Sustainable Conservation Carbon Cycle Institute CalCAN California Climate & Agriculture Network ORGANIC VALLEY

Jenny Lester Moffit, Deputy Secretary
Amrith Gunasekara, Science Advisor
Geetika Joshi, Office of Environmental Farming & Innovation
California Department of Food and Agriculture
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April 11, 2017

RE: AMMP Program Recommendations

Dear Deputy Secretary Moffit and Drs. Gunasekara and Joshi,

We write to express our appreciation for CDFA's leadership in developing the new Alternative Manure Management Practices Program (AMMPP) program, which expands the methane reduction strategies supported by the state and made available to dairy producers. We take this opportunity to forward our recommendations for AMMPP implementation, including practices we believe are ready for inclusion in the program. The successful implementation of the AMMPP can make all the difference in diverse dairy producers throughout the state being able to reduce their methane emissions, maintain viable operations and provide multiple co-benefits to their communities.

Several literature reviews and analyses of methane reduction strategies for the dairy industry exist (please see references below). We are not attempting here to reiterate that work, but instead highlight those management practices, based on our review of the science, that can reduce methane emissions from manure management while providing multiple operational and environmental co-benefits.

Recommendations:

1. Recommended Practices:
We recommend including the adoption of the following methane-reducing practices, individually or in combination, under AMMPP:

- A drier manure management system (e.g. flush to scrape or vacuum)
- Advanced solid separation, in a flush or a dry system

- Composting of solids
- Pasture-based practices
- Compost pack barns

Some additional comments on the practices listed above:

1. *Adopting a drier manure management system*. It will be important to distinguish among management systems and associate methane reduction potential based on how quickly they separate solids after manure collection. Dry systems that store manure in slurry form for extended periods prior to solid separation will generate significantly more methane than those that separate solids immediately after manure collection.
2. *Adopting advanced solid separation, in a flush or a dry system*. It will be important to associate methane reduction potential with reduction in volatile solids. Removing volatile solids will decrease methane emissions from both slurries and liquid manure. However, different advanced solid separation technologies achieve different volatile solids removal rates and, therefore, have different methane reduction potentials.
3. *Adopting well-managed composting of solids*. Well-managed composting will reduce methane emissions as compared to storing of solid manure in anaerobic static piles. It will be important to associate methane reduction potential with different compost methodologies (windrows, aerated static piles, and in-vessel). Note that moisture and oxygen levels within compost determine methane emission levels, so compliance with best practices should also be considered.
4. *Adopting pasture-based practices*. This may include keeping a portion of the herd (e.g. replacement heifers) or the entire herd on pasture for a portion of, or the entire year, reducing the amount of manure held in a lagoon. It will be important to associate methane reduction potential with the amount of manure diverted from the lagoon.
5. *Adopting compost pack barns*. Composting barns are an alternative to other dairy cow housing systems that maintain manure under cover throughout the wet season and provide for active aerobic decomposition of manure and bedding. It will be important to associate methane reduction potential with the extent to which the bedding pack is kept dry and aerated.

2. Support Combination of Practices with Focus on Compost as End Product:
We recommend that CDFA support combined practices under AMMPP to move dairy producers towards drier manure management systems that include composting as the final stage of management. The combined practices of handling more of the dairy manure in solid forms and then composting it provides multiple benefits. These benefits include the reduction of methane emissions associated with anaerobically stored raw manure, reduced risk of nitrate leaching in storage and handling operations, and the creation of a stabilized nitrogen product that can be more widely distributed to crop and livestock producers – resulting in improved soil organic matter, reduced nitrate leaching, and increased carbon sequestration while minimizing methane and nitrous oxide emissions.

If done appropriately, there is an opportunity to create synergy between the AMMP Program and the state's goals of improving ground water quality in impacted communities via the well-managed production and use of quality compost.

3. Provide Incentive and Demonstration Project Funding
Much like the Healthy Soils Program, there is a need under the AMMPP to both incentivize dairy management practices that reduce GHG emissions and fund demonstration projects that combine incentives with outreach and education to the dairy industry. Many dairy producers may not be inclined to be among the first to try new practices, but would benefit from seeing first hand, through demonstration projects, the operational viability of methane reduction strategies. We know of dairy industry partners who are willing to seek demonstration project funding. We strongly urge CDFA to include demonstration project funding as part of the program guidelines for AMMP.

4. Provide Adequate Incentive Funding
We recommend that CDFA consider an incentive cap of $500,000 to adequately fund the practices we described above. This recommendation is based on existing studies, our conversations with industry leaders, and our work on these issues over the years.

Thank you for your consideration of our recommendations. We welcome discussing this further with you.

Sincerely,

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References:

S. Kaffka et al. Feb. 2016. Evaluation of Dairy Manure Management Practices for Greenhouse Gas Emissions Mitigation in California. Final Technical Report to the State of California Air Resources Board http://biomass.ucdavis.edu/wp-content/uploads/2016/06/ARB-Report-Final-Draft-Transmittal-Feb-26-2016.pdf

CalCAN. Oct. 2015. Diversified Strategies for Reducing Methane Emissions from Dairy Operations. http://calclimateag.org/wp-content/uploads/2015/11/Diversified-Strategies-for-Methane-in-Dairies-Oct.-2015.pdf

Sustainable Conservation. July 2015. Greenhouse Gas Mitigation Strategies for California Dairies. http://suscon.org/blog/2015/07/combating-climate-change-dairies-key-in-reducing-methane/

Justine J. Owen, Ermias Kebreab, and Whendee Silver. 2014. Greenhouse Gas Mitigation Opportunities in California Agriculture: Review of Emissions and Mitigation Potential of Animal Manure Management and Land Application of Manure. NI GGMOCA R 6. Durham, NC: Duke University.
https://nicholasinstitute.duke.edu/sites/default/files/publications/ni_ggmoca_r_6.pdf

Compost Pack Barn References:

https://ky.water.usgs.gov/projects/ky_ag_monitoring_committee/KASCM.3.11.15.presentations/Dairy_KASMC_3_11_15_2.pdf

http://www.progressivedairy.com/topics/barns-equipment/a-global-perspective-on-compost-bedded-pack-barns

http://www.vrijloopstallen.nl/documenten/Prospects_for_bedded_pack_barns_for_dairy_cattle.pdf

Md Saidul Borhan, Saqib Mukhtar, Sergio Capareda and Shafiqur Rahman (2012). Greenhouse Gas Emissions from Housing and Manure Management Systems at Confined Livestock Operations, Waste Management - An Integrated Vision, Dr. Luis Fernando Marmolejo Rebellon (Ed.), InTech, DOI: 10.5772/51175. Available from: https://www.intechopen.com/books/waste-management-an-integrated-vision/greenhouse-gas-emissions-from-housing-and-manure-management-systems-at-confined-livestock-operations