ENVIRONMENTAL FARMING ACT SCIENCE ADVISORY PANEL (EFA SAP)
CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

MEETING AGENDA
January 21, 2020
10 AM to 4 PM
California Department of Food and Agriculture
Main Auditorium
1220 N Street, Sacramento, CA 95814

REMOTE ACCESS
Webinar information
Registration URL: https://attendee.gotowebinar.com/register/783026405712893453
Webinar ID: 633-656-467
Presentation materials will be posted at the following link prior to the meeting:
https://www.cdfa.ca.gov/EnvironmentalStewardship/Meetings_Presentations.html

Topic	Presenter	Action Level
1. Introductions	Chair Bridson	Informational Item
2. Minutes	Chair Bridson	Action Item Requires EFA SAP Approval
3. Whole Orchard Recycling (WOR) • Review of Proposal to add WOR to the Healthy Soils Incentive Program • Presentation of public comments received for the WOR CDFA report • Requirements for the WOR practice based on public comments and modeled data for GHG reductions	Michael Wolff, PhD, CDFA Benjamin Nicholson, MBA, CARB	Action Item Requires EFA SAP Approval to add the WOR to the Healthy Soils Incentive Program
Public Comments	Chair Bridson	
4. Carbon Removal and Soil Sequestration Partnership www.e2.org	Nicole Lederer Chair and Co-Founder, Environmental Entrepreneurs	Informational Item
5. Partnering with the CDFA Healthy Soils Program	Anthony Myint, Director of Partnerships Restore California	Informational Item

6. Addition of an Organic Transition Option to the Healthy Soils Program	Jane Sooby Senior Outreach & Policy Specialist, CCOF Scott Park, Farmer Park Farming Organics Kate Scow, PhD, Professor, University of California, Davis	Action Item Requires EFA SAP approval of costs associated with organic transition to be allowed in the Healthy Soils Incentive Program
Public Comment	Chair Bridson	
7. Healthy Soils Program • Program updates • Presentation of Public comments received • Use of new mapping and location identification tool for the Healthy Soils Incentive Program application process • Comet-Planner updates	Guihua Chen, PhD, CDFA Geeika Joshi, PhD, CDFA Dennis Grossman, PhD, Strategic Growth Council Adam Chambers, PhD, USDA NRCS	Informational Item
8. State Water Efficiency and Enhancement Program • Program Updates	Stephanie Jamis, MSc, CDFA	Informational Item
9. Technical Assistance Program • Program Updates	Carolyn Cook, MSc, CDFA	Informational Item
10. Public Comments	Chair Bridson	Informational Item
11. Next Meeting and Location	Chair Bridson	Informational Item

EFA SAP MEMBERS

https://www.cdfa.ca.gov/oefi/efasap/

Jocelyn Bridson, MSc, Rio Farms, Member and Chair
Jeff Dlott, PhD, SureHarvest, Member and Co-Chair
Don Cameron, Terranova Ranch, Member
Vicky Dawley, Tehama RCD, Member
Judith Redmond, Full Belly Farm, Member
Doug Parker, PhD, UCANR, Subject Matter Expert
Tom Hedt, USDA NRCS, Subject Matter Expert
Scott Couch, CalEPA, SWRCB, CalEPA Member
Jeffrey Onsted, PhD, DOC, Resources Agency, Member
Michelle Buffington, PhD, ARB, CalEPA, Member
Vacant, Resources Agency, Member

CDFA Liaison to the Science Panel - Amrith (Ami) Gunasekara, PhD,
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CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE (CDFA)
ENVIRONMENTAL FARMING ACT SCIENCE ADVISORY PANEL

The Lau Family Meat Processing Center Conference Room
California Polytechnic State University
1 Grand Avenue
Stenner Creek Road
San Luis Obispo, CA 93407
October 17, 2019

MEETING MINUTES

Panel Member in Attendance

Jocelyn Bridson, Rio Farms (Chair)
Don Cameron, Terranova Ranch (Member)
Michelle Buffington, CalEPA, CARB (Member)
Thomas Hedt, USDA NRCS (Subject Matter Expert)
Kealii Bright, Department of Conservation (Member)
Scott Couch, CalEPA, State Water Board, (Member)
Jeff Dlott, Sure Harvest (Co-Chair and Member)
Judith Redmond, Full Belly Farm (Member)
Vicky Dawley, Tehama RCD (Member)

