

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE
2018 HSP Demonstration Projects
Applications Submitted to CDFA *

Applicant's Organization	Project Description	Funds Requested	Cost Share	County	GHG Reduction Estimation (MTCO ₂ e/year)**
Alameda County Resource Conservation District	This demonstration project will trial higher rates of compost addition in eastern Alameda County rangelands. Rangeland comprises more than a third of total land use in the county. We will target compost application on slopes between 15 to 30 percent to determine whether reported benefits in these locations are similar to those in flatter grazed areas. Rangelands vary widely in topography, and the efficacy of applying compost to a wider array of locations, including hillsides, will greatly expand the applicability of the practice in the county and throughout the state. We will also evaluate key soil and vegetative characteristics following compost application. Because sensitive species such as California red-legged frog and California tiger salamander move through grasslands, we will also examine whether vegetation height is affected in rangelands enhanced with compost. This proposed project is a partnership between the Alameda County Resource Conservation District (ACRCD), Alameda County Waste Management Authority (StopWaste), the University of California, Merced, the USDA Natural Resources Conservation Service (NRCS) and Point Blue Conservation Science. StopWaste owns the property, located in the Altamont Pass. It is grazed year-round and also supports wind energy production. UC Merced will lead the research portion of the work, focusing on GHG emissions, carbon-sequestration and vegetative community indicators associated with compost application. We will also evaluate potential runoff due. We will compare compost treated sites with controls, and we will also create exclosures to observe change when grasslands are left ungrazed. ACRCD is developing a carbon farm plan for the Altamont property and will manage the project. The partners, in collaboration with the grazing lessee, will host a variety of workshops and field days to describe the carbon farming process and demonstrate our results to farmers and ranchers throughout the region.	\$249,802.00	\$107,802.00	Alameda	45.5
CA Center for Cooperative Development	1. Develop a scalable filtration method for boron and salts in agricultural well water in order to prevent toxic soil build-up; 2. Perform a comparative analysis of soil amendments with the intention of finding an amendment mix that accomplishes the following: a. Mitigates the absorption of boron and salts in the soil; b. Increases soil organic matter; c. Reduces soil leaching; d. Increases moisture retention; and e. Identifies a carbon sequestration solution for orchard waste.	\$248,680.00	\$0.00	San Bernardino	164.6
Cal Poly Corporation, an auxiliary non-profit of California Polytechnic State University, San Luis Obispo	Orchard alleys, referring to the area of the orchard floor between the tree rows, are commonly left fallow in California citrus crops. The lack of carbon, nutrients and water inputs in these alleys leads to a decline in soil organic matter (SOM) contents and soil health. Growing cover crops rebuilds SOM with co-benefits for soil health. Given that the rooting system of a citrus tree extends well into the alleys, cover crops also have potential to positively affect the tree. However, concerns prevail about competition between the trees and the cover crop for water and nutrients, and increased risk for frost damage. On the other hand, citrus trees benefit from mycorrhizal association for water and nutrient acquisition. Mycorrhizae, in turn, have been shown to accelerate soil carbon sequestration. Mycorrhizal inoculation and cover cropping are two strategies to increase mycorrhizal associations. In this project, we will demonstrate the effect of cover crops and mycorrhizal inoculation on SOM and investigate the synergies and tradeoffs regarding greenhouse gas emissions, crop yield and various soil health indicators. Demonstrating these practices in citrus as opposed to deciduous orchards is particularly relevant, because citrus is sensitive to frost and produces fruit in winter when the cover crop is grown. Findings from our demonstration trial will be summarized and disseminated among growers in California. We will organize three farm field days, present at a minimum of four professional meetings and conferences, publish in peer-reviewed journals as well as growers magazines, and conduct surveys to assess barriers to adoption and strategically tailor our outreach activities. The ultimate objective is to inform growers of the costs and benefits of cover crops and mycorrhizal inoculation, and to increase adoption of soil health management in California's orchards.	\$249,163.00	\$25,150.00	San Luis Obispo	2.6
California Marine Sanctuary Foundation	Irrigated agriculture is important on CA's Central Coast because of the extensive resources that it utilizes (land, water and people) and the broad market it supplies, providing fresh produce across the nation. Our project will take place on an organic vegetable farm growing a diversity of crops (broccoli, squash, green beans, corn, tomatoes, and lettuce) and implementing compost addition to a field with carbon poor soils adjacent to Carneros Creek in Monterey County. The cooperating farm, Triple M Ranch has implemented conservation practices since 2011 and will be a place to display not only compost addition, but also cover crops, riparian cover, grassed waterway, and hedgerows. Our Project includes a GHG trial of mycorrhizal fungi application to lettuce, where we will test GHG emissions, SOM changes and yield effects of this application using two trials, one with only mycorrhizae and the other including mycorrhizae plus compost. We have a strong team cooperating on the project. Arlene Haffa from CSUMB will be a co-PI and will conduct GHG field trials, bringing 9 years of GHG experience working on strawberries and vegetables. Pam Krone from the California Marine Sanctuary Foundation will be the project manager, overseeing team coordination and organizing Demonstration Events to insure outreach welcomes a large group of growers and agricultural professionals in three adjacent counties (Monterey, Santa Cruz and San Benito) and throughout California. Bi-lingual Mexican born grower, Javier Zamora, owner and operator of Triple M Ranch is an articulate and respected spokesman who will translate these practices into meaningful language related to farming interests and values. By addressing the compelling reasons that sequestering carbon and increasing soil health will help the farmer, the resources of the region and Marine Sanctuaries we anticipate demonstration events will garner motivation for broader implementation of HSP practices.	\$249,365.00	\$29,668.00	Monterey	30.0

