
Lipinski, Tara
Lisa L Enterprises
Lloyd, Carli
LMHGOLF Inc.
Loophole Productions Inc.
Lucas, Ciara
MacIntyre, Samantha
Manuel, Simone
Mars Advertising Inc.
McDonald, Joan
Melke NYC
Mezrahi, Samir
Milne, Brooke
MLA Integrated Marketing Consulting LLC
MMI Agency LLC
MomoMilk LLC d/b/a Milk Bar
Moonrock Agency LLC
Moure, Adele
Mullin, Troy Cheri
Nae Nae Twins
Neptune Retail Solutions
Noe, Renee Maudlena
Not Impossible LLC
Nutrition for Littles LLC
Ogwumike, Chiney
Olivia Amato LLC
One Tree Planted Inc.
O'Shea, Kelsey
Ostrander, Allie
Queen Latifah Inc.
Outkreate LLC
Outside Interactive Inc.
PepsiCo Inc.
Phalanx AI Inc.
Pondera Advisors LLC
Ponderosa Advisors LLC
Power, Aerial
Prime Consulting of Florida Inc.
Quinn, Christine
Radius Global Market Research
Red Spark Consulting LLC
Revamped LLC
Rice, Kiki
Roe Productions LLC
Rubin, Ronald
Savanah Moss Inc
Sharpova, Maria
Schreiber, Samantha
Seidel, Izzy
Seidel, Molly
Simone Manuel Inc.
Sigg, Olivia
Shore, Mindy
Snyder Cohn PC
Spectrum Group Productions Inc.
Soubrier, Crystal Dunn
St. Anoine, Jacquie
St. Louis Baking and Pastry
Stagwell Global LLC
Street Smart Nutrition LLC
Stomp Out Bulling LLC
SW19 Inc.
Tales and Turbans LLC
Team Services LLC
The Advantage Group International Inc.
The Baby Dietitian LLC
The Colony Group LLC
The First Todd Inc.
The Method LLC
Thumbs Up Enterprises Inc.
Tillack, Kristin
Tise, Celia
Trojan Goddess LLC
Tut, Hallie
Twigge, Lauren

Twoody Media LLC
VidCon LLC
Viacom International d/b/a Paramount Global
Village Marketing Agency LLC
Washpoppin Inc.
Watkinson Miller PLLC
Winter, Nicole
Wishbone Kitchen LLC
Woodward, Mason
Xu, Janet
Yerke, Madison
Youngren, Kennedy

Approved Nutrition Competitive Research Activities, 2023

Principal Investigator, Institution, Project Title and Status

Daniela Barile, PhD (University of California-Davis): *Whey phospholipid concentrate as a source of bioactive compounds that improve human health* [ongoing 2023].

Nick Bellisimo, PhD (Ryerson University): *Effect of dairy form on mood and cognitive performance in school-aged children* [ongoing 2023].

Sherman Bigornia, PhD (University of New Hampshire): P*rospective associations of dairy intake with cardiometabolic and brain-related health in the Hispanic Community Health Study/Study of Latinos* [ongoing 2023].

Christopher Blesso, PhD (University of Connecticut): *Evaluation of milk polar lipids on lipoprotein metabolism, inflammation and gut microbiota in dyslipidemic adults with abdominal obesity* [ongoing 2023].

Bradley Bolling, PhD (University of Wisconsin-Madison): *Anti-inflammatory activity of yogurt mediated by the intestinal barrier* [ongoing 2023].

Nicholas Burd, PhD (University of Illinois at Urbana - Champaign): *Dairy food consumption and its effects on inflammation and the postprandial regulation of muscle protein synthesis* [ongoing 2023].

Sharon Donovan, PhD, RD (University of Illinois at Urbana - Champaign): *STRONG Kids 2: A cells-to-society approach to nutrition in early childhood* [ongoing 2023].

Foundation for the National Institutes of Health: *The performance of novel cardiac biomarkers in the general U.S. population* [ongoing 2023].

Adam Drewnowski, PhD (University of Washington): *The Nutrient Rich Food Index NRF9.3 revises: Toward a category-specific nutrient profiling tool applicable to milk and dairy products* [commenced 2023].

Darcy Freedman, PhD (Case Western Reserve University): *Nourishing neighborhoods, empowering communities study* [ongoing 2023].

Thom Huppertz, PhD (Wageningen University): *Quantifying differences in bioavailability of different dietary proteins in older adults* [ongoing 2023].

Ruchi S. Gupta, PhD (Food Allergy Research and Education): *The childhood activities nutrition and development oversight study* [ongoing 2023].

Naiman A. Khan, PhD, RD (University of Illinois at Urbana - Champaign): *Cross-sectional and longitudinal predictors of cognitive control and early academic abilities among preschool children* [ongoing 2023].