State Agency Staff and Presenters

Amrith Gunasekara, Ph.D., CDFA
Carolyn Cook, M.Sc., CDFA
Scott Weeks, CDFA
Michael Wolff, Ph.D., CDFA
Geetika Joshi, Ph.D., CDFA
Andrew Whitaker, Ph.D., CDFA
Thea Rittenhouse, CDFA
Joyce Mansfield, CDFA
Benjamin Nicholson, MBA, CARB

AGENDA ITEM 1 – Introductions

The meeting was called to order at 10:05 AM by Chair Bridson. Panel members introduced themselves. Present at the meeting were all the members noted above under “Panel Members in Attendance.” Two new representatives were in attendance. They were Michelle Buffington representing the California Air Resources Board and Kealli Bright from the California Resources Agency. Chair Bridson reviewed the meeting agenda and introduced Joyce Mansfield who is the Public Affairs Information Officer for the Office of Environmental Farming and Innovation (OEFI) at CDFA.

AGENDA ITEM 2 – Minutes
Chair Bridson introduced the July 18, 2019 meeting minutes. Member Cameron moved the motion to approve minutes. The motion was seconded by Member Scott Couch. The Panel approved the minutes.

AGENDA ITEM 3 – State Water Efficiency and Enhancement Program (SWEEP) Update
Mr. Scott Weeks of OEFI provided program updates on the CDFA OEFI State Water Efficiency Enhancement Program (SWEEP). He provided background information on Proposition 68, the funding source for the most recent solicitation of SWEEP grants. The solicitation period for applications was announced on December 28, 2018 and closed on March 8, 2019. Following administrative and technical reviews, 120 projects were selected for awards in 2019.

Mr. Weeks briefly explained the project types funded by SWEEP, such as moisture sensors, drip-irrigation and micro-irrigation systems. He provided details on the pre-project consultation effort for the 120 projects. 111 projects accepted the award after the pre-project consultation totaling $9.5 million. Approximately $3.2 million and 37 projects benefited Severely Disadvantaged Communities as defined by Proposition 68. The 111 projects collectively reduce 36,000 $MTCO_2e$ of greenhouse gases over 10 years and would result in 29 billion gallons of water savings over 10 years.

Member Redmond requested clarification on the average grant size for SWEEP in the most recent round. Mr. Weeks noted the average grant amount was $85,000 per project. He provided the timeline for the second solicitation for 2019.

Member Buffington asked if CDFA provided technical assistance to SWEEP applicants. Mr. Weeks responded that technical assistance was provided to SWEEP applicants. Chair Bridson requested clarification if projects must start their projects by June 15, 2020 and if growers could purchase equipment before that date. It was clarified that no expenses would be reimbursed by the grant should costs be incurred prior to June 15, 2020.

Mr. Weeks noted that 3 Workshops for application assistance would be provided by CDFA in October 2019; located in Glenn, Stanislaus and Kern counties. Additionally, 34 technical assistance providers (TAPs) were available across the State as a resource to SWEEP applicants. Member Bright asked to clarify the gradient of colors on the TAP map. Mr. Weeks explained that lighter shades represent one TAP per county, while darker shades implied greater number of TAPs in the respective county. Member Cameron asked if a list of TAPs be available. Mr. Weeks responded such a list would be made available on the CDFA SWEEP website when the solicitation is posted.

Mr. Weeks provided a demonstration of the application portal, noting that previous round applications could be accessed by applicants and updated based on feedback received by technical reviewers. Member Couch asked to clarify if the process would still be competitive and if a grower correcting their mistakes would guarantee them funding. Mr. Weeks replied that SWEEP is a highly competitive program and all updated applications

would still need to go through the full technical review process.

Member Buffington suggested potential integration of maps for California Climate Investments and Proposition 68 funded projects by CDFA as this would address the issue of multiple funding sources being experienced by multiple agencies. Dr. Gunasekara commented that CDFA would need to evaluate the feasibility of this request.

Chair Bridson questioned if the available dollars for SWEEP should be $10.5 million after $9.5 million had been awarded out of the total funding of $20 million. Mr. Weeks clarified that there are additional costs from total funding that would also be accounted, such as CDFA administrative costs, bond expenses, technical assistance funding, technical review costs, and, verification and monitoring costs. Member Cameron asked if the program was still oversubscribed and Mr. Weeks responded that in the most recent round of funding, SWEEP was oversubscribed by 300%.