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Coastal San Luis Resource Conservation District (Coastal San Luis RCD)	Coastal San Luis Resource Conservation District in partnership with Avila Valley barn will demonstrate the implementation of Compost Application on an Organic Central Coast Apple Orchard. The project will provide an example of in-field application of compost on a densely planted orchard, specifically organically grown apples in San Luis Obispo County. The goal of the project is to provide an on-the-ground example of soil health practices while building an understanding of the quantified soil health and soil microbial community outcomes from compost application over three years. The project comprises 13 acres of certified organic apples- half will be treated with organic compost sourced within 15 miles of the orchard and half will be left as a control in order to compare changes in soil health metrics over time. Widespread (across the region) yet targeted (farmers and ranchers) outreach will occur to ensure 120 different farmers participate in the three demonstration events to be hosted over the grant term. Baseline data for soil health metrics and farmer awareness of soil health practices will be compiled at the start of the project. Ongoing data collection will occur throughout the project term. Results will be made into public-friendly materials such as flyers and website posts, with all data and associated information being made available upon request. Demonstration events will occur with each annual compost application. Included in the demonstration will also be soil sampling training and presentations on why soil health metrics are being tracked over time. Partner researchers such as professors from Cal Poly and partner soil health practitioners such as other regional RCDs will also be invited to participate in the demonstration events to help foster a strong local network of on-the-ground, on-farm conservation practices.	\$77,517.05	\$19,534.00	San Luis Obispo	30.0
Community Alliance with Family Farmers (CAFF)	Currently, the practice of winter cover cropping is underutilized in California, despite the multitude of agronomic and environmental benefits associated with the practice including soil carbon sequestration and soil health, on-farm water conservation, reduction in particulate matter and increased biodiversity. The proposed project will work with three collaborating growers in Merced, Colusa and Yolo counties to demonstrate the practice of winter cover cropping in almonds, walnuts and pistachios. Cover crop demonstrations will be carried out according to industry and NRCS practice standards and will offer commercial scale demonstrations of cover cropping in three different nut tree cropping systems. In addition to field scale demonstrations of both legume and non-legume cover crops, the project will utilize CAFF's extensive networks in the agricultural community to promote further cover crop adoption through hosting Farmer Cover Crop Field Days at each of the demonstration sites as well as hosting Farmer Cover Crop Breakfast Meetings in order to facilitate knowledge sharing and peer learning among growers and extension professionals. Additionally, this project will include the development of a cover crop webpage and a cover crop publication, which will both be peer-reviewed and widely promoted. There will also be substantial data collection including soil chemical, physical and biological properties, water infiltration and cover crop biomass in order to effectively evaluate cover crop implementation at each of the demonstration sites. Success of the project will be measured by Field Day participation, multiple grower surveys, utilization of resources, analysis of soil, water infiltration rate and cover crop biomass data, and increased cover crop adoption among Field Day and Breakfast Meeting participants.	\$99,996.65	\$11,903.77	Merced Colusa Yolo	7.7
Community Environmental Council	This project will study and demonstrate the benefits of cover crops during the transition of twenty acres from a fully tilled and conventionally managed annual row crop system to a perennial orchard system. Through the use of mixed cover crop species, this project will evaluate the cost and benefit of high and low application rates, in addition to GHG sequestration, soil health benefits, water cycle benefits, and biodiversity benefits. This project will evaluate the effectiveness of cover crops to regenerate degraded soil in preparation of establishing a perennial avocado orchard. Through partnering with the Farm Bureau, this project will engage Ventura County managers of row crop operations and managers of orchard systems, and showcase how improved soil health can assist in the establishment of long-range, perennial orchard systems. Through partnering with technical training programs at a local High School and University, this project will also engage underrepresented students pursuing agricultural degrees and demonstrate the environmental and agronomic benefits of soil health practices. The site of the demonstration project is located adjacent to the Santa Clara River, one of the last free-flowing rivers in the Country, plagued with nitrate and pollution challenges. This proximity to an endangered water way allows our project to clearly connect soil health and watershed health, demonstrating the ecosystem services associated with healthy soils, including decreased topsoil runoff and nitrate pollution, increased groundwater infiltration and in-stream flow, and strengthened riparian habitat. Together with a large and diverse set of partners, the Recipient will integrate cover cropping into a working ranch, garner support for wide scale adoption of soil health practices on agricultural land, and show the potential for the agricultural sector to become both more resilient in the face of climate change and a leader in climate change mitigation.	\$249,766.00	\$108,688.00	Ventura	11.4

