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ASSEMBLY COMMITTEE ON AGRICULTURE
ROBERT RIVAS, CHAIR
ASSEMBLYMEMBER, THIRTIETH DISTRICT

INFORMATIONAL HEARING

Wednesday, February 10, 2021

1:30 p.m. to 3:30 p.m. State Capitol, Room 4202

SUBJECT: Environmental Farming

Background

California agriculture helps to feed the world and fuel our economy. Agriculture provides one out of every 10 jobs in California, and our state has led the nation in total farm production every year since 1948. During 2018, California's 69,400 farms generated $49.9 billion in cash receipts. California accounts for 40 percent of all organic production in the U.S. and organic sales continue to grow in the state. In 2018, sales of organic products in California totaled more than $10 billion.
Many farmers engage in practices that contribute to the well-being of ecosystems, air quality, wildlife and their habitat. Agriculture plays a pivotal role in preserving open space that is vital to the environment.

The Cannella Environmental Farming Act of 1995 (CEF Act), requires the Department of Food and Agriculture (CDFA) to establish and oversee an environmental farming program to provide incentives to farmers whose practices promote the well-being of ecosystems, air quality, wildlife and their habitat. CEF Act requires CDFA to convene a Scientific Advisory Panel on Environmental Farming to provide advice and assistance with respect to environmental farming issues.
CDFA's Office of Environmental Farming & Innovation, created to serve California by supporting agricultural production and incentivizing practices resulting in a net benefit for the environment through innovation, efficient management and science, is the result of the CEF Act. Current programs include the Healthy Soils Program (HSP), Alternative Manure Management Program (AMMP), State Water Efficiency and Enhancement Program (SWEEP), and the Dairy Digester Research & Development Program (DDRP).

Environmental Farming is farming included, but not limited to, practices that use water more efficiently, reduce the use of pesticides, lower greenhouse gases, aid wildlife habitat, or reduce air pollutants. These goals are often achieved by changing farming practices or by the use of technology. Example of practices include shifting to crops that use less water, cover crops, pesticide alternatives, use of solar or other alternative energies. Some of the technologies used to ensure efficient use of water, fertilizers and on farm fuels include in-ground water sensors; use of drones to gather crop data, and GPS enhanced farm equipment.

Organic Farming means certified organic foods are grown and processed according to federal guidelines addressing, among many factors, soil quality, animal raising practices, pest and weed control, and use of additives. Organic producers rely on natural substances and physical, mechanical, or biologically based farming methods to the fullest extent possible.
Produce can be called organic if it's certified to have grown in soil that had no prohibited substances applied for three years prior to harvest. Prohibited substances include most synthetic fertilizers and pesticides. In instances when a grower has to use a synthetic substance to achieve a specific purpose, the substance must first be approved according to criteria that examines its effects on human health and the environment

Sustainable Farming, a more expansive version of Environmental Farming, defined as efficient production of safe, high-quality agricultural product, in a way that protects and improves the natural environment, the social and economic conditions of the farmers, their employees and local communities, and safeguards the health and welfare of all farmed species.

The Sustainable Agriculture Research & Education Program at UC Davis states, "*There are many practices commonly used by people working in sustainable agriculture and sustainable food systems. Growers may use methods to promote soil health, minimize water use, and lower pollution levels on the farm. Consumers and retailers concerned with sustainability can look for "values-based" foods that are grown using methods promoting farmworker wellbeing, that are environmentally friendly, or that strengthen the local economy. And researchers in sustainable agriculture often cross disciplinary lines with their work: combining biology, economics, engineering, chemistry, community development, and many others. However, sustainable agriculture is more than a collection of practices. It is also process of negotiation: a push and pull between the sometimes competing interests of an individual farmer or of people in a community as they work to solve complex problems about how we grow our food and fiber*."

Regenerative Agriculture describes farming and grazing practices that, among other benefits, reverse climate change by rebuilding soil organic matter and restoring degraded soil biodiversity – resulting in both carbon drawdown and improving the water cycle.
The Center for Regenerative Agriculture and Resilient Systems at CSU Chico states that "*regenerative agriculture is a holistic land management practice that leverages the power of photosynthesis in plants to close the carbon cycle, and build soil health, crop*

resilience and nutrient density. Regenerative agriculture improves soil health, primarily through the practices that increase soil organic matter. This not only aids in increasing soil biodiversity and health, but increases biodiversity both above and below the soil surface, while increasing both water holding capacity and sequestering carbon at greater depths, thus drawing down climate-damaging levels of atmospheric CO2, and improving soil structure to reverse civilization-threatening human-caused soil loss."

CDFA's Office of Environmental Farming & Innovation Programs
The mission of the Office of Environmental Farming & Innovation is to serve California by supporting agricultural production and incentivizing practices resulting in a net benefit for the environment through innovation, efficient management, and science.

Healthy Soils Program (HSP): HSP stems from the California Healthy Soils Initiative, a collaboration of state agencies and departments to promote the development of healthy soils on California's farmlands and ranchlands. The HSP has two components: the HSP Incentives Program and the HSP Demonstration Projects. The HSP Incentives Program provides financial assistance for implementation of conservation management that improve soil health, sequester carbon, and reduce greenhouse gas emissions. The HSP Demonstration Projects showcase California farmers and rancher's implementation of HSP practices.