AGENDA ITEM 4 – Healthy Soils Program (HSP) August 23, 2019 Workshop
Ms. Thea Rittenhouse, Farm Equity Advisor at CDFA, presented an update on the Public Listening Session for HSP held in August 2019. Purpose of this session was for stakeholders to discuss the big picture perspectives on the HSP. A broader discussion on programmatic goals and outcomes took place. This session was attended by 122 webinar and 21 in-person attendees, which included farmers, agriculture industry representatives, universities, non-profit organizations, State and local government, Resource Conservation Districts. Major topics covered were HSP data and metrics, new ideas for HSP practices, HSP strategic planning and engagement with socially disadvantaged farmers, small-scale and beginning and limited resource farmers.

Member Buffington noted that there were several lessons learned in the workshop and asked how CDFA intended to share this information with other agencies so their programs could also benefit from these findings. Ms. Rittenhouse noted that this workshop was a first step and acknowledged that arranging information-sharing meetings could be a potential step for CDFA.

Member Cameron asked if CDFA will be prioritizing and ranking this feedback and building them into program priorities. Dr. Gunasekara replied that comments could be categorized into two levels – policy and programmatic. While policy level comments were being deliberated by CDFA Executive Leadership, several of the program level comments were being addressed by OEFI.

Chair Bridson suggested that some of the questions relating to program administration process, such as reimbursements should be made into a Q and A resource for grant recipients. She further noted that integration and quantification of environmental co-benefits with GHG benefits is key for the HSP and urged CDFA to partner with CARB, Natural Resources Agency and the State Water Boards to evaluate the data collection and quantification of various air and water quality benefits, and to make this a goal for HSP for the next decade. Dr. Gunasekara acknowledged this need and noted that the CDFA is working with CARB to quantify some co-benefits and integration of HSP projects into the CDFA Ecosystem Services Database. Member Hedt also noted that EQIP is

working on more open-ended application periods which may help better align with HSP in the future.

Member Cameron appreciated CDFA's responsiveness to the public comments. Co-chair Dlott echoed comments made on the quantification of Ecosystem Services and noted that there is a spectrum of services for which metrics are needed.

Member Couch noted that the State Water Boards were starting to look into the status of water quality research and recently established a contract with the University of California, Davis, to study variables in terms of leaching from compost piles. He acknowledged that work on nitrogen balance (applied versus removed) needed longer-term efforts. Chair Bridson noted that farmers are eager to learn what level of nitrogen removal credits can be received for practices such as cover crop planting during winter and compost application; these are currently not quantified.

AGENDA ITEM 5 – HSP Program Updates and Public Comment Period

Dr. Andrew Whitaker of OEFI provided an update on the 2018 solicitation and 2020 funding/program timeline. He summarized the funding sources for the 2018 round and noted that 188 incentives and 21 demonstration applications have been funded.

Dr. Whitaker shared the current program process for the $28 million in funding appropriated to CDFA for the HSP in fiscal year 2019-20 and noted that a public comment period on the program framework was ongoing until October 23, 2019. A second public comment period on the draft program solicitation documents (Request for Grant Applications or the RGA) would be conducted in late 2019. Public listening sessions were conducted in Orland, Fresno and Sacramento in September 2019. Key public comments were shared with the panel members. Dr. Whitaker also presented the 2020 HSP timeline.

Member Couch requested to clarify the difference between Type A and Type B Demonstration Projects. Dr. Whitaker explained that Type A projects included a mandatory GHG data collection component in addition to outreach and demonstration of HSP practices, while Type B did not. Therefore, the maximum grant award for Type A projects was greater ($250,000) than Type B ($100,000).

Member Bright asked if the 2018 projects were widely distributed across the State. Dr. Whitaker responses that the projects were distributed across 46 counties in California. Dr. Gunasekara added that the program incentive over 20 different practices that provided many options for different regions.

Chair Bridson asked what CDFA planned to do with the soil sample data as the soil organic matter (SOM) levels may not show statistically significant changes within a three-year time-frame. Dr. Whitaker responded that the first round of funded projects are expected to be complete in 2020, and would give CDFA the first opportunity to analyze 3-years' SOM data. The decision regarding next steps would be taken after this data analysis was complete.