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Dixon Resource Conservation District	Water conveyance facilities (ditches) are essential to agriculture throughout California, providing both drainage and water delivery services. Traditional vegetation management practices on ditches prioritize maintaining water conveyance using chemical (herbicide) and mechanical (earth moving or mowing) tools to keep obstructions clear. Although a focus on conveyance is effective at moving water, traditional maintenance practices have avoidable external costs to growers, the public, and the environment. This project aims to demonstrate strategies to manage primary ditches, field drains, and field edges using perennial vegetation in order to reduce long-term maintenance requirements and improve ecological services. As part of the demonstration, we have worked with the grower and landowner to select appropriate farm-edge practices on 4.2 acres. Proposed practices include a vegetated ditch, a filter strip located on a field drain for irrigated alfalfa, a field border, riparian herbaceous cover, and two hedgerows. We have selected these specific practices in order to demonstrate a variety of site-appropriate practices to growers, as well as local agencies. Proposed practices are expected to decrease erosion & maintenance costs after vegetation is established, reduce the use of fossil fuels and herbicides, and improve soil health, infiltration rate, and carbon storage. The Dixon RCD maintains over 70 miles of ditch, and coordinates the Dixon Solano Water Quality Coalition, which helps >600 producers monitor water quality on ~130k acres in Solano County. Outreach will be targeted at growers enrolled in this program, as well as staff and board members of local agencies and districts who manage waterways. Through four events at the project site, and a blog, we will identify and lower barriers to practice adoption, including technical, financial, and cultural barriers. Our goal is to demonstrate site-appropriate tools to manage ditches as vegetated waterways that maintain water conveyance while providing important benefits to the environment.	\$99,901.02	\$58,065.61	Solano	3.3
Gold Ridge Resource Conservation District	Orchard understories perform a number of ecosystem services and each can impact each other (e.g. water relations and gas exchange), and each ecosystem service is interconnected and impacted by one or more management decisions by the producer. In organic farming systems, tillage is often utilized in the rows for weed control and suppression. However, this practice has negative consequences that can include the loss of soil structure, accelerated decomposition of organic matter, reduction of infiltration, and increased susceptibility to water and wind erosion. This project will test both the practice of mulching as a weed control, and the practice of inoculating the soil with actively aerated compost tea to improve soil health. This project will utilize the current practice of tillage in the orchard rows as the Control. Three Treatment scenarios will be established to test against the Control Rows. These are: T1 " Compost Tea Only (tillage), T2 " Mulch Only (no tillage), and T3 " Mulch and Compost Tea (no tillage). Soil sampling and gas exchange sampling will be conducted to measure change in total organic carbon, soil organic matter, bulk density, infiltration rates, CO ₂ , CH ₄ and N ₂ O flux between the orchard soil and the atmosphere. While the literature shows that mulching applications can work well to conserve water and suppress weeds in orchard rows, less is known of its effects on carbon sequestration and GHG emissions, especially in the presence of actively aerated compost tea applications. We hypothesize that woodchip-based mulch for weed suppression, when combined with actively aerated compost tea(T3) will remain effective at controlling weeds, while measurably increasing the soil carbon pool and releasing less CO ₂ , CH ₄ , and N ₂ O to the atmosphere over the life of the project than that of the Compost Tea rows (T1), Mulch Only rows (T2) or the Control rows (C).	\$249,871.83	\$0.00	Sonoma	0.1
Hampton Ranch, LLC	The project will demonstrate the environmental and economic benefits and costs associated with increasing soil organic matter in a row cropping production system. This will be accomplished by comparing the yields of fields that have had compost and compost tea applications and incorporated cover crops versus ones that have had neither of these treatments. The Recipient will also analyze other soil health indicators such as GHG emission reduction, carbon sequestration, and improved moisture retention in the soil. The results of this project will be showcased to over 120 local farmers via biannual workshops and an annual farm field-day.	\$68,038.00	\$9,000.00	Ventura	15.0
Mission Resource Conservation District	San Diego County's light textured soils found in the primary growing region of North County make adoption of healthy soil practices an important part of agricultural operations moving forward. These soils are shallow and have an organic matter content ranging from 0.8 to 1.5%. In addition to low percentages of organic matter, these soils have problems with salinity and low infiltration rates. The rising cost of water in the region which is averaging \$1300 per acre foot in the growing region, necessitates growers working to improve soil organic matter as a means of increasing water holding capacity to make best use of irrigation water. The goal of the project is to first reduce GHGs from the operation by sequestering carbon, which will increase organic matter. The project also seeks to reduce soil salinity and improve water infiltration rates. These goals will be pursued through the adoption of the following healthy soils management practices, cover cropping, reduced tillage, composting and mulching. These goals will be measured by lab soil tests, Electrical Conductivity Mapping (for soil texture change) and Natural Resources Conservation Services, Soil Quality Test Kit tests. The outcomes identified by the project are to see the adoption of these healthy soils practices by growers in the region and to reach 120 to 140 growers through the outreach activities of the project.	\$90,811.93	\$30,000.00	San Diego	39.4

