

1st Annual Scientific Summit on Dairy Methane Management Research

June 11-12, 2019

The Conference Center located at UC Davis

Coordinated by:

UC Division of Agriculture and Natural Resources and UC Davis

Background

Methane (CH₄) is a gas and the primary constituent of natural gas. Natural gas is used in domestic setting for cooking and in the industrial and commercial sectors for energy production. Methane is also a greenhouse gas and short-lived climate pollutant. The gas has a global warming potential of 25, indicating one gram of CH₄ is equivalent to 25 grams of carbon dioxide (CO₂) over a 100-year timeframe. Methane is the second most important greenhouse gas in California. There are state, national and global efforts to address methane emissions including emissions of the gas from agriculture. Agriculture methane emission stem primarily from animal ruminant systems as belching and anerobic manure management systems. Controlling and finding science-based solutions to controlling these emissions is critical to climate change mitigation and could contribute to climate change adaptation. Although there are many efforts on the scientific front to develop science-based solutions, there is no single national gathering event to bring the scientific community together to highlight recent research finding and discuss the science of controlling methane emissions from animal agricultural systems.

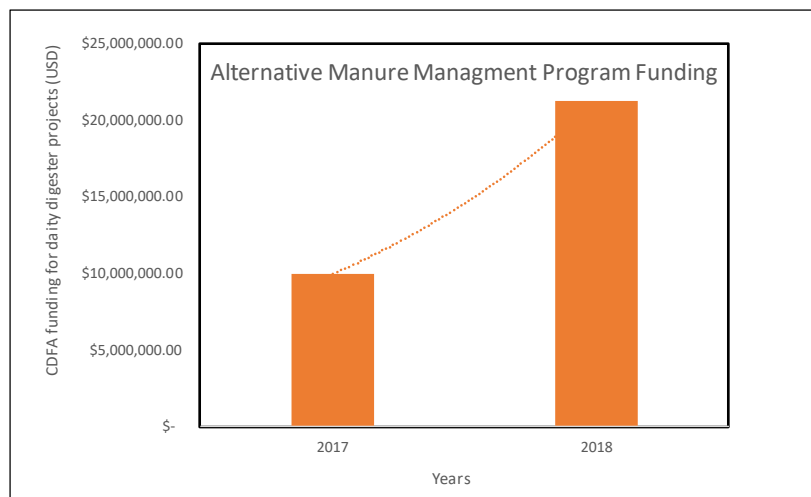
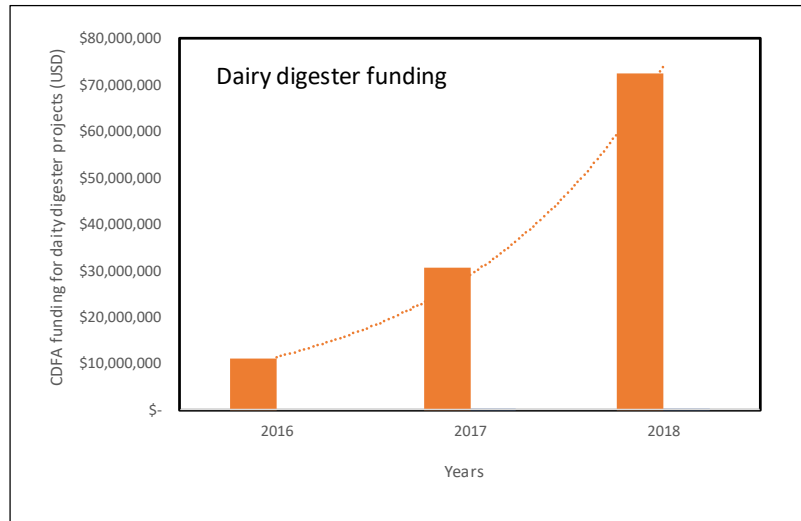
California is home to approximately 1.7 million cows and 1300 dairy operations. These operations provide highly nutritious milk and milk products that feed the state, country and world. Milk production is the number one commodity in California and has over 50% gains in production efficiency since the 1980s. One tradeoff of milk production however, is the emission of methane from manure which is a potent greenhouse gas and short-lived climate pollutant. Milking cow potentially generates more than 33 million tons (@30 kg/cow/day) of manure annually in California. If left unmanaged in California, total methane is equivalent to approximately 547,619, 047 BTU unutilized energy and would add 23 million metric tons of CO₂e to the atmosphere. Therefore, methane emissions from manure management and enteric fermentation of ruminant is of crucial importance in reducing climate change impacts from agriculture. The California Department of Food and Agriculture (CDFA) has several programs that address manure management. They include the Dairy Digester Research and Development Program (DDRDP) and the Alternative Manure Management Program (AMMP). In the past three years, more 100 projects including 64 dairy digester projects

