CALIFORNIA ASSOCIATION of SANITATION AGENCIES
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November 21, 2025

Ms. Virginia Jameson
California Department of Food & Agriculture
Deputy Secretary for Climate & Working Lands
3288 Meadowview Rd
Sacramento, CA 95832

Submitted via email: Climate@cdfa.ca.gov

Re: CASA's input on CDFA's Draft Climate Resilience Strategy for California Agriculture

Ms. Jameson:

The California Association of Sanitation Agencies (CASA) appreciates this opportunity to comment on CDFA's Draft Climate Resilience Strategy for California Agriculture (Draft Strategy). CASA is an association of local clean water agencies representing over 90 percent of the sewered population of California. Our members are engaged in recovering resources from the wastewater treatment process, including recycled water, biogas for production of renewable energy or low carbon fuel, biosolids for an organic soil amendment, and other valuable resources. Our members support the circular water economy while also remaining compliant with water and air quality regulations and fulfilling our mission of protecting public health and the environment.

Our members are positioned to support the state in achieving carbon neutrality mandates by 2045 by:

- Improving soil health and increasing carbon sequestration by land applying biosolids (directly supporting the objectives of the Healthy Soils Initiative, Natural & Working Lands Climate Smart Strategy, and this Draft Strategy)
- Reducing short-lived climate pollutant (SLCP) emissions by accepting diverted organic waste from landfills
- Reducing carbon intensity of vehicle fuel through the recovery and use of renewable biomethane
- Producing clean, renewable energy through the recovery and use of renewable biomethane

CASA recognizes the tremendous effort undertaken by CDFA to comprehensively address and summarize California's climate- and agriculture-related policies within the Draft Strategy. CASA also appreciates CDFA's development of the three pillars (or outcomes) the Draft Strategy aims to achieve via the twelve key objectives – all to protect and support food and natural systems, as well as establish agricultural practices resilient to a changing climate to bolster community resilience.

The fact that wastewater facilities receive all things California residents flush and put down the drain naturally puts the sector in a position to collect, treat, and recover renewable resources that can be put to use again – including water, nutrients, organic matter, carbon – all of which are needed by Californian soils.

CASA has organized the three pillars (with the twelve objectives categorized by pillar) into a table on page 2 and inserted the key roles our resource recovery facilities play in supporting each pillar. Following the table, we highlight two specific objectives where our resource recovery facilities are already taking the actions to support them. We also offer citations to peer-reviewed scientific research that provides insight on the benefits of land applying biosolids.

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Draft Strategy Pillars & Objectives	Role of Water Resource Recovery Facilities
Support a Thriving and Resilient Food Sector 1. Foster a Robust & Sustainable Agricultural Economy 2. Ensure a Water System for Food System Resilience in Hotter, Drier Future 3. Support Agricultural Workforce Wellbeing & Health 4. Protect Animal Health **5.** Advance Energy Efficiency & Decarbonization for Agricultural Operations	Use of recovered resources, including biosolids, recycled water, and biogas (for renewable energy and fuel production) directly support objectives 1, 2, and 5 under this pillar. These resources will be available in perpetuity (supporting a sustainable agricultural economy), regardless of a changing climate. Land application of biosolids to agricultural fields improves soil health (re-establishing carbon, nutrients, and organic matter to the matrix, leading to increased water-holding capacity and crop yield), creating drought tolerant systems. Because these recovered resources are renewable and the embodied energy can be utilized to generate electricity and/or fuel, they provide an effective way to decarbonize operations as well.
Protect Natural Systems Critical to Agriculture 6. Conserve Productive Farmland 7. Deploy Sustainable, Adaptable, & Integrated Pest Management **8.** Boost Biodiversity on Farmlands	Land application of biosolids to agricultural fields improves soil health (re-establishing carbon, nutrients, and organic matter to the matrix, leading to increased water-holding capacity and crop yield), directly supporting objectives 6 and 8. Improving and maintaining soil health naturally conserves productive farmland and crop yield, which also boosts biodiversity within the soil, at its surface, and across productive fields.
Encourage Resilient Agriculture Practices 9. Enhance Agricultural Practices to Support Clean Air Communities 10. Advance Climate-Smart & Healthy Soils Practices 11. Improve Ranching Sustainability & Rangeland Management **12.** Increase Dairy Farming Sustainability	The practice of land applying biosolids (a recovered, renewable, organic resource that will be available in perpetuity) to agricultural fields directly supports objectives 9, 10, and 11 and has shown to increase soil/field and crop resilience under warmer, drier conditions, since as soil health improves its resilience also deepens. Biosolids will be available as long as the community flushes, serving as a sustainable means to maintain climate-smart practices and outcomes on farmlands and rangelands.

Starting with Objective 1: *Fostering a Robust and Sustainable Agricultural Economy* – there is a critical need to *strengthen local and regional food systems to build resilience (1.4.2)*:

CDFA highlighted the steps CalRecycle is taking toward a "circular economy" (being established by the Zero Waste Plan), transitioning from a disposal-based system to a circular bioeconomy that collects and reuses what would have been waste and turns it into a product that can benefit (for example) California soils and agriculture. Beneficial use of biosolids that are produced as an integral part of the wastewater treatment process to improve soil health and crop yield represents a pure example of the definition of circular bioeconomy. Land applying biosolids to soils supports all three pillars of this Strategy (as indicated in the table above), as well as all objectives of the Healthy Soils Initiative and Natural and Working Lands Climate-Smart Strategy. Existing research quantifies carbon sequestration that can be achieved through biosolids land application and identifies numerous co-benefits including restoring soils through returning nutrients back to the land and rebuilding organic matter, which also improves water holding capacity and increases crop yields. In turn, land application of biosolids also offsets the need for energy-intensive synthetic fertilizer and reduces the need for irrigation, producing crops that are more resilient to drought.