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Multicultural Exchange for Sustainable Agriculture (MESA)	With both increasing city density and urban sprawl in California, urban and peri-urban agriculture has the potential to significantly reduce GHG emissions, reverse soil deterioration, sequester carbon and foster healthy communities. Nearly 300,000 acres are currently at risk of sprawl development in the Bay Area alone. At the urban edge where this project will take place, there is the potential to enhance the environmental quality for species threatened by the loss of habitat, increase the climate resilience of urban farms, and increase access to healthy and affordable food to disadvantaged communities. Within a 13-acre peri-urban property with 3.5 acres of a diversified fruit and nut orchard, 1 acre of vegetables and flowers, 5.5 acres of grazing lands for small-ruminants and a .75-acre riparian zone, this project will demonstrate the conversion of grazing lands to Silvopasture on a small-scale. Over three years, soil carbon, surface, and sub-surface hardness, and nutrient cycling will be measured. In addition, participatory sampling with ranchers during annual field-days will compare the two systems in terms of (1) implementation, planning, and management; (2) comprehensive field-based soil health and microbiology monitoring; and (3) system productivity including above and below ground biomass and biodiversity. Outreach activities will specifically focus on training and outreach on disadvantaged communities already engaged in our programs and partner networks to further impact the populations most affected by urban food system inequalities and injustices. By reaching farmers/ranchers in 9 counties of the San Francisco Bay Area, this project greatly enhances opportunities for urban and peri-urban farmers to become leaders in carbon ranching and farming. The impact will be further amplified through the creation of a Silvopasture module on MESA's online social-learning network, currently serving hundreds of farmers in CA and beyond.	\$100,000.00	\$64,500.00	Contra Costa	0.7
Organic Fertilizer Association of California	Cover crops can provide benefit in terms of GHG reduction and improving soil health and productivity which make them a useful tool in addressing climate change. But growers are resistant to adopt a new strategy that they have not seen and evaluated in real world scenarios with concerns about cost and a lack of knowledge about cover crop management. This project will establish a real world, in field test plot of cover crops in a Glenn County orchard and provide three field days and six webinars (3 in Spanish) in order to showcase the value of cover crops and encourage growers in the regions and across California to establish cover crops as part of their cropping system. Growers will see the GHG benefits, improved soil health and the cost-effectiveness. The project goal is demonstrating the value of cover crops to 120 growers at on farm field day events and another 200 in webinars. Further, to get 30% of those growers to begin utilizing cover cropping as part of their management plan which will be measured by actual attendance and participant surveys. With over 1.5 million acres almonds and walnuts alone, there is tremendous opportunity for GHG reduction using cover crops.	\$81,862.00	\$113,560.00	Glenn	1.3
Planting Justice	With CDFA grant funding, Planting Justice is proposing to demonstrate the benefits of applying co-composted biochar - biochar that has been mixed with compost feedstock prior to aerobic composting -- to perennial crops on our farm in El Sobrante, CA. Biochar has been shown to have a multitude of soil, crop and climate benefits, and many of these benefits are enhanced by biologically charging activating biochar with microbes and nutrients during the composting process. In this project, we propose to demonstrate this by pyrolyzing our existing wood chip stock into biochar, mixing it into our compost process, and applying this co-composted biochar to our fruit tree crops over two growing seasons. Data will be collected and analyzed throughout on soil health, crop yield, greenhouse gas reduction and carbon sequestration, and we will conduct quarterly on-farm outreach events on the benefits of project activities to our network of farmers and ranchers, including underrepresented groups from disadvantaged communities in the San Francisco Bay Area.	\$250,000.00	\$131,000.00	Contra Costa	8.8
Point Blue Conservation Science	This project will look at the potential of carbon sequestration and greenhouse gas (GHG) reduction attributable to grazing lands soil management practices. We will implement a ranching system which utilizes climate-smart practices to improve soil health and increase ecosystem services of the ranch. This project will study the effects of the introduction of a diverse pasture planting and pasture compost application within a holistically managed cattle grazing operation, on soil health and ecological function. We are interested in the economic implications of incorporating these conservation practices on a working ranch. Detailed records on implementation costs and livestock weight gains will be kept to facilitate understanding of return on investment of improved land management. Results will be disseminated through on-farm annual workshops, presentations, and articles or publications.	\$249,950.00	\$47,839.00	Modoc	228.2
Regents of the University of California, Davis	Compost application has been proven to sequester carbon and improve soil health in agricultural soils. However, use of compost in California row crops remains low, primarily due to the high cost of compost (\$60/ton, on average). Opportunities are now emerging to utilize large particle compost, a byproduct of current compost processing streams, by application and recycling to annual row crop lands. Currently, the average agricultural compost customer is using small particle compost (screened to a particle size of 3/8 inch and less), which makes up approximately 50% of the compost made at a green waste composting facility. The other 50% of the compost processing stream produces a large-particle compost byproduct (over 3/8 inch and less than 3 inch in size). Previously, this byproduct was used in cogeneration plants; however, this recycling process is now gone with the closures of these plants. If a new market is not found for this type of compost, there is a chance that it will find its way back into the landfill, an outcome that would not satisfy upcoming green waste recycling standards. Small particle compost has historically been more desirable for growers due to its ease of incorporability; however, some producers have expressed interest in utilizing the large-particle compost due to its lower cost and potential for sequestering more carbon, as the larger-diameter pieces may take longer to break down in soils, resulting in greater retention of carbon. This project will bring together two processing tomato growers, a compost industry representative, and UC Davis soil health researchers, to investigate the potential of large particle compost to 1) build soil organic matter and store carbon, 2) contribute to soil fertility for crops, and 3) realize greater soil carbon gains per dollar investment, relative to small particle compost, on two California tomato farms.	\$249,683.00	\$57,600.00	Yolo	480.6

