

CDFA Livestock Methane Reduction Programs Expenditures Report for FY 2021-22



Dairy Digester Research and Development Program

CDFA OFFICE OF ENVIRONMENTAL FARMING & INNOVATION



Alternative Manure Management Program

CDFA OFFICE OF ENVIRONMENTAL FARMING & INNOVATION



CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

Report to the Joint Legislative Budget Committee
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Contents

Executive Summary 3
Program Background 4
Funding Sources and Division 5
FY 2021-22 Appropriation Division 6
Additional AMMP Prioritization 7

Executive Summary

The California Department of Food and Agriculture's (CDFA) [Office of Environmental Farming and Innovation \(OEFI\) Dairy Digester Research and Development Program \(DDRDP\)](#) awards competitive grants to implement dairy digesters that result in long-term methane emission reductions from manure management on California dairies and minimize or mitigate adverse environmental impacts. The [Alternative Manure Management Program \(AMMP\)](#) awards competitive grants to California dairy and livestock operations to implement non-digester technologies and specific management practices that result in long-term methane emission reductions and maximize environmental benefits.

The [Budget Act of 2021](#) (Item 8570-102-0001) appropriated \$32,000,000 to CDFA for Livestock Methane Reduction, with priority given to the Alternative Manure Management Program. It also required CDFA to submit a report on the Dairy Digester Research and Development Program and the Alternative Manure Management Program to the Joint Legislative Budget Committee. As described in the Budget Act, *"of the amount appropriated for manure management projects, the report shall detail the amount of funding expended on DDRDP, the amount expended on AMMP, the methodology in allocating the funding between programs, and the amount of matching funds that were expended on projects funded by this appropriation"*.

The Budget Act of 2021 appropriation was used to award manure management projects in the 2022 DDRDP and AMMP grant solicitations. CDFA also made grant funding re-appropriated from past canceled or declined projects from previous years' livestock methane reduction appropriations available. CDFA awarded a total of 14 DDRDP projects requesting \$18,711,830 in state funding and providing \$64,187,317 in matching funds, and 27 AMMP projects requesting \$19,009,409 in state funding and proposing \$10,040,812 in matching funds. While this division of funding may appear to be approximately a 50:50 split of total awards allocated between programs, for DDRDP, only \$10,921,683 of its awards were specifically attributed to the Budget Act of 2021 appropriation. For AMMP, \$18,259,409 of its awards were specifically attributed to the Budget Act of 2021 appropriation. Thus, there was a division of funding that is equivalent to approximately a 37:63 allocation of awards from the Budget Act of 2021 appropriation between DDRDP and AMMP, respectively.

To evaluate options for allocating funding between programs, and prioritizing AMMP without compromising the critical goal of achieving [Senate Bill 1383](#)'s (Lara, 2016) livestock and dairy manure methane reduction target, CDFA staff

utilized a previously developed analysis that estimates how much each program would need to contribute to California's dairy cow manure management to reach that target, based on GHG reduction potential. The calculation was updated with recent data on California's dairy herd inventory, GHG inventory values, AMMP and DDRDP project data determining GHG mitigation potential, and adjusted for the average number of dairy cattle impacted per project and the differences in maximum grant amount per project to yield a funding allocation ratio. The analysis showed that up to 47-52% could be allocated for AMMP, while no less than 48-53% should be allocated for DDRDP.

Program Background

Methane is a potent greenhouse gas (GHG) that has a global warming potential 25 times that of carbon dioxide (using a 100-year global warming potential). It is also a Short-Lived Climate Pollutant (SLCP). Short-Lived Climate Pollutants are climate gases that remain in the atmosphere for a much shorter period of time than longer-lived GHGs such as carbon dioxide. The SLCPs are powerful climate forcers that have relatively short atmospheric lifetimes. Because SLCP impacts are especially strong over the short term, acting now to reduce their emissions can have an immediate beneficial impact on climate change and public health. In California, the dairy and livestock sectors account for over half of statewide methane emissions, with half of those emissions coming from enteric fermentation and the rest coming from manure management. Because no viable, safe, and/or economically feasible enteric methane mitigation option is currently available in the marketplace, the state has focused on methane mitigation strategies related to dairy and livestock manure management so far. Two programs administered by the California Department of Food and Agriculture (CDFA) [Office of Environmental Farming and Innovation \(OEFI\)](#) work directly to incentivize dairy and livestock manure methane emissions reduction: the Dairy Digester Research and Development Program (DDRDP), and the Alternative Manure Management Program (AMMP).