Member Buffington asked if the program timelines were based on encumbrance and liquidation timelines for the appropriated funds. Dr. Gunasekara responded that the encumbrance and liquidation deadlines totaled 4 years for CDFA, of which approximately 3 years are intended for implementation of funded projects, which coincides with liquidation deadline. CDFA cannot require data collection beyond the 3-year grant, however, farmers and ranchers are expected to be able to discern if they would like to adopt HSP practices in the long-term after the 3-year incentivized trial period through the HSP.

Chair Bridson suggested exploring solutions such as a small grant to pay for soil tests through 5 or 10 years for a sub-set of HSP recipients that may be interested in participating. She noted that SOM content is not scientifically likely to show significant increases within a three-year timeframe and should not be taken as the sole metric to demonstrate program success, recognizing that soil health takes decades to build, and is dependent upon multiple variables including individual practice types and sampling schedule. Member Redmond noted that many farmers may already be collecting long-term SOM data. Co-chair Dlott further questioned if long-term soil health data could be collected by funded demonstration Projects, and if an organization could be funded to establish new demonstration sites, and also continue sampling on previously funded sites. Dr. Gunasekara responded that demonstration projects were not barred from re-applying for new fields, although CDFA was mindful of striking balance in distribution of funds to previously funded applicants and new applicants.

Member Redmond commented on the difficulty in getting attendees to participate in field days and asked if the Technical Assistance (TA) Grant Program could include additional assistance to demonstration grant recipients to get more attendees to visit their farms on field days. Dr. Gunasekara responded that the TA grant program is focused on Incentive Program recipients. Dr. Joshi noted that in many cases, TA grantees and HSP Demonstration Projects grantees are same organizations and there is a need for careful distinction of awarded funds and their utilization for their intended purposes. Dr. Gunasekara further noted that CDFA would evaluate field day attendance data to determine how many grant recipients were able to meet program requirements, and that grant recipients were strongly encouraged to work with other organizations to maximize attendance. Chair Bridson and Member Cameron suggested that CDFA should consider providing a media kit with some slides or other relevant materials covering basic programmatic information for use by Demonstration Projects recipients at conferences and other meetings. Co-Chair Dlott echoed comments by Member Redmond on better ways to increase participation rather than lowering program requirements, further noting that this presented a long-term opportunity for social science research. Research could potentially evaluate outreach data to determine effectiveness and create baselines of most effective outreach. Chair Bridson suggested follow-up surveys to learn what worked best.

Member Redmond mentioned that low prices for compost application practice was a concern. Individual farmers have noted that the funds supplement the costs of the projects, but own investment is needed in most cases. Dr. Gunasekara noted that cost for compost application practice was increased from $35/ton to $50/ton from 2017 to 2018 round of HSP. Since the project boundary for estimation of GHG benefits is limited to the farm, the

boundary for project costs needed to be consistent and therefore, cost of transportation of compost to the farm would be outside of the project boundary. Alternatively, the GHG emissions of transportation would need to be considered for the practice, which may overshadow the carbon sequestration benefits of compost application. Compost application remained the most popular practice requested by applicants in terms of both grant monies as well as acres covered.

Chair Bridson invited public comments for Items 1-5.

PUBLIC COMMENTS FOR ITEMS 1-5
In-person Attendees:
Josette Lewis of the Almond Board of California noted that methods to determine longer term trend data of soil carbon was needed and the Specialty Crop Block Grant Program provided an opportunity to do so. She noted that in some cases, industry funding can be leveraged for such studies, and the Almond Board of California has previously funded research studies.

Brian Koloji of Black Swan LLC, a project manager for a funded SWEEP project in Kern County expressed appreciation for climate smart agriculture work in California. He noted that there were no TA providers in Kern County, although they received assistance from UCCE Kern County and other business sources. He suggested that information from the CDFA Grants Awards Procedures should be included in application assistance workshops.

Remote Attendees:
Dr. Pam Krone, an HSP Demonstration Project awardee noted that working with their local RCD, NRCS and UCCE had proved helpful in conducting outreach. She suggested that multiple projects located in the same region should be allowed to collaborate on field days and outreach events to ensure consistent messaging and not over-burdening participating farmers and ranchers with too many events to attend.