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Resource Conservation District of Greater San Diego County	Through the implementation of an active grazing management plan on San Diego County rangelands, this Demonstration Project will highlight the benefits of prescribed grazing on soil health, water moisture, cost savings, and the environment. Prescribed grazing utilizes livestock to manage vegetation while improving forage for animal health and productivity, maintaining plant composition and structure, boosting watershed function, and reducing greenhouse gas emissions by 2 metric tons of carbon dioxide equivalents per year. The project is located at Daley Ranch (Jamul, CA) and targets local ranchers, farmers, land managers, and environmentalists, many who are seeking solutions to the severe and frequent climatic events concerning their agricultural operations. We strive to demonstrate the ecological, economic, and management benefits of grazing land practices through field events and project dissemination on local and state levels.	\$100,000.00	\$28,014.00	San Diego	2.0
San Joaquin County Resource Conservation District	The Central Valley of California is one of the most productive agricultural areas in the world. The San Joaquin River, one of the largest rivers in the state, flows through the Central Valley and supports agriculture by providing irrigation water. Adverse effects of this agriculture include water discharges, high concentration of suspended sediments, and runoff. Soil erosion and sediment deposition from farmlands can contribute to degraded soil and reduced surface water quality. The San Joaquin county Resource Conservation District (SJCRC) is working with the county and the Delta Water Quality Coalition to implement programs that help farmers and ranchers reduce their impacts on the waters of the state of California. These programs include best management practices, such as the use of filter strips, to address sediment and erosion control. Since coalition members are required to complete a Sediment and Erosion Control Plan (SECP), the SJCRC is currently developing a program to provide growers with site-specific erosion control recommendations, and to hold SECP self-certification classes. To gain greater insight into the Filter Strip practice, we propose to implement the practice at the CA Plant Materials Center (CAPMC) using four different grass species: creeping wildrye, deergrass, orchard grass and red fescue. These would be planted using a no-till drill and broadcast seeder. Our aim is to have a demonstration site where we could: a. Implement the filter strip practice; b. Complement the SECP self-certification classes; c. Conduct outreach to growers in the area; d. Collect data on plant establishment, plant cover, soil health, and organic carbon samples. Carbon sequestration is not generally considered a benefit of filter strips, but our hypothesis is that organic carbon will accumulate under the plantings. We will measure project outcomes through data collections, through surveys and participant attendance, and by conducting yearly evaluations via mail and email.	\$66,822.00	\$15,000.00	San Joaquin	0.1
Solano Resource Conservation District	The Demonstration site at Wild Oak Vineyard will showcase 5700' of Hedgerow, 1.6 acres of Riparian Forest Buffer and Riparian Herbaceous Cover and 30.3 acres of Conservation Cover on the 34 acre parcel. The vineyard is located at a major intersection in the Suisun Valley American Viticultural Area, one of the earliest named AVAs in California, and neighbors an olive orchard without any of these practices installed to serve as a control. Four Demonstration Field Days will be held at the site over the course of the project, featuring hands-on activities and presentations on perennial cover in vineyards/orchards, plant selection and management of native plant hedgerows, creating wildlife habitat and healthy soils on your farm, and carbon farming. The project will work closely with partners from Dixon RCD and USDA-NRCS to encourage Solano County growers to integrate natural spaces with their agricultural operations, and to elevate the role of agriculture in mitigating for climate change. The Solano Healthy Soils blog will be created and managed to support outreach for the project, where subscribers can pose questions to our staff and to one another, and track the progress of the practices installed at the demonstration site.	\$98,441.68	\$65,316.11	Solano	12.6
The McConnell Foundation	The McConnell Foundation envisions the Ross Ranch as a learning laboratory for the northern Sacramento Valley where the applicability and benefits of carbon sequestration through soil management practices can be tested. The project site was recently awarded a Sustainable Agricultural Land Conservation (SALC) grant through California Department of Conservation. The newly appointed SALC conservation easement will ensure the demonstration site will serve as a resource for land owners and managers well into the future. Recent wildfires in the Sacramento valley have reduced the region's carbon stocks. Fuel reduction projects, such as those detailed in the California Forest Carbon Plan and Community Wildfire Prevention and Mitigation Report, mitigate wildfire activity but reduce carbon stocks in the short term. Demonstrating and promoting the adoption of healthy soil management on agricultural land will sequester carbon and has the potential to offset regional carbon loss by storing carbon in the soils where it is more resilient to the effects of wildfire. Project activities will consist of compost application, perennial rangeland seeding, silvopasture and riparian planting. Through partnerships at the local, regional, and statewide levels the installation and management costs and benefits to soil health, forage production, and ecological function will be shared during ranch field days, workshops, partner's publications and newsletters. The success of the project will be measured by increases in soil organic matter, agricultural and ecological co-benefits, the increased adoption of soil management practices locally, new certified compost facilities within the region, and increased participation in the CDFA Healthy Soils Program locally.	\$100,000.00	\$109,086.00	Shasta	122