These programs support manure management practices that complement each other – DDRDP incentivizes the installation of anaerobic digesters on dairies to capture and use methane produced from manure for renewable energy, such as electricity or fuel, and AMMP incentivizes practices that involve handling and storing manure in ways that don't include use of an anaerobic digester and support management of manure in a drier form. DDRDP and AMMP practices are not mutually exclusive, and in most cases are complementary. Together, the programs offer a range of strategies to reduce GHG emissions from manure management on California dairy and livestock operations. This is important due

to the variation in size, location, and management styles of dairies and livestock operations across the state.

Since 2015, DDRDP has funded 131 projects for \$214 million, which are estimated to reduce 2,300,000 metric tons of carbon dioxide equivalents (MTCO_{2e}) annually. Since 2017, AMMP has funded 142 projects for \$87 million, which are estimated to reduce 260,000 MTCO_{2e} annually. Combined, these projects are estimated to address over 20 percent of the GHG emissions attributed to manure management within California's agriculture and forestry sector (i.e., 11.58 million MTCO_{2e}; [California Greenhouse Gas Inventory – 2022](#)). DDRDP remains one of the most efficient California Climate Investment programs in terms of the cost of each ton of GHG reduced (\$9/MTCO_{2e}), with AMMP coming in around thirteenth out of 50 programs that have a quantified GHG emissions benefit (\$62/MTCO_{2e}) ([California Climate Investments 2022 Annual Report](#)).

Funding Sources and Division

In 2021, in consideration of the new legislative language to give priority to AMMP, program staff analyzed the original extrapolation to assess how much CDFA could increase the award share for AMMP without compromising the critical goal of achieving SB 1383's target. Several factors had changed compared to the original projection, including the greater availability of actual project data and a decrease in the maximum award amount for DDRDP projects over time (originally up to \$3 million per project, reduced to \$1.6 million per project). This decrease, which was driven by the total reduction of funds available to DDRDP and the highly competitive nature of the program, meant that less incentive funding was necessary to achieve the same reduction impact.

Program staff updated the extrapolation using GHG reduction potential data from funded projects to date, more recent [dairy herd numbers](#) from the CDFA, and more recent [GHG inventory data](#) from the California Air Resources Board to determine the share of AMMP and DDRDP practices that would be needed to achieve a 40% reduction in manure management methane, if the programs eventually impacted all dairy cows (where the majority of manure methane emissions comes from in California). This showed that the portion of dairy cows impacted by DDRDP would need to be at least 60-65%, and the portion impacted by AMMP would need to be no more than 35-40% based on the GHG reduction potential of each program. Staff then accounted for the reduction to the maximum award amount per project for DDRDP, the difference in maximum grant amounts per project between the programs, and the average number of cattle impacted per project between programs to convert that into an approximate equivalent of projects and funding needed. The analysis aimed to estimate a

minimum ratio of DDRDP to AMMP award allocation needed in continuing funding that would still result in a trajectory that meets methane reduction targets. The results suggested that no more than 47 to 52% of the award ratio should be available to AMMP, and no less than 48 to 53% of the award ratio for should be available to DDRDP.

FY 2021-22 Appropriation Division

To determine a funding division for the 2022 AMMP and DDRDP grant round and provide prospective applicants with a general expectation at the time of solicitation release, CDFA took the following into consideration:

- Budget Act of 2021 language to give priority to AMMP.
- The updated analysis and calculations on program impact and funding ratios performed by CDFA staff.
- The importance of meeting the SB 1383 targets and ensuring progress towards reducing GHG emissions for California's dairy and livestock industry and California's climate goals.

Following application review and scoring, and considering the successful re-appropriation and availability of additional grant funds from canceled or declined projects from previous grant rounds, the final award recommendation exceeded the original aim. Of the FY 2021-22 appropriation allocated to manure management projects, 37% was expended on DDRDP awards, and 63% was expended on AMMP awards. The breakdown of how much of the FY 2021-22 appropriation was expended on AMMP, the amount expended on DDRDP, and the amount of matching funds are shown in [Table 1](#).

Table 1. Summary of AMMP and DDRDP funded projects in 2022 (FY 2021-22).

Program	Number of Awarded Projects	Annual GHG Reduction (in MTCO _{2e})	Amount of FY 2021-22 Appropriation	Amount of Re-appropriated funds	Total Funds Awarded	Matching Funds*
DDRDP	14	193,184	\$10,921,683	\$7,790,149	\$18,711,832	\$64,187,317
AMMP	27	40,698	\$18,259,409	\$750,000	\$19,009,409	\$10,040,812
Total	41	233,882	\$29,181,092	\$8,540,149	\$37,721,241	\$74,228,129

**Matching funds are required for DDRDP, and are only encouraged for AMMP (i.e., not mandatory matching funds)*

A full list of the awarded 2022 AMMP and DDRDP projects is shown in [Table 2](#). A summary breakdown of project numbers across the years is shown in [Figure 1](#).