Ronald Kraus, MD (University of California-San Francisco): E*ffects of diets high in dairy fat on circulating branched chain fatty acids in overweight and obese adults* [commenced 2023].

Kelsey M. Mangano, PhD, RD, (University of Massachusetts Lowell): *Longitudinal associations between dairy foods and biomarkers with cardiometabolic outcomes in the Boston Puerto Rican Health Study* [concluded 2023].

Maria Marco, PhD (University of California-Davis): *Fermented dairy effects on markers of intestinal health: A literature review* [ongoing 2023]; *The yogurt matrix during digestion: benefits of milk composition and structure* [ongoing 2023].

Daniel Moore, MD, PhD (University of Toronto): *Anabolic potential of dairy and dairy products for active children and adolescents* [ongoing 2023].

Lynn L. Moore, DSc, MPH (Boston University School of Medicine): *Yogurt and total dairy intake among women: effects on weight change and fracture risk during critical life stages* [ongoing 2023].

Stuart Phillips, PhD (McMaster University): *The mechanistic underpinning of protein quality and quantity in aging skeletal muscle: A high sensitivity proteome profiling approach* [ongoing 2023].

Jeffery Schwimmer, MD (University of California, San Diego): *Whole dairy foods consumption for children with NAFLD* [ongoing 2023].

Marie-Pierre St-Onge, PhD (Columbia University): *The role of dairy products on sleep health: A narrative review* [ongoing 2023].

Minghua Tang, PhD (University of Colorado): *Influence of a dairy based complementary diet on body composition, bone growth, and food acceptance; a randomized controlled trial* [commenced 2023].

Zifan Wan, PhD (University of Wisconsin-Platteville): *Utilization of the novel atmospheric cold plasma technology for controlling listeria monocytogenes in brine solution and brined cheeses* [commenced 2023].

Connie Weaver, PhD (San Diego State University): *Racial/ethnic differences in calcium metabolism in response to dietary sodium* [ongoing 2023].

Elena Volpi, MD, PhD (University of Texas Medical Branch at Galveston): *A Phase I randomized clinical trial of in-hospital and post-hospital whey protein vs. isonitrogenous collagen protein vs. isocaloric placebo maltodextrin supplementation to improve recovery from*

hospitalization for an acute medical illness in previously independent community dwelling older adults [ongoing 2023].

Trudy Voortman, PhD (Erasmus University Medical Center Rotterdam): *The role of dairy foods in inflammation and inflammatory diseases in the general population: Resolving inconsistencies in current evidence* [ongoing 2023].

Approved Product Competitive Research Projects, 2023

Principal Investigator, Institution, Project Title and Status

Alirez Abbaspourrad, PhD (Cornell University): *Conversion of lactose to surfactants* [ongoing 2023]; *Improvement of lactoferrin thermal stability and functionality by complex coacervation and microencapsulation methods* [ongoing 2023]; *Isolation and encapsulation of tryptophan to improve stability and reduce bitterness* [ongoing 2023]; *Mitigating the astringency of whey protein through complexation and encapsulation techniques* [ongoing 2023].

Samuel Alcaine, PhD (Cornell University): *Create nationwide food safety resources and provide support for artisan/farmstead dairy producers* [ongoing 2023].

Jayendra K. Amamcharla, PhD (University of Minnesota): *Tailoring protein interactions to influence functional properties of milk protein concentrate powders* [ongoing 2023]; *Development and validation of a simple and rapid water adsorption kinetics-based approach to measure solubility of dairy powders* [ongoing 2023]; *Functional enhancement of milk protein concentrates with aggregated whey proteins for controlling viscosity in high protein fermented products* [ongoing 2023].

Dennis D'Amico, PhD (University of Connecticut): *Optimizing the application of hydrogen peroxide to control Listeria Monocytogenes contamination on the surface of high-moisture cheese* [ongoing 2023]; *Effective of bioprotective cultures on Listeria monocytogenes in milk and high moisture cheese* [commenced 2023].

Orla Baxter (Worcester Polytechnic Institute): *Center for Advanced Research in Drying* [commenced 2023].

MaryAnne Drake, PhD (North Carolina State University): *Southeast Dairy Center Application Laboratory Program* [ongoing 2023]; *Sugar reduction in school lunch chocolate milk* [ongoing 2023]; *Identification of sources of undesirable flavors in aseptic milk* [ongoing 2023]; *Protein beverage innovation platform* [ongoing 2023]; *The role of pH and mineral salts on heat stability and acid gelation of commercial liquid and dried MPC* [ongoing 2023]; *Understanding the sources of variability in butter hardiness: stage of lactation* [ongoing 2023].

