



# National Milk Producers Federation

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Agri-Mark, Inc.  
Associated Milk Producers Inc.  
Bongards' Creameries  
California Dairies, Inc.  
Cayuga Marketing  
Cooperative Milk Producers Association  
Dairy Farmers of America, Inc.  
Ellsworth Cooperative Creamery  
FarmFirst Dairy Cooperative  
First District Association  
Foremost Farms USA  
Land O'Lakes, Inc.  
Lone Star Milk Producers  
Maryland & Virginia Milk Producers Cooperative Association  
Michigan Milk Producers Association  
Mount Joy Farmers Cooperative Association  
Northwest Dairy Association  
Oneida-Madison Milk Producers Cooperative Association  
Prairie Farms Dairy, Inc.  
Premier Milk Inc.  
Scioto Cooperative Milk Producers' Association  
Select Milk Producers, Inc.  
Southeast Milk, Inc.  
Tillamook County Creamery Association  
United Dairymen of Arizona  
Upstate Niagara Cooperative, Inc.

August 1, 2020

Mr. Stephen Censky  
Deputy Secretary  
United States Department of Agriculture.  
1400 Independence Avenue, SW  
Washington, DC 20250

## Re: Solicitation of Input from Stakeholders on Agricultural Innovations (Docket No. USDA–2020–0003)

Dear Deputy Secretary Censky:

The National Milk Producers Federation (NMPF) supports the U.S. Department of Agriculture's Agricultural Innovation Agenda and is pleased to submit the following comments on the Solicitation of Input from Stakeholders on Agricultural Innovations (Docket No. USDA–2020–0003)<sup>1</sup>. The main aim of the USDA Agricultural Innovation Agenda (the USDA Agenda) is to *"stimulate innovation so that American agriculture can achieve the goal of increasing U.S. agricultural production by 40 percent while cutting the environmental footprint of U.S. agriculture in half by 2050."*<sup>2</sup> The USDA Agenda aligns with and will be complimentary to sustainability efforts of the U.S. dairy industry.

### U.S. Dairy Industry Commitment to Sustainable Production

The U.S. dairy industry's sustainability successes have been intimately tied to the long-standing USDA work in research, education, and economics. Due to the foundational research from and extension outreach by USDA going back many decades, by 2007 producing a gallon of milk used 90 percent less land and 65 percent less water, with a 63 percent smaller carbon footprint than in 1944.<sup>3</sup> In 2009 and reaffirmed in 2013, the U.S. dairy industry and USDA committed to increase sustainability by reducing GHG intensity 25% by 2020.<sup>4</sup> Preliminary analysis shows the goal is within reach with producing a gallon of milk in 2017 requiring 30% less water, 21% less land, a 19% smaller carbon footprint and 20% less manure than it did in 2007.<sup>5</sup>

In 2018, the Innovation Center for U.S. Dairy convened leadership from across the industry to establish the U.S. Dairy Stewardship Commitment to document and demonstrate collective social responsibility progress in important areas including animal care, environmental stewardship, product quality and safety, workforce development and community contributions.<sup>6</sup> As part of its collective commitment to provide the world responsibly-produced

<sup>1</sup> Federal Register Vol. 85 No. 63. 18185. <https://www.govinfo.gov/content/pkg/FR-2020-04-01/pdf/2020-06825.pdf>

<sup>2</sup> USDA Agricultural Innovation Agenda. February 2020. <https://www.usda.gov/sites/default/files/documents/agriculture-innovation-agenda-vision-statement.pdf>

<sup>3</sup> Capper, J.L., R.A. Cady, D.E. Bauman. The environmental impact of dairy production: 1944 compared with 2007. 2009. Journal of Animal Science. 87:6 Pp 2160–2167. <https://doi.org/10.2527/jas.2009-1781>

<sup>4</sup> Memorandum of Understanding Between United States Department of Agriculture and The Innovation Center for U.S. Dairy. April 2013. <https://www.usda.gov/sites/default/files/documents/usda-mou-innovation-center-us-dairy.pdf>

<sup>5</sup> Capper, J.L., and R.A. Cady. 2020. The effects of improved performance in the U.S. dairy cattle industry on environmental impacts between 2007 and 2017. Journal of Animal Science. 98:1. Pp.1-14. <https://doi.org/10.1093/jas/skz291>

<sup>6</sup> Innovation Center for U.S. Dairy. 2018. The U.S. Dairy Stewardship Commitment. <http://commitment.usdairy.com/>

dairy foods that nourish people, strengthen communities and foster a sustainable future, earlier this year the U.S. dairy industry set aggressive new environmental sustainability goals to become carbon neutral or better, optimize water usage and improve water quality by 2050.<sup>7</sup>

In 2010, the U.S. dairy industry launched the National Dairy FARM Program: Farmers Assuring Responsible Management™ to “to show customers and consumers that the dairy industry is taking the very best care of cows and the environment, producing safe, wholesome milk and adhering to the highest standards of workforce development.”<sup>8</sup> Created by the NMPF in partnership with Dairy Management Inc., the FARM Program helps ensure the success of the entire industry by demonstrating that U.S. dairy farmers are committed to producing the best milk with integrity. The FARM Environmental Stewardship platform provides a comprehensive estimate of greenhouse gas emissions and energy use on dairy farms with a suite of tools and resources for farmers to measure and improve their footprint.<sup>9</sup> Today, 98 percent of the U.S. dairy farmers participate in the FARM Program with almost 80 percent by milk volume participating in the FARM Environmental Stewardship area.