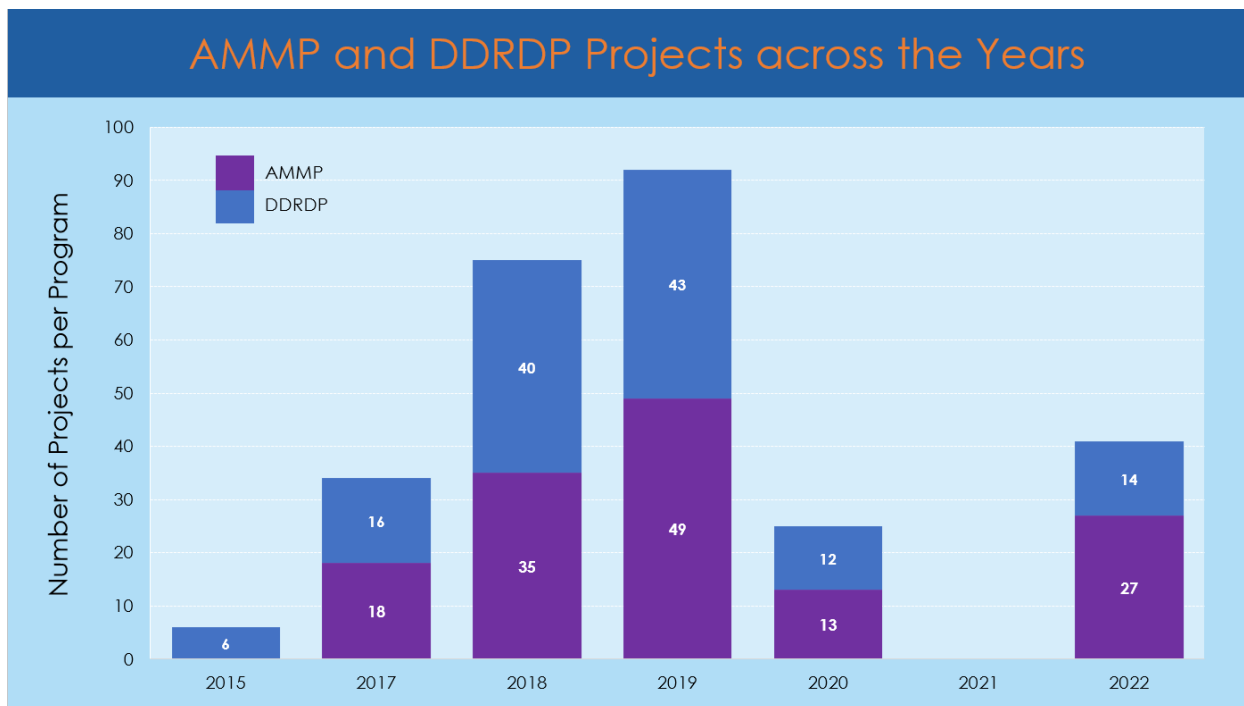


Figure 1. Number of AMMP and DDRDP projects funded since 2015.

Additional AMMP Prioritization

In addition to the shift in funding allocation towards the AMMP, there are other resources and investments in place only for AMMP to improve assistance and access.

Technical assistance is available free of charge to AMMP applicants and grant recipients. [Assembly Bill 2377](#) (Irwin, 2018) required CDFA to establish a technical assistance grant program to provide funds to Technical Assistance Providers (TAP) to assist the applicants of Climate Smart Agriculture (CSA) programs, including the Healthy Soils Program (HSP), State Water Efficiency and Enhancement Program (SWEET), and AMMP. CDFA makes 5% of appropriations for these programs available for technical assistance services. Funds are awarded through a competitive grant process by CDFA's CSA Technical Assistance Grant Program. To support the 2022 AMMP grant round, three organizations applied and were [awarded](#) – providers included California Dairy Campaign, University of California Cooperative Extension, and Western United Dairies. In addition to the technical assistance grant program, CDFA partners with UC Agriculture and Natural

Resources to support Climate Smart Agriculture [Community Education Specialists](#) based across the state who are available to assist applicants and grant recipients with CDFA's CSA programs.