John English, PhD (University of Arkansas): *Center for Advanced Membrane Separation Technology* [commenced 2023].

Selvarani Govindasamy-Lucey, PhD (University of Wisconsin-Madison): *Designer milk powder for export cheese* [ongoing 2023]; *Shelf-stable snacks made by extrusion of natural cheeses* [ongoing 2023]; *Improving the functionality of frozen and super chilled shredded cheese during extended storage* [ongoing 2023]; *Strategies to control browning/blistering in low-moisture part-skim mozzarella cheese* [ongoing 2023].

Federico Harte, PhD (Pennsylvania State University): *Transforming high pressure jet (HPJ) processing into a commercially viable technology for the dairy industry* [ongoing 2023]; *Harte-Milk Textiles: Electrospinning of neat casein nanofibers* [ongoing 2023].

Richard Hartel, PhD (University of Wisconsin-Madison): *Application of select dairy ingredients to enhance shelf life, physical properties and sensory attributes of high protein frozen dairy desserts* [ongoing 2023]; *Characterizing the functional and practical performance of hydrolyzed lactose syrup in selected foods* [ongoing 2023].

Tu-Anh Hyunh, PhD (University of Wisconsin-Madison): *Inhibition of listeria monocytogenes on wooden cheese board microbiota* [concluded 2023].

Mark Johnson, PhD (University of Wisconsin-Madison): *Innovative approaches to increase the shelf life of string cheese and fresh cheese curds* [ongoing 2023]; *Manufacture of low-moisture part-skim mozzarella cheese using milks high in casein and novel cheesemaking approach* [ongoing 2023]; *Developing a dairy-based antifungal ingredient for use in the cheese industry* [ongoing 2023].

Jovana Kovacevic, PhD (Oregon State University): *Suppressing the growth of listeria monocytogenes in Hispanic-style cheese – evaluation of different interventions* [commenced 2023].

John A. Lucey, PhD (University of Wisconsin-Madison): *Wisconsin Center for Dairy Research Applications Laboratory* [ongoing 2023]; *Novel ceramic nanofiltration to improve coproduct quality and increase utilization* [ongoing 2023]; *Dairy beverage innovation* [ongoing 2023]; *Controlling sedimentation during storage of high protein UHT beverages* [ongoing 2023].

Nicole Martin, PhD (Cornell University): *Improving outcomes in domestic and export markets by preparing the U.S. dairy industry to address microbacterium, an emerging bacterial contaminant of concern* [commenced 2023].

Owen M. McDougal, PhD (Boise State University): *Cost effective dairy protein certification method* [concluded 2023].

Carmen I. Moraru, PhD (Cornell University): *Large-scale production of lactose fatty acid esters-based biosurfactants using whey permeate* [ongoing 2023].

Daniel Noguera, PhD (University of Wisconsin-Madison): *Microbial production of value-added constituents from lactose-rich diary coproducts* [ongoing 2023]; *Improved recovery of succinic acid and lactic acid as microbially produced value-added chemicals from lactose-rich coproducts* [ongoing 2023].

NIZO Food Research B.V. (Netherlands): *Reduction of spore count in milk powder production - Phase II of development of an improved enumeration method for highly heat-resistant spores* [ongoing 2023].

Reza Ovissipour, PhD (Virginia Polytechnic Institute and State University): *Reducing surface bacterial contamination with nanobubbles to enhance sanitation in dairy processing facilities* [ongoing 2023].

Scott A. Rankin, PhD (University of Wisconsin-Madison): *Production of lactose-free dairy products by the catalytic hydrolysis of lactose in dairy streams with solid acid catalysts* [ongoing 2023].

Prafulla Salunke, PhD (South Dakota State University): *Midwest Dairy Foods Applications Laboratories Program* [ongoing 2023]; *Manufacture of ingredients for use in clean label process cheese and recombined cheese in export markets* [ongoing 2023]; *Effect of shred dimensions on functionality and consumer acceptance of low moisture mozzarella cheese* [ongoing 2023].

Tonya Schoenfuss, PhD (University of Minnesota): *Improvement of processing and functional properties of milk protein concentrate and micellar casein by pulsed electric field pre-treatment* [concluded 2023].

Abigail Snyder, PhD (Cornell University): *Management of yeasts and molds through strain-level PCR-based typing schemes* [ongoing 2023].

Caixia Wan, PhD (University of Missouri): *Process development for bioplastics production from lactose permeate* [ongoing 2023].

Zifan Wan, PhD (University of Wisconsin-Platteville): *Utilization of the novel atmospheric cold plasma technology for controlling listeria monocytogenes in brine solution and brined cheeses* [commenced 2023].