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The Regents of the University of California	<p>California leads the nation in almond production with a harvested area of 1.33 million acres in 2017. The application of organic amendments in almond orchards and the reduction of greenhouse gas emissions could contribute to the California healthy soils initiative. Our goal for this project is to significantly increase the use of dairy manure in almond orchards as a nutrient-rich and safe organic amendment to achieve carbon sequestration and provide economical and sustainable benefits for the soil, crop, and environment. The objectives are to: 1- Produce and characterize the physical and chemical properties of dairy manure compost products. 2- Investigate and demonstrate the effectiveness of the compost products in sequestering carbon and improving soil health on a commercial almond orchard and determine the impact of compost application on the greenhouse gas emissions. 3- Conduct outreach activities and disseminate project results to stakeholders and the public.</p> <p>We will be partnering with Van Ruler Orchards, Inc. and Wickstrom Dairies L.P. in Hilmar, CA, in the production and application of compost products. Compost will be produced from dairy manure and then processed into a pelletized product. Field application of loose and pelletized compost products will be researched and demonstrated on the Van Ruler orchards. The experimental treatments will include loose and pelletized dairy manure compost and controls without compost. The effects of these treatments on the almond yields, emissions of greenhouse gases, soil and tree health, carbon sequestration, and food safety of almonds will be determined. Field days will be organized to present the research findings to at least 120 farmers. It is expected that the research results will lead to better understanding of how to best utilize dairy manure to supply the nutrients and organic matter needed by almond orchards in an effective and safe manner while improving soil health and quality.</p>	\$249,999.00	\$0.00	Merced	9.7
The Regents of the University of California	<p>The Healthy Soils Demonstration Project will be conducted on a farm of 5,000 contiguous acres spanning from Colusa Refuge east to the Sacramento River. Davis Ranch is a leader within the county, actively exploring and implementing new farming techniques to encourage sustainable farming practices, build soil health, reduce pesticide runoff, and reduce overall inputs in conventional systems. The Healthy Soils Demonstrated Project will take place in a 38.9 acre field that has never been cover cropped and has been in a conventional crop rotation of processing tomatoes (2018, 2016), corn (2017), and beans (2015). Other crops in this rotation are sunflower and wheat. This cropping system, which includes an annual winter fallow, is common in the Sacramento Valley region. Davis Ranch would like to build upon their existing management practices to incorporate winter annual cover cropping into their production system, which would build soil organic matter, maintain soil coverage, maintain living roots throughout the year, and incorporate more plant diversity into the system. Cover crops have been challenging to manage economically in conventional systems and the objective of this project is to reduce barriers to this soil health practice for regional growers. Additionally, this project will quantify changes in soil water dynamics with cover crops, which will help growers adapt to extreme weather events, which are projected by climate change models. This project brings together University of California (UC) Cooperative Extension, Colusa County Resource Conservation District, Natural Resource Conservation District, Richter Ag (Custom Farm Business), and Davis Home Ranch. While there is a research component to this project, demonstration and outreach are central to this project. Collectively, our team will use their respective resources in the region to encourage ranchers and farmers to increase cover cropping and implement soil building practices on their farms.</p>	\$98,673.00	\$58,307.00	Colusa	4.9
University of California Agriculture and Natural Resources	<p>The state of California is advocating simultaneously for the increased diversion of organic waste from landfills and the implementation of climate-smart agricultural practices. To achieve these objectives actions must be both innovative and practical. Our project proposes to conduct field research combined with hands-on demonstration to investigate and increase the knowledge of the use of organic amendments within conventionally fertilized vegetable cropping systems of the central coast region. Our team will collect data to inform our on-going work into the development of best management recommendations for this practice, termed Integrated Nutrient Management planning, using compost. The agricultural management practices that will be implemented include combining both compost and urea. Our aim is to reduce fertilizer derived greenhouse gas emissions, nitrate leaching to groundwater and to increase soil carbon stocks. There has been considerable scientific debate about whether synthetic N fertilizers increase or deplete soil carbon. Our project has the potential to contribute significantly to this discussion through producing results associated with the integration of organic amendments alongside synthetic N. Also, with growers in mind, our project intends to investigate the legacy effects of these practices in order to identify agronomically optimal application frequencies because the cost of compost can be a substantial barrier. Considering this, our project will identify the soil health effects two- and three-years post application. This information will be vital for cost-constrained growers looking to make management decisions that improve their soil health. With an outreach strategy that includes both in-person Field Days at our project demonstration site and webcasted workshops, our team aspires to widely disseminate information concerning Integrated Nutrient Management planning throughout California's central coast and beyond. With scientifically-sound, agronomically relevant information we are confident conventional vegetable growers will make decisions that improve both soil health and reduce GHG emissions.</p>	\$250,000.00	\$66,395.00	Monterey	0.4