Rex Dufour of National Center of Appropriate Technology expressed support for WOR. He noted that this practice will benefit the large acreage of tree perennial crops in California by increasing carbon sequestration and soil quality.

AGENDA ITEM 6 – Technical Assistance Program

Ms. Carolyn Cook of OEFI provided a background of technical assistance at CDFA, which started with USDA funding in 2016, followed by funding from the Strategic Growth Council. She noted that the efforts for technical assistance had evolved rapidly in the past years, and the passing of AB 2377 in 2018 was the latest development. As mandated by this bill, CDFA implemented the Climate Smart Agriculture Technical Assistance Grants in 2019. She provided the program timeline and shared information regarding the online application platform. The program received 26 applicants requesting funding for HSP TA, 1 for AMMP TA and 8 for both AMMP and HSP TA. The applications were currently in review period with awards announcement expected in November 2019. In addition, Climate Smart Agriculture Community Education Specialists had also been appointed at various county

offices of the UC Cooperative Extension to assist applicants. Ms. Cook presented an analysis of the 2018 TA for SWEEP, AMMP and HSP.

Member Dawley noted that SWEEP and AMMP both have vendors as a resource to applicants. This is less common in HSP, however, many agriculture industry representatives were present at the August 23, 2019 HSP Listening Session. She requested to know who they represented. Ms. Rittenhouse responded that most attendees represented specific commodity boards, and companies making biochar and compost, and seed companies.

Member Redmond asked if the EFA-SAP should be hearing more information on the AMMP and if there are commonalities between comments for AMMP and HSP. Dr. Joshi provided context regarding the AMMP, noting that unlike the HSP practices, AMMP practices were focused on reducing methane emissions from manure (rather than carbon sequestration). In the past EFA-SAP meetings, information on the AMMP had been provided to the Panel upon Panel Members' request. However, since the EFA-SAP members do not have expertise in livestock agriculture, programmatic decisions for the AMMP were instead under the purview of the AMMP Technical Advisory Committee which consists of State and Federal Agency subject matter experts.

Chair Bridson noted that it appeared that there may be a reduced number of TA applicants and grants available going forward. Ms. Cook clarified that the previous award process for TAPs was a brief application awarded on a first-come-first-serve basis. The new application is more rigorous and funds a greater range of TA activities. Therefore, the lower number did not represent a lower interest in TA but rather an ability to select organizations that have the capacity and expertise to provide more robust TA.

Chair Bridson inquired what the impact of losing 15-20 TAPs would be, and if it would affect specific regions. Ms. Cook responded that providing TA in different parts of the State was part of the scoring criteria and CDFA expected being able to award applicants that covered greater number of, and, larger regions.

AGENDA ITEM 7 – Whole Orchard Recycling

Mr. Benjamin Nicholson of the California Air Resources Board (CARB) gave a presentation which included the background of how GHG benefits achieved from implementation of specific practices are quantified using biogeochemical models. The HSP uses a version of the USDA's Comet-Planner tool which is based on the DayCent model. CARB uses the Denitrification Decomposition (DNDC) model for quantification of GHGs and has historically focused on NOx and N_2O emissions.

Dr. Michael Wolff of CDFA subsequently provided background of Whole Orchard Recycling (WOR) modeling work done using the DNDC model. He provided a background of WOR implementation in California, noting that there is an increased tree biomass available in California through forests, and orchards, especially since biomass co-generation facilities are no longer available. In this practice, orchard trees are chipped into 2 inch – 4 inch chips and incorporated into soil up to 6 inches. This practice results in

carbon sequestration since the gradual breakdown of wood serves as a carbon source for soil microbes. Co-benefits include improved water retention, aeration, improved soil structure, dissolved organic carbon in the deep soil profile, lowered leaching and improved nutrient retention. He presented data and results from the research conducted by the Kearny Agricultural Research Center (University of California). Data showed annual increases in SOC in 2010, and in 2019 up to 4.5 feet in the soil. Dr. Wolff shared results from conducting DNDC model runs showing that model projections could be successfully with available field data. He noted that the model projections were conservative relative to field data, and methane emissions from the practice were negligible. Dr. Wolff also presented the co-benefits and proposed HSP implementation requirements for WOR.