The following citations of peer-reviewed scientific research are provided for your reference and use. Specifically, we list citations that document benefits of land application of biosolids to soils, including quantifying carbon sequestration and offsets in synthetic fertilizer, as well as ways biosolids build drought resilience.

Crop Production Benefits

- Ippolito, J. and Barbarick, K.A. (2022). *The Clean Water Act and biosolids: A 45-year chronological review of biosolids land application research in Colorado*. Journal of Environmental Quality. https://doi.org/10.1002/jeq2.20376
- Mitchell, S.M., Yorgey, G. and Kruger, C (2016). *Guide to Biosolids Quality*. Washington State University Extension.

Carbon Sequestration

- Villa, Y. and Ryals, R. (2021). *Soil Carbon Response to Long-Term Biosolids Application*. Journal of Environmental Quality. https://doi.org/10.1002/jeq2.20270
- Tian, G., Granato, T. C., Cox, A. E., Pietz, R. I., Carlson Jr, C. R., & Abedin, Z. (2009). *Soil carbon sequestration resulting from long-term application of biosolids for land reclamation*. Journal of Environmental Quality, 38(1), 61-74. https://doi.org/10.2134/jeq2007.0471
- Torri, S. I., Corrêa, R. S., & Renella, G. (2014). *Soil carbon sequestration resulting from biosolids application.* Applied and Environmental Soil Science, 2014.https://doi.org/10.1155/2014/821768
- Antonelli, P. M., Fraser, L. H., Gardner, W. C., Broersma, K., Karakatsoulis, J., & Phillips, M. E. (2018). *Long term carbon sequestration potential of biosolids-amended copper and molybdenum mine tailings following mine site reclamation.* Ecological Engineering, *117*, 38-49. https://doi.org/10.1016/j.ecoleng.2018.04.001

Offsetting Synthetic Fertilizer and Increasing Drought Resilience

- Broderick, S.; Evans, W., (2017). *Biosolids Promote Similar Plant Growth and Quality Responses as Conv entional and Slow-release Fertilizers*. American Society of Horticulture Science, Vol 27: Issue 6, 794-804.
- Brown, S.; Beecher, N.; Carpenter, A., (2010). *Calculator Tool for Determining Greenhouse Gas Emissions for Biosolids Processing and End Use.* Environmental Science & Technology, 44, 9509–9515.
- Sullivan, D.; Cogger, C.; Bary, A., (2015). *Fertilizing with Biosolids*. A Pacific Northwest Extension Publication Oregon State University, Washington State University, University of Idaho.
- Sylvis Environmental, (2009). *The Biosolids Emissions Assessment Model (BEAM): A Method for Determining Greenhouse Gas Emissions from Canadian Biosolids Management Practices*. Technical Report., 1–200.
- National Academies of Sciences, Engineering, and Medicine. 2024. *Exploring Linkages Between Soil Health and Human Health*. Washington, DC: The National Academies Press. https://doi.org/10.17226/27459.
- Evanylo, G. et al. (2006). *Biosolids Impact on Tall Fescue Drought Tolerance*; Journal of Residuals Science & Technology, Vol 3, No 2.
- Zhang, X. et al (2008). *Impact of Biosolids on Hormone Metabolism in Drought-Stressed Tall Fescue*. Crop Science, Vol. 49.

Objective 10 targets *Advancing Climate-Smart and Healthy Soil Practices*, specifically, identifying digestate research gaps and supporting research to address gaps (10.5.4) – this includes additional studies on *use of biosolids* and *processing food waste at wastewater treatment plants*.

For decades, biosolids have been land applied across California and the broader United States, recycling carbon, nitrogen, organic matter back to the soil to avoid interrupting natural cycles and rebuilding soil health. Over 90 percent of California's municipal wastewater solids are treated through anaerobic digestion, from which biosolids are generated for beneficial use. **There will always be a source of biosolids with the existence of society – we will all continue to flush our toilets and produce this material**. As we make strides to establish a circular economy, water resource recovery systems are designed with this goal in mind. Land application of biosolids is recognized as a sustainable beneficial means of utilizing this vital renewable resource and build soil health and resistance to impacts of climate change. **CASA appreciates CDFA identifying the "use of biosolids" as a subject in need of additional scientific study and supports CDFA in further researching and collaborating to evaluate the broad benefits of its use on agricultural soils.**

Regarding the "processing of food waste at wastewater treatment plants", CASA has been in productive discussions with CalRecycle since the signing of Senate Bill 1383. Our members also supported the State Water Board's Co-Digestion Capacity Analysis which found that existing wastewater-related anaerobic digesters across California have available capacity to receive and co-digest all digestible and divertible food waste in the state.

In summary, beneficial use of biosolids derived from water resource recovery facilities is a critical path to ensuring community resilience through a circular bioeconomy and achieving carbon neutrality, while remaining compliant with existing federal and local air quality, water quality, and land related regulations. Without support for this practice, natural carbon and nitrogen cycles will continue to be interrupted, putting soil and crop resilience at risk. CASA and its members are ready and willing to collaborate on

research to better valuate the benefits of land applying biosolids to soils and opportunities to process (co-digest) food waste at wastewater treatment plants.

Our members share CDFA's objective – to bolster community resilience through protecting local soil and food systems, as well as implement practices that help farmers and communities withstand and adapt to climate change. Please contact us with any questions regarding our comments or inquiries to meet at (916) 446-0388 or email us at sdeslauriers@casasweb.org and mlono-batura@casaweb.org.

Sincerely,

Sarah A. Deslauriers, P.E., ENV SP
Director of Air, Climate, & Energy Programs

Maile Lono-Batura
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cc: Adam Link, Executive Director, CASA