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Applications Submitted to CDFA *

Applicant's Organization	Project Description	Funds Requested	Cost Share	County	GHG Reduction Estimation (MTCO ₂ e/year) **
University of California Davis	The potential for compost (i.e. green waste and food waste/green waste mixture) to improve soil health and productivity while lowering global warming potential makes them appealing to address climate change mitigation and promote sustainable land-use. In California tomatoes, however, little information is available to growers to utilize compost and reassess nutrient management plan. Our goal is to demonstrate successful compost utilization and nutrient reduction management for tomato growers to 1) sequester C, 2) reduce greenhouse gases especially nitrous oxide emissions, 3) build healthy soils to enhance system resilience to climate change, and 4) improve overall sustainability and productivity of tomatoes. This project leverage an interdisciplinary assessment of compost types and fertilizer rates supported by the Water Resource Control Board. In this proposal, we propose to demonstrate the impact of different compost types on soil C sequestration, greenhouse gas emissions, soil fauna (i.e. earthworms and nematodes) population, crop yield, and the implications for resource use efficiency of tomato production. We will provide detailed measurement on soil C and greenhouse gas emissions associated with compost application, conduct soil fauna analysis, and host outreach events to extend information to growers.	\$249,999.00	\$215,383.00	Yolo	5.4
University of California Regents, Agriculture and Natural Resources	This demonstration project will evaluate the Field Border Conservation Practice Standard (NRCS CPS 386) and will be conducted at the Lockeford Plant Materials Center (CAPMC) near Lodi, California. There is no vegetative cover near the edge of the demonstration project field and this has created an opportunity to evaluate how implementation of vegetative field borders influence soil ecosystem services and conservation. Establishing a vigorously growing vegetative strip at the field's edge is crucial to achieving the conservation management goals of field borders. There is tremendous potential for growers across California to adopt this conservation practice, however, significant adoption barriers need to be addressed before field border installation gains widespread acceptance by the grower community. Therefore, effective demonstrations are needed to communicate to growers how different plant species can become effectively established and maintained as vegetative field borders. Additionally, there is an opportunity to communicate to growers how these plant species differ with respect to their ability to reduce soil compaction, sequester carbon and improve soil health. Implementing NRCS CPS 386 and monitoring plant productivity and soil quality will enable quantification of the short-term influence of vegetative field borders on soil ecosystem services and indicators of soil health. The CAPMC has an established reputation for hosting Field Days and Open Houses and will provide on-site capacity to conduct grower focused meetings at the demonstration field. The demonstration field will provide an opportunity to showcase how plant species selection impacts the ability of field borders to conserve soil resources and build healthy soils. Demonstrations of field border installation will show growers what plant species work best at achieving conservation management goals, helping them gain confidence in their ability to improve soil health by successfully establishing field borders.	\$41,940.00	\$30,000.00	San Joaquin	0.1
Upper Salinas-Las Tablas Resource Conservation District	This demonstration project will assess the differences in GHG emission and soil health with respect to compost, vermicompost, and liquid vermicompost extract applications on grape vines on the central coast of California. Compost application is a standard practice although there is increasing interest in changes to overall yield and soil health with the use of vermicompost and vermicompost extracts. Along with required Soil Organic Matter tests, this demonstration project will include Phospholipid Fatty Acid (PLFA) tests to increase information on microbial community health as it relates to compost and vermicompost applications. GHG testing will be completed by the soils lab at Cal Poly San Luis Obispo. There are five local organizations joining to collaborate for this project which will assist in the outreach component by broadening canvassing efforts for workshops. There is not enough information on vermicompost for local growers to be able to make management decisions that incorporate it as a tool. Northern San Luis Obispo county has a facility which can produce enough vermicompost and liquid vermicompost extracts to be a useful addition to an agriculturalist's soil health regime. This demonstration project will gather unique and important information and make it available directly to the agricultural community.	\$249,356.44	\$75,845.05	San Luis Obispo	14.2