The AMMP program also worked with the California Office of Planning and Research and Conservation Biology Institute to develop a new tool titled the [CDFA AMMP Project Planning Tool](#) (a custom module of [RePlan](#)), which was introduced in the first quarter of 2022. It was noted that applicants may not have the software, technical skills, or funding for a private consultant or grant writer services to produce project maps, which have the potential to increase the quality and reviewability of an application. This project was an effort to improve the application process and ensure all prospective applicants, interested dairy and livestock owners and technical assistance providers had access to a free, user-friendly tool to create site maps and visuals of manure management plans, and explore how the implementation of various manure management practices might reduce their on-farm GHG emissions. Although a brand-new element for the 2022 solicitation round, the Project Planning Tool was utilized in about a third of the submitted AMMP applications.

Table 2. Comprehensive Information on AMMP and DDRDP Projects Funded by CDFA in 2022 (FY 2021-22).

Program	Organization/ Project Title	Project Location	Project Type	Total Estimated GHG reductions (MTCO _{2e})*	Annual Estimated GHG reductions (MTCO _{2e} /year)	Grant Funds	Matching Funds**	Total Project Cost	Award \$/ Total Estimated GHG reduction \$/MTCO _{2e}
AMMP	Alexandre Acres	Ferndale, Humboldt Co.	New Solid Separation	503	101	\$442,800	\$213,000	\$655,800	\$880
AMMP	Bartelink Dairy	Escalon, San Joaquin Co.	New Solid Separation	3,458	692	\$741,043	\$173,315	\$914,358	\$214
AMMP	Correia Dairy	Petaluma, Sonoma Co.	New Solid Separation	1,871	374	\$710,580	\$86,500	\$797,080	\$380
AMMP	Cross Creek Dairy	Visalia, Tulare Co.	New Compost Bedded Pack Barn	14,167	2,833	\$750,000	\$986,807	\$1,736,807	\$53
AMMP	D&V Dairy	Tipton, Tulare Co.	New Solid Separation	39,067	7,813	\$749,985	\$4,913,644	\$5,663,629	\$19
AMMP	Diamond D Dairy	Hanford, Kings Co.	New Solid Separation	13,504	2,701	\$749,961	\$124,261	\$874,222	\$56
AMMP	Diamond M Valley Dairy	Petaluma, Sonoma Co.	New Solid Separation and Pasture-Based Management	1,701	340	\$741,678	\$10,000	\$751,678	\$436
AMMP	East View Dairy	Visalia, Tulare Co.	New Compost Bedded Pack Barn	7,261	1,452	\$750,000	\$162,053	\$912,053	\$103
AMMP	Fagundes Bros Dairy 4	Snelling, Merced Co.	New Compost Bedded Pack Barn	1,433	287	\$750,000	\$507,255	\$1,257,255	\$523
AMMP	Fiorini Dairy	Turlock, Stanislaus Co.	New Solid Separation	5,807	1,161	\$750,000	\$79,748	\$829,748	\$129
AMMP	Fred Melo Heifer Ranch	Merced, Merced Co.	New Compost Bedded Pack Barn	3,669	734	\$750,000	\$177,606	\$927,606	\$204

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AMMP	Gabriel Machado & Sons Dairy	Turlock, Stanislaus Co.	New Solid Separation	5,028	1,006	\$750,000	\$115,833	\$865,833	\$149
AMMP	John Jongsma Dairy	Tulare, Tulare Co.	New Solid Separation	5,028	1,006	\$749,842	\$59,275	\$809,117	\$149
AMMP	L & L Dairy	Kingsburg, Fresno Co.	New Compost Bedded Pack Barn	4,733	947	\$750,000	\$939,600	\$1,689,600	\$158
AMMP	Lima Farms	Merced, Merced Co.	New Solid Separation	11,102	2,220	\$515,474	\$21,868	\$537,342	\$46
AMMP	Lopes Family Dairy	Newman, Stanislaus Co.	New Compost Bedded Pack Barn	11,875	2,375	\$750,000	\$196,849	\$946,849	\$63
AMMP	Manuel Cardoso & Sons Dairy	Delhi, Merced Co.	New Solid Separation	8,495	1,699	\$390,701	\$9,000	\$399,701	\$46
AMMP	Monster Dairy	Newman, Stanislaus Co.	New Solid Separation	5,042	1,008	\$750,000	\$24,393	\$774,393	\$149
AMMP	Oakview Dairy	Tulare, Tulare Co.	New Solid Separation and Flush-to-Scrape	9,951	1,990	\$727,655	\$0	\$727,655	\$73
AMMP	Pedretti Ranches	El Nido, Merced Co.	New Solid Separation	1,768	354	\$509,140	\$32,294	\$541,434	\$288
AMMP	R & S Dairy	Escalon, San Joaquin Co.	New Solid Separation	5,925	1,185	\$747,233	\$340,000	\$1,087,233	\$126
AMMP	Sam Kooistra Dairy	Turlock, Stanislaus Co.	New Solid Separation	6,293	1,259	\$750,000	\$83,852	\$833,852	\$119
AMMP	Terrilinda Dairy	Santa Rosa, Sonoma Co.	New Solid Separation	2,729	546	\$748,097	\$77,360	\$825,457	\$274
AMMP	Ulys Dairy	Dixon, Solano Co.	New Solid Separation	10,525	2,105	\$735,220	\$115,781	\$851,001	\$70