(\$114,250, 802 USD) and 57 AMMP projects (\$31,228,297) have been funded. These programs created unparalleled interest in manure management and benefitted hundreds of farmers and created stewardship towards manure management in California.

Dairy digesters are a renewable technology that uses livestock manure to capture and destroy methane, which is a renewable source of electrical energy generation and transportation fuel. The technology has many environmental, economic, and social benefits. CDFA's DDRDP financial assistance for the installation of dairy digesters in California resulted in reducing greenhouse gas emissions and improving manure management for the benefit of environment, dairymen, and animal. CDFA receives funding from California Climate Investments for methane emissions reductions from dairy and livestock operations.

In addition to dairy digesters, CDFA's AMMP financial assistance supported alternative manure management practices that involve handling manure in

ways that don't require using an anaerobic digester and are scientifically proven techniques for curbing greenhouse gases emissions. Currently, eligible practices for funding through AMMP include: pasture-based based management; solid separation or conversion from flush to scrape in conjunction with some form of drying or composting of collected manure. CDFA's AMMP provides financial assistance for the implementation of these alternative manure management practices that are non-digester manure management techniques, and are relatively less expensive than dairy digesters, which will result in reduced greenhouse gas emissions. Increasing interest among dairy farming communities, scientists, manure management-based industries and support from CDFA have generated a set of new opportunities for California residents.



Dairy industry is important to other states as well. For example, New York State is the third largest milk producer in the country. The State annually produces 13.7 million tons of manure from its more than 600,000 dairy cows and approximately 3.7 million tons of food waste sent to local landfills. New York and California share more than a lot of cows. Both states are national leaders in taking action to reduce greenhouse gases and recognize that taking action on the potent greenhouse gas, methane makes tremendous sense. New York State's 2017 *Methane Reduction Plan* (MRP), shows that agricultural and food waste sources account for 80% of State's total methane emissions. Capturing and using this methane quickly reduces New York's GHG emissions and provides stored renewable natural gas to compliment the State's aggressive renewable energy transition.

Although these programs together address and incentivize several management practices on dairy operations, additional scientific and practical advancement in manure management is needed. Further there is an ever wider scientific gap on solutions to address enteric fermentation. Currently, there is no single forum in the U.S. that bring scientists together from private and academic institutions to discuss new research and making collaborative efforts to bring the advance solutions for manure management and enteric fermentation. Therefore, the University of California in collaboration with Institute of Gas Innovation and Technology (I-GIT) at Stony Brook University, and coordination with CDFA, are proposing to have a one-day summit followed by field visits to dairy farms to discuss new research and solutions for manure management and enteric fermentation. The information gathered in these summits, planned for one each year, are expected to inform existing programs and future policy development.

Four major topics are proposed for discussion at the summit spanning a day of discussions and information sharing. They are broadly categorized as 1. Management of Manure for Methane Emissions, 2. Management of Methane from Enteric Fermentation, 3. Bridging the Gap Between Science and Reality, and 4. Methane Regulations and Policy.