Chair Bridson asked if the WOR study cited in the report had been replicated elsewhere. Dr. Wolff noted that WOR had only been studied in the California Central Valley, however, studies on mulching with similar carbon-sequestration mechanism were widely available.

Member Cameron asked to clarify the type of irrigation system used in the study; Dr. Wolff replied that the study employed micro irrigation. Member Hedt asked if the study results accounted for soil carbon sequestration only, or if they included above-ground biomass, and if WOR could be compared to composting of wood chips. Dr. Wolff noted that the report only included soil carbon sequestration, and published literature was not available comparing WOR to composting of wood chips.

Member Cameron inquired if tree pruning's and shed leaves that may be incorporated into the soil were included in the modeling. Dr. Wolff and Dr. Gunasekara responded that these parameters were not included as this was not a common practice, and that the focus of WOR was on handling of dead trees.

Co-chair Dlott asked if regional variation in emission factors were driven by precipitation differences. Dr. Wolff responded that while precipitation was a factor, soil type was a stronger driver of these differences.

Chair Bridson asked if N-leaching was measured in the WOR research study and if ability of wood chips or almond hulls to tie up N leaching could be a benefit for water quality improvements. Dr. Wolff noted that while N-leaching was not measured in the study, this may be a potential benefit in the first few years where an N-immobilization effect from wood chops addition can be observed.

Member Cameron asked if the practice would be allowable to be implemented on different fields within an APN. Dr. Gunasekara responded that CDFA had received public comments regarding this concept and it was being evaluated for all HSP practices in addition to WOR.

Co-chair Dlott asked if biological effects of WOR on tree growth were considered. Dr. Gunasekara noted that this aspect had not been included in modeling.

Member Couch asked if the data on soil water retention and pathogen reduction were available. Dr. Wolff responded in the affirmative.

Member Dawley asked what the changes to this practice in recent times were that make it feasible for farmers to implement widely. Dr. Wolff noted that initially non-portable tub grinders were used, however, the new grinders are portable and produce a consistent size of wood chips, making them an attractive option for orchards.

Co-Chair Dlott asked if this practice would be incentivized by the HSP for all tree crops or specifically for almonds. Dr. Gunasekara noted that CDFA will incentivize this practice for all tree crops as the potential for carbon sequestration through WOR is not limited to almond trees.

Mr. Nicholson of CARB closed the presentation by sharing that CARB will be updating their GHG quantification methodology (QM) to include WOR and accept public comments on the QM Ben N closed the presentation by sharing CARB will be updating their QM and accepting public comments. CDFA announced that public comments on the WOR Report would be accepted until November 8, 2019.

Member Cameron asked if the work on inclusion of WOR would be completed to allow including the practice for 2020 HSP. Dr. Gunasekara noted that CDFA aimed to include the practice for the next round of HSP in 2020. Member Cameron further asked if the carbon levels of other trees such as citrus or pistachios were very different from almonds. Dr. Wolff responded that there is a narrow range of carbon level for different tree species, and it is not a significant driver of the model outcomes.

Chair Bridson asked if the proposed practice implementation requirements could be expanded to include re-planting with annual crops rather than orchard trees to provide potential benefits for water quality protection. Dr. Wolff responded that this would need to be modeled, as factors such as tillage would come into play. Chair Bridson asked if the 30-60 tons/acre wood chips for application, as noted in the studies cited, should be a requirement for WOR implementation, and if there is a potential for access nutrient buildup when combined with compost. Dr. Gunasekara responded that mature orchards can provide greater amounts of wood chips than this range, and this can be ensured by limiting off-site movement of chipped trees. In practical terms, measuring of tons of wood chips prior to application would be a challenge. He further added that since the practice implementation requirements proposed that WOR be implemented once in 10 years, nutrient overload was unlikely. Member Bright noted that WOR presented a great environmentally beneficial alternative to the business-as-usual scenario of burning of orchard trees and provided air-quality benefits, noting its importance in California in the light of excess tree biomass challenges.

AGENDA ITEM 8 – Public Comments
In-person attendees:
Mr. Brian Koloji of Black Swan LLC expressed support for WOR.