USDA-ARS	This project has two components, both of which are aimed to improve grower adoption of mixed-species cover cropping systems in California. The first entails using scientific research to accrue deeper insights into the economic, ecological, and environmental impacts associated with mixed-species cover crops in a perennial cropping system in the San Joaquin Valley (SJV). The recipients will establish a new demonstration site with grapes, a prevalent crop in Eastern SJV and state-wide. The influence of mixed-species cover crops on water demands, soil SOC and nutrient compositions, soil biodiversity, greenhouse gas (GHG) emissions, and crop yield will be assayed. Recipients will use this opportunity to optimize the species compositions of the mixed-species cover to benefit growers and environmental health. Secondly, the demonstration plots used to collect these data will be open for field days with the goal of increasing farmer education and exposure to mixed-species cover crops. Recipients plan to work with stakeholder interest groups and field-day attendees to identify benchmarks for soil evaluations that are both highly relevant to grower interests and economics. Findings relevant to these benchmarks will be the focus of subsequent field days, presentations, and outreach programs.	\$244,705.60	\$129,296.50	Fresno	0.2

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Ventura County Resource Conservation District	<p>This project will study and demonstrate the application of compost and mulch on approximately 40 acres of newly planted citrus trees in Ventura California. Through the use of varying applications of mulch and compost, this project will evaluate the cost and benefit of the low and high application rates, in addition to GHG emissions, soil health benefits, water cycle benefits, and tree health benefits of improved soil health in a perennial citrus system. Through partnership with the Farm Bureau, this project will engage Ventura County managers of row crop operations and managers of orchard systems, and showcase how improved soil health can assist in the establishment of healthy perennial orchard systems. Through partnering with a local University and High School, this project will also demonstrate the value and power of soil health to underrepresented students in the area who are pursuing agricultural careers. The site of the demonstration project is located adjacent to the Ellsworth Barranca, which leads to the Santa Clara River - one of the last free-flowing rivers in the Country, plagued with nitrate and pollution challenges. This proximity to an endangered water way allows our project to clearly connect soil and watershed health, demonstrating the ecosystem services associated with soil health, including decreased topsoil runoff and nitrate pollution, and increased groundwater infiltration. Together with a large and diverse set of partners, the Recipient will integrate compost and mulch into a working ranch, and show the potential for the Ventura County agricultural sector to become more resilient in the face of a changing climate.</p>	\$249,546.00	\$141,953.00	Ventura County	21.4
West Hills College Coalinga	<p>West Hills College Coalinga operates the Farm of the Future as a hands-on laboratory for use by Agriculture and Industrial Science students. The farm is divided into field blocks which are used for production row crops, a pistachio orchard, student projects, and lab activities. One field in particular is appropriately considered the "unhealthiest" soil on the farm. At one time the field was an almond orchard, but with yields lower than 15% of expected, it was removed and subsequently reduced to use as a part-time parking lot and for experimental crops such as pumpkins. This project will use healthy soil practices to rebuild and make this field productive again.</p> <p>This project will demonstrate to West Hills students and growers in the Central Valley the use of compost and cover crops to regain a "healthy" status. Defining what factors and criteria determine if a soil is healthy or not will include microbial biomass, infiltration, and organic matter as determined through the use of hyperspectral imaging compared to conventional soil sampling. Student workers or students within a class will complete operational tasks and data collection under the guidance of the Farm Manager and faculty. Data collection will use technology including GPS, hyperspectral imaging, biomass test kits, and Geographic Information Systems, for the benefit of the students. This project will cooperate with University of California Agriculture and Natural Resources West Side REC for outreach events.</p>	\$87,180.00	\$22,820.00	Fresno	28.0
White Buffalo Land Trust	<p>WBLT will serve as a demonstration, learning, and research site that is contextually relevant for California's central and southern bioregions. WBLT will develop and offer trainings on the demonstration site, and invite other farmer, ranchers, and community members in the region to learn from our work and build a better understanding of the diverse ecological benefits from implementing conservation practices.</p> <p>Our property is located in Summerland, California in Santa Barbara County on 11.75 acres and 7/10th of a mile from the ocean. We have a gently sloped landscape with existing avocado orchards that are in need of increased diversity in the canopy as well as within the understory and groundcover. We have the opportunity to be a demonstration site for others looking to increase the production of their orchards while maintaining a healthy understory that builds soil and has the capacity to infiltrate the limited precipitation we do get.</p> <p>Our demonstration and training site will help build resilience into our region as we are increasingly faced with the challenges of drought, flood, fire, climate change, income disparity, and so much more. WBLT has the resources needed to support our community of farmers and rancher and we have a deep will to undergo the scientific research that will influence public opinion about the potential impacts of agriculture, inform policy writers around how to best support our working landscapes, and collaborate with educational institutions to better connect classroom theory with on-the-ground practice.</p> <p>This project will be focused on the integration multistory cropping systems within the existing orchards, using mulching system to benefit soil health and water infiltration, and use planned grazing to maintain the understory of our orchards system. We feel that the integration of annuals, animals and perennials is a necessary dynamic to support regenerative agricultural systems.</p>	\$98,357.60	\$0.00	Santa Barbara	43.1

* The 2018 HSP Demonstration Projects application information was extracted from the online application system as submitted, therefore, CDFA cannot guarantee accuracy of the information.

** Total emission reduction is estimated by the applicant and has not been verified.