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AMMP	Van Foeken Dairy #2	Hilmar, Merced Co.	New Solid Separation	7,510	1,502	\$750,000	\$5,000	\$755,000	\$100
AMMP	Vitoria Farms	Chowchilla, Madera Co.	New Solid Separation	3,781	756	\$750,000	\$115,607	\$865,607	\$198
AMMP	William Jongsma Dairy	Pixley, Tulare Co.	New Solid Separation	11,263	2,253	\$750,000	\$469,911	\$1,219,911	\$67
DDRD	3 Machados Dairy Digester Project	Merced, Merced Co.	New covered lagoon digester	158,441	15,844	\$1,200,000	\$3,527,795	\$4,727,795	\$8
DDRD	Bar Mac Dairy Biogas	Gustine, Merced Co.	New covered lagoon digester	91,235	9,124	\$912,352	\$6,844,732	\$7,757,084	\$10
DDRD	CDF Howard Dairy Digester Project	Livingston, Merced Co.	New covered lagoon digester	316,585	31,659	\$1,600,000	\$8,102,501	\$9,702,501	\$5
DDRD	Couco Creek Dairy Digester Project	Turlock, Stanislaus Co.	New covered lagoon digester	155,255	15,526	\$1,600,000	\$4,275,216	\$5,875,216	\$10
DDRD	Grand View Dairy Digester Project	Le Grand, Merced Co.	New covered lagoon digester	132,103	13,210	\$1,600,000	\$4,414,535	\$6,014,535	\$12
DDRD	Lakeshore Dairy Digester Project	Hanford, Kings Co.	New covered lagoon digester	159,224	15,922	\$1,600,000	\$3,972,072	\$5,572,072	\$10
DDRD	LegenDairy Digester Project	Tipton, Tulare Co.	New covered lagoon digester	113,934	11,393	\$1,200,000	\$3,940,407	\$5,140,407	\$11
DDRD	Lerda-Goni Farms Biogas	Tulare, Tulare Co.	New covered lagoon digester	45,677	4,568	\$502,448	\$3,988,935	\$4,491,383	\$11
DDRD	Martins View Jersey Dairy Biogas	Gustine, Merced Co.	New covered lagoon digester	81,822	8,182	\$818,216	\$5,905,782	\$6,723,998	\$10
DDRD	Mattos Bros Dairy Digester Project	Hanford, Kings Co.	New covered lagoon digester	119,017	11,902	\$1,600,000	\$2,732,819	\$4,332,819	\$13

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DDRDP	Meirinho West Dairy Digester Project	Modesto, Stanislaus Co.	New covered lagoon digester	166,952	16,695	\$1,600,000	\$3,816,266	\$5,416,266	\$10
DDRDP	P&M Dairy and VP Farms Biogas	Tipton, Tulare Co.	New covered lagoon digester	154,656	15,466	\$1,546,564	\$4,626,524	\$6,173,088	\$10
DDRDP	River Rock Dairy Digester Project	Stevinson, Stanislaus Co.	New covered lagoon digester	104,835	10,484	\$1,600,000	\$4,115,962	\$5,715,962	\$15
DDRDP	Top O' The Morn Farms Biogas	Tulare, Tulare Co.	New covered lagoon digester	132,103	13,210	\$1,332,252	\$3,923,771	\$5,256,023	\$10
Totals				2,135,328	233,882	37,721,241	74,228,129	111,949,370	

*Estimated reductions calculated using the CARB Quantification Methodology and its accompanying Benefits Calculator Tool. For AMMP, this value is assessed for a project lifespan of 5 years. For DDRDP, this value is assessed for a project lifespan of 10 years. MTCO_{2e}: Metric tonnes of carbon dioxide equivalent.

**Matching funds are not required for AMMP, and values are proposed only; matching funds are subject to change.