Ms. Josette Lewis of the Almond Board of California appreciated the analysis conducted by CDFA and CARB. She noted that 25,000 – 40,000 acres of orchards are terminated in California at the end of their life span and generate up to 5 million pounds of tree biomass by 2025 per estimates by the Almond Alliance. There was need to find a sustainable

solution. She noted that many of the field sites in the published and ongoing WOR studies are funded by the Almond Board of California. She expressed the support of the Almond Board of California to include this practice under the HSP Incentives Program, noting that CDFA should allow the practice to be implemented on fields meant to be fallowed, which is likely to occur as a result of implementation of the Sustainable Groundwater Management Act (SGMA) to enable groundwater recharge.

Chair Bridson called for the Panel to address the inclusion of WOR in the HSP Incentives Program, an action item. Member Cameron introduced the motion to include WOR. Co-Chair Dlott proposed an amendment to allow the practice to be implemented on fallow lands in addition to re-planted orchards. Upon discussion, Member Cameron introduced the motion to move forward with the inclusion of WOR in consideration of minor comments received until November 8, 2019 and for CDFA to evaluate the inclusion of fallowed lands and share information with the Panel at the next January 2020 EFA-SAP meeting. The motion was seconded by Member Redmond and passed unanimously by the Panel.

Update on CDFA's Public Outreach Activities
Ms. Joyce Mansfield of CDFA introduced herself as the CDFA Public Information Officer for OEFI and shared that CDFA was planning to celebrate Healthy Soils Week in December 2019 to engage with the Governor's Office and the Legislature, in addition to California citizens. She noted that she will be working with OEFI staff to update program outreach materials, infographics, coordinating Spanish translation efforts, OEFI newsletter and assisting with outreach and media kit preparation for use by a wide group of speakers across diverse platforms. She would also aim to ensure OEFI presence at meetings and conferences of significance, such as the World Ag Expo. She shared the handle for new OEFI Twitter account, @CDFAClimateNews and YouTube playlist on CDFA YouTube Channel featuring videos of OEFI grant recipients with the Panel. Chair Bridson appreciated her efforts and suggested that videos be made at HSP Demonstration Projects field days and showcasing cumulative data from three years of funded projects.

AGENDA ITEM 9 – Next Meeting and Location
Dr. Gunasekara announced that the next meeting of the Panel would be on January 16, 2020 in Sacramento. Chair Bridson expressed gratitude to CalPoly San Luis Obispo for hosting the meeting. Meeting was adjourned at 2:40 p.m. by Chair Bridson.

Respectfully submitted by:

Amrith Gunasekara, Ph.D.
Liaison to the Science Advisory Panel

Whole Orchard Recycling (WOR): Inclusion in the CDFA Healthy Soils Incentive Program

Michael Wolff, Ph.D., CDFA
Benjamin Nicholson, P.E., M.B.A., CARB

Environmental Farming Act Science Advisory Panel Meeting
January 21, 2020
Sacramento, CA

CALIFORNIA CLIMATE INVESTMENTS
Cap and Trade Dollars at Work

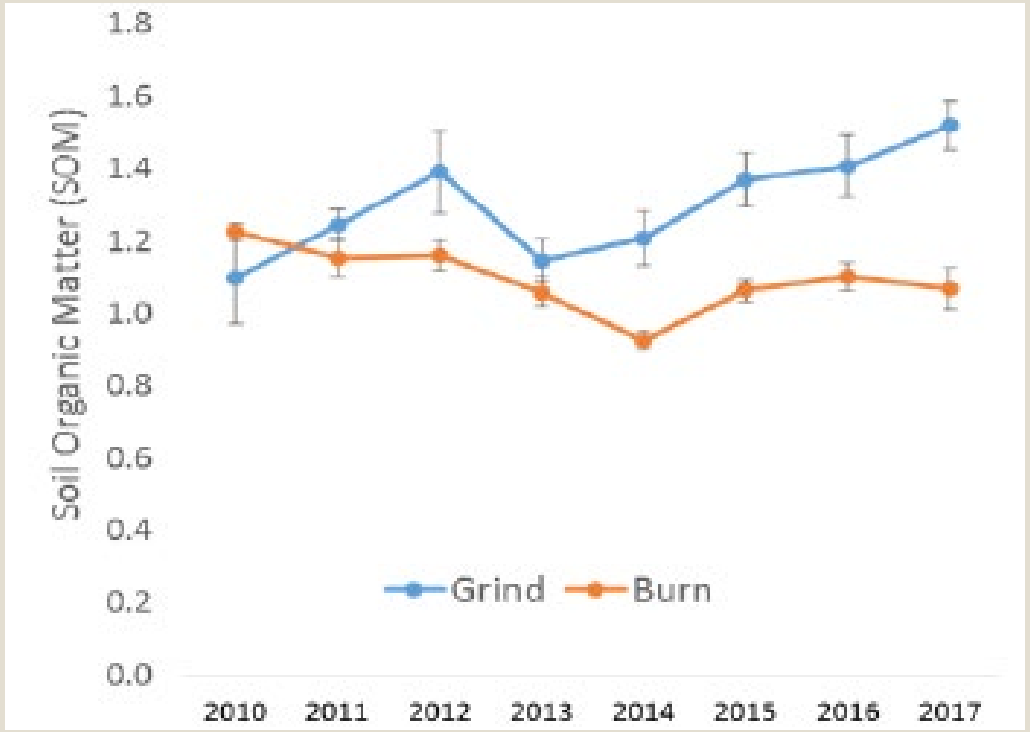
cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