Toni Wang, PhD (University of Tennessee): *Utilization of dairy protein-based peptides and their derivatives to improve the quality of high moisture cheeses* [ongoing 2023].

Yi-Cheng Wang, PhD (University of Illinois - Urbana-Champaign): *Nanomaterials-based time-temperature indicators for monitoring the quality of aseptic milk products* [ongoing 2023].

Martin Wiedmann, PhD (Cornell University): *Development of a digital dairy platform for dairy innovation* [ongoing 2023].

Ruihong Zhang, PhD (University of California-Davis): *A novel integrated system for polyhydroxyalkanoates (PHA) production from cheese production byproducts* [ongoing 2023].

Haotian Zheng, PhD (North Carolina State University): *Predicting heat stability of nonfat dry milk in the application of reconstituted UHT milk using spectroscopic techniques as a rapid method* [ongoing 2023]; *Soft matter strategy for creating novel food texturizer: replacement of starch by using whey protein aggregates and the aggregates stabilized o/w Pickering emulsion droplets* [ongoing 2023]; *Scalable and cost-effective liquid shear-driven fabrication of nano fibers of whey protein assemblies* [ongoing 2023]; *Establishing database of interfacial properties for US milk powders: interfacial characteristics as indicator of powder quality and functionality* [ongoing 2023]; *Investigation of plasmin system activities in milk protein fractions: towards application of high protein beverages* [ongoing 2023]; *Rational design of why protein self-assemblies for Pickering stabilization at oil-water interface* [commenced 2023]; *Developing technical capability for quantitively characterizing milk foaminess, milk foam stability and milk protein fractions* [commenced 2023].

Approved Sustainability Competitive Research Activities, 2023

Principal Investigator, Institution, Project Title, and Status

Brent Auvermann, PhD (Texas A&M AgriLife Research): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [concluded 2023].

Barry Bradford, PhD (Michigan State University): *Assessment of greenhouse gas footprints on small and mid-sized U.S. dairy farms* [concluded 2023].

Joshua Boltz, PhD (Arizona State University): *Maximizing value from dairy-cow wastewater by intensifying anaerobic digestion* [ongoing 2023].

Michael Cope, PhD (University of Wisconsin, Platteville): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Geoffrey Dahl, PhD (University of Florida): *Potential for manipulating methane intensity in dairy production* [ongoing 2023].

Josua Faulkner, PhD (University of Vermont): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Foundation for Food and Agriculture Research: *The Greener Cattle Initiative Program* [ongoing 2023].

Randy Jackson, PhD (University of Wisconsin-Madison): *U.S. Dairy Net Zero Initiative: improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Carolyn Keller, PhD (University of Wisconsin-Platteville): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Quirine Ketterings, PhD (Cornell University): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Ermias Krebreab, PhD (University of California, Davis): *Quantitative assessment for feed additives enteric methane mitigation protocol* [ongoing 2023].

April Leytem, PhD, (USDA, ARS, Northwest Irrigation and Soils Research): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Deanne Meyer, PhD (University of California, Davis): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Cristine Morgan, PhD (Soil Health Institute): *U.S. Dairy Net Zero Initiative: Improving dairy on-farm sustainability through improved soil health and manure management* [ongoing 2023].

Meridth Niles, PhD (University of Vermont): *Assess U.S. dairy producer perceptions surrounding climate change adaption and mitigation strategies* [commenced 2023].

Jason Oliver, PhD (Cornell University): *Analytical support to enhance quantification of GHG emissions from long-term dairy manure storage systems* [commenced 2023].

Keith Paustian, PhD (Colorado State University): *Modeling environmental impacts of synthetic and dairy-manure based fertilizers in U.S. dairy farms* [ongoing 2023].

Kristan Reed, PhD (Cornell University): *Expanding FARM ES capability through integration with the Rumnant Farm Systems (RuFaS) model* [ongoing 2023].

Bruce E. Rittmann, PhD (Arizona State University): *NEWT Non-CORE Project: Maximizing value from dairy cow wastewater by intensifying anaerobic digestion* [ongoing 2023].

Amir Sadeghpour, PhD (Southern Illinois University): *Agronomic benefits of separated dairy solids to replace synthetic phosphorus fertilizer in corn cropping systems* [commenced 2023].

Daniel Sumner, PhD (University of California - Davis): *Economic, environmental and resource impacts of using by-products as ingredients in feed rations on U.S. dairy farms* [ongoing 2023].

Mike Van Amburgh, PhD (Cornell University): *Quantifying nitrogen volatilization in dairy excretion: A case for reducing protein feeding through improved dietary formulation* [ongoing 2023].

Francisco Leal-Yepes, PhD (Washington State University): *Smart sensing solutions for dairy farming* [concluded 2023].