To reach these 2050 goals, the U.S. dairy industry will need to identify technological and other advancements that can accelerate improvements, enabling nimble adaptation and focus on technology and practices that can be scaled for maximum impact. To meet these challenges, we have mobilized through the Net Zero Initiative, a partnership of the U.S. dairy community that seeks to unite the assets and expertise of trade, professional and industry organizations in a collaborative effort to create a path and growing portfolio of strategies and programs to achieve carbon neutrality, as well as significant improvements in water quality, through adoption of economically viable technologies and practices. USDA is an important part of this collaborative effort and the USDA Agenda aligns with and will enhance our efforts.

#### **NMPF Response to USDA Agenda Questions**

##### ***1. What agricultural commodity, group of commodities, or customer base does your response pertain to or would benefit?***

The U.S. dairy industry has identified research areas that will accelerate economic and environmental outcomes, benefiting America’s dairy farmers and the greater agriculture community, dairy consumers, and communities and rural areas:

- U.S. dairy farmers will benefit through increased access to information on efficient, economically viable technologies and practices to improve economic and environmental sustainability
- U.S. dairy farmers will benefit from producing a more competitive dairy product for the global dairy market
- U.S. and global consumers will benefit from greater access to dairy products produced with increased environmental sustainability
- U.S. and global society will benefit from the greater environmental improvements to air, water and soil
- U.S. communities and rural economies will benefit from increased jobs

##### ***2. What are the biggest challenges and opportunities to increase productivity and/or decrease environmental footprint that should be addressed in the next 10- to 30-year timeframe?***

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<sup>7</sup>Innovation Center for U.S. Dairy. 2020. New Environmental Goals Including Carbon Neutrality and Cleaner Water with Maximized Recycling by 2050. <https://www.usdairy.com/sustainability/environmental-sustainability>

<sup>8</sup> National Dairy FARM Program. 2020. <https://nationaldairyfarm.com/>

<sup>9</sup> FARM Environmental Stewardship. 2020. <https://nationaldairyfarm.com/dairy-farm-standards/environmental-stewardship/>

The U.S. dairy industry has identified the opportunities, which will offer the most economical and scalable pathways to increase productivity and deliver environmental benefits to meet our and the USDA Agenda goals:

- **Productivity:** identification of additional milk production efficiency that can be realized through genomics, precision breeding, feed efficiency, and animal health and management
- **Enteric Emissions:** increased understanding of methods to decrease enteric emissions through genomics, precision breeding, precision feeding, and feed additives
- **Feed Production:** increased understanding of conservation practices that can be implemented to improve soil carbon sequestration and decrease nutrient runoff; and identification of additional feed production efficiency that can be realized through genomics, precision nutrient management, and harvest optimization
- **Manure & Nutrient Management:** increased understanding of technologies and conservation practices that can be implemented related to manure management, leading to reduced environmental impacts and improved utilization of nutrients contained in manure

**3. For each opportunity identified, answer the following supplemental questions:**

**a. What might be the outcome for the innovation solution (e.g., the physical or tangible product(s) or novel approach) from each of the four innovation clusters?**

**b. What are the specific research gaps, regulatory barriers, or other hurdles that need to be addressed to enable eventual application, or further application, of the innovation solution proposed from each of the four innovation clusters?**

The U.S. dairy industry has provided innovation solutions and specific research gaps, barriers and/or other hurdles that need to be addressed to enable greater scale for each of the four areas identified in the USDA Agenda solicitation.

Genome Design – The utilization of genomics and precision breeding can drive improvements in milk production efficiency, feed production efficiency, enteric emissions, feed production and manure & nutrient management.

Further research and focus on genome design provide an opportunity for the industry to produce more milk with a reduced carbon footprint, utilizing less antibiotics and with fewer replacement animals. Additionally, the use of genomic selection, and other selective breeding techniques, to develop dairy cattle that are more resistant to heat represents an opportunity for increasing milk production in impacted regions. Current research gaps in genomic selection include:

- Increased fertility
- Increased disease resistance, specifically mastitis
- Increased longevity reducing the ratio of non-productive to productive years
- Feed efficiency for decreased inputs or increased output
- Reduced enteric methane production by evaluation of the rumen microbiome
- Heat stress resistance to increase milk production in areas where applicable

In addition to research gaps in animal genomic selection, gaps also exist in crop production efficiency, feed efficiency and manure management. Those research gaps and opportunities include:

- Study of specific forage and feed crops (alfalfa, corn, sorghum, etc.) to improve yield, drought and pest resistance, reduced herbicide use and increase the digestibility of feed

- Study of specific cover crops to be planted in rotation with feed crops to improve soil health, increase yields, increase drought and pest resistance, reduce herbicide use, increase water retention, reduce the need for tillage and increase the potential for soil carbon sequestration
- Study of specific feed inoculants to improve the digestibility of feed
- Study of the soil microbiome and ways to capture and utilize the nutrients in the soil to increase feed production and reduce losses to the environment
- Study of microbes responsible for hydrolysis and methanogenesis in anaerobic digestion to increase methane yield from anaerobic digestion

*Digital/Automation* – Deployment of precise, accurate and field-based sensors to collect information in real time can drive improvements in milk productivity, enteric emissions, feed production and manure & nutrient management. While the industry has seen significant automation in many areas, there remain several areas where increased research and study could represent a great opportunity for improvement. The following areas represent opportunities to meet our and the USDA Agenda goals:

- In-field sensors for monitoring soil and crop conditions as well as the nutrient levels and utilization
- In-field sensors for monitoring soil carbon content and GHG losses to validate carbon sequestration efforts and reliably document the effect of technologies and practices
- Edge of field sensors to detect nutrient losses and monitor the success of mitigation efforts to improve nutrient capture and utilization
- Instrumentation for real time monitoring of harvest to optimize the feed value and digestibility of forages and grains
- Real time detection of mycotoxin and other harmful compounds during harvest to prevent even low levels of these compounds from effecting production when fed
- Real time testing of feed ingredients with appropriate ration adjustments to maximize the production of each dairy cow
- Daily monitoring of the milk and activity data for each cow, coupled with advances in detection for signs of stress or disease to reduce the negative impact of removing a cow from the milking string for treatment
- Real time monitoring of manure nutrients and components during treatment to maximize the nutrient recovery and minimize unwanted losses to the environment

Information is only useful if you can access it. For this reason, in addition to the actual sensors and instruments there is a real need for the continued expansion of high speed communications infrastructure that is suitable for use over a broad area to allow all the data and information that can be gathered to be accessed and analyzed.

*Prescriptive Intervention* – Application and integration of data sciences, software tools, and systems models can drive improvements in milk productivity, enteric emissions, feed production and manure & nutrient management.

Once data and information are collected, it must be analyzed to develop actionable recommendations for implementing new or adjusting planned actions based. Already today, most dairy farms manage multiple technologies that collect data and are expected to analyze past trends and future probabilities to make decisions/recommendations. As more data and information is collected the ability to do this becomes more and more difficult. Developing computerized systems, models and dashboards becomes helpful and, as we continue to gather more and more information, necessary. It is one thing to identify that there is a potential problem coming, it is a completely different matter to analyze all the options and come up with a way to address the problem without significant unintended consequences. Here is where the use of

machine learning and artificial intelligence will become more and more important to the development of “smart” systems of management through continued development and enhancement of the FARM Environmental Stewardship platform. One of the key areas of research and practical development in this area is how to capture the knowledge and experience of the current generation of farmers and dairy experts before we lose the collective knowledge of this generation.

**Systems-Based Farm Management** – Leveraging a systems approach in order to understand the nature of interactions among different elements of a dairy operation can drive improvements in milk productivity, enteric emissions, feed production and manure & nutrient management. The following areas represent opportunities for the dairy industry to meet our and the USDA Agenda goals:

- Research that captures the environmental and economic outcomes of implementing technologies and conservation practices as a solution to improve water quality
- Research that captures the environmental and economic outcomes of implementing technologies and conservation practices as a solution to reduce greenhouse gas emissions
- Research on the environmental impacts of fertilizer and its role in soil health and productivity
- Research that identifies the benefits of combining wastes and maximizing treatment systems to quantify the potential impact of a systems approach the management of organic waste
- Evaluation of technology systems that produce renewable energy from waste streams with the goal of developing recommendations on the use of financial incentives to achieve maximum environmental benefit

### **Conclusions**

We encourage USDA to start prioritizing technologies and practices that farmers can adopt today to help meet our and the USDA Agenda goals. One of the greatest opportunities that exists for dairy farmers is their ability to provide real solutions to many of today’s biggest environmental challenges like carbon emissions, soil health, water quality and water quantity. This can only happen through collaboration of the U.S. dairy industry with USDA through technical and economic programs to support the research and adoption of new technologies and practices. The U.S. dairy industry and USDA have a long history of collaboration to benefit dairy farmers, rural communities and the public. The USDA Agricultural Innovation Agenda is the next chapter in this collaboration.

NMPF also supports the comments submitted by our dairy industry partners Dairy Management Inc., the Innovation Center for U.S. Dairy, and Newtrient, LLC. We look forward to continuing to work with USDA on these important efforts.

Sincerely,

A handwritten signature in purple ink that reads "Jamie Jonker". The signature is cursive and stylized.

Jamie Jonker, Ph.D.  
Vice President, Sustainability & Scientific Affairs