The Healthy Soils Program is funded from the State's cap and trade proceeds, also known as California Climate Investments (CCI). The HSP has received $40.5 million in funding from the CCI between 2016 and 2019. CDFA also received funding of $10 million from the California Drought, Water, Parks, Climate, Coastal Protection and Outdoor Access for all Act of 2018.

State Water Efficiency and Enhancement Program (SWEEP): SWEEP provides financial assistance in the form of grants to implement irrigation systems that reduce greenhouse gases and save water on California agricultural operations.

Eligible system components include (among others) soil moisture monitoring, drip systems, switching to low pressure irrigation systems, pump retrofits, variable frequency drives and installation of renewable energy to reduce on-farm water use and energy.

Along with helping farmers and ranchers save water and reduce their energy costs, SWEEP results in environmental benefits as well. CDFA estimates that over 81,000 metric tons of CO2e will be reduced annually, the equivalent of removing 17,500 cars from the road for one year (based on emissions reductions equivalent). Moreover, SWEEP projects will help save over 117,000 acre-ft of water annually, equivalent to roughly the amount of water used by 234,000 households in California.

To date, CDFA has selected 835 projects to be awarded covering over 137,000 acres. $81.1 million, with more than $52.8 million in matching funds contributed by awardees.

Alternative Manure Management Program (AMMP): AMMP provides financial assistance for the implementation of non-digester manure management practices in California, which will result in reduced greenhouse gas emissions.
AMMP practices involve handling manure in ways that don't involve using an anaerobic digester. Currently, eligible practices for funding through AMMP include: pasture-based management; alternative manure treatment and storage (such as compost bedded pack barns); and solid separation or conversion from flush to scrape in conjunction with some form of drying or composting of collected manure.

AMMP receives funding from the Climate Investments Program for methane emissions reductions from dairy and livestock operations. The 102 AMMP projects funded so far are expected to reduce greenhouse gas emissions by an estimated 996,030 metric tons of CO2e over 5 years.

Dairy Digester Research and Development Program (DDRDP): DDRPD provides financial assistance for the installation of dairy digesters in California, which will result in reduced greenhouse gas emissions.
Dairy digesters are a renewable technology that uses livestock manure to produce methane, which is a renewable source of electrical energy generation and transportation fuel. The technology has many environmental and social benefits. DDRDP receives funding from California Climate Investments for methane emissions reductions from dairy and livestock operations.

Since 2014, CDFA has funded a total of $183.4 million to 108 dairy digester projects, with $369.7 million provided in matching funds by grant awardees. This funding has been awarded to projects that will result in methane emissions reductions from the California agriculture sector.

In 2017, agriculture contributed approximately 32.4 million metric tons of CO2e or 8 percent of California's total annual GHG emissions. Methane emissions resulting from manure management, a subset of these total statewide agricultural methane emissions, account for approximately 2.7 percent of the total statewide GHG emissions, or approximately 35.9 percent of the agricultural GHG emissions. DDRDP projects having a cumulative estimated GHG reduction of 19.9 metric tons CO2e over ten years, or approximately 1.99 metric tons CO2e annually, equate to a 17 percent reduction in methane emissions from manure management in California.
Data in the California Climate Investments 2020 Annual Reports show that DDRDP projects are the 3rd best cost to GHG metric tons CO2e reduction, in comparison to all other California Climate Investments.

Carbon Farming

All agricultural production originates from the process of plant photosynthesis. With energy from the sun, plants combine carbon dioxide (CO2) from the air with water and minerals from the soil to produce carbohydrates, building their bodies and the soil around them. Carbon is recognized as a key energy currency of biological systems, including agricultural systems. Agricultural production depends on plant photosynthesis to move carbon dioxide out of the atmosphere and into the plant, where it is transformed into agricultural products: food, flora, fuel or fiber.

There are certain commonly used agricultural practices through which photosynthetically derived carbon can be sequestered and stored in the soil. Carbon farming involves implementing practices that are known to improve the rate at which CO2 is removed from the atmosphere and converted to plant material and soil organic matter. Carbon farming is successful when carbon gains resulting from enhanced land management or conservation practices exceed carbon losses

Recent studies demonstrate the efficacy of several carbon-beneficial agricultural practices in increasing soil carbon sequestration. Compost use has been shown to increase the amount of carbon stored in both grassland and cropland soils and has important co-benefits, such as increased primary productivity and water-holding capacity. Restoration of riparian areas on working lands has the capacity to sequester significant amounts of carbon. There are at least thirty-two on-farm Natural Resource Conservation Service (NRCS) conservation practices that are known to improve soil health and sequester carbon, while producing important co-benefits: increased water retention, hydrological function, biodiversity, and resilience.

While there is a potential to expand carbon farming to sequester more carbon, agriculture has not been able to access carbon markets. Farmers have been limited from participating in carbon markets due to high costs and a lack of tools to accurately quantify soil's changing carbon content. But the idea of economically incentivizing carbon farming is gaining traction. Several startups have launched new carbon markets; and organizations and researchers are racing to develop methods to measure soil carbon. President Biden has also mentioned expanding carbon farming in his plan to combat climate change.