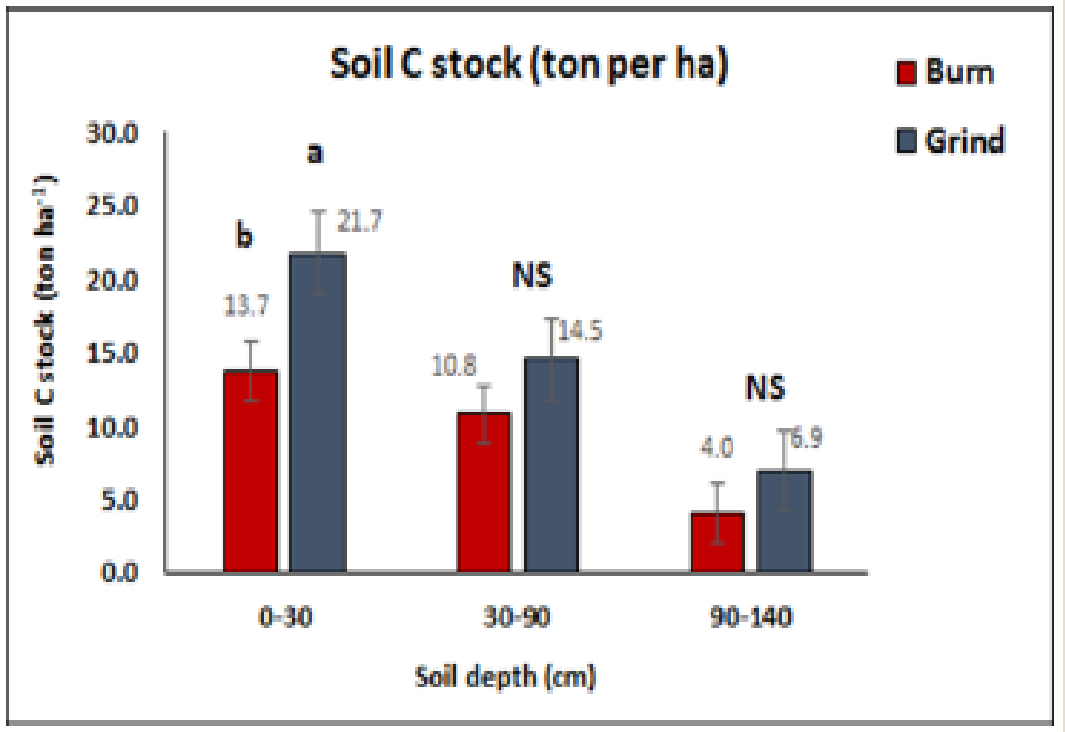
Whole Orchard Recycling (WOR)

- Pioneered in California by UC Cooperative Extension
- Entire orchard is normally chipped to 2” chips.
- Chips are incorporated into soil to at least 6”.
- Services have evolved in recent years.
- Currently used in almond and walnut orchards in San Joaquin and Sacramento Valleys.

Photo Credits: Brent Holtz, UCCE

SOC Results from Kearney ARE Center





Sampling in upper 6 inches of the soil over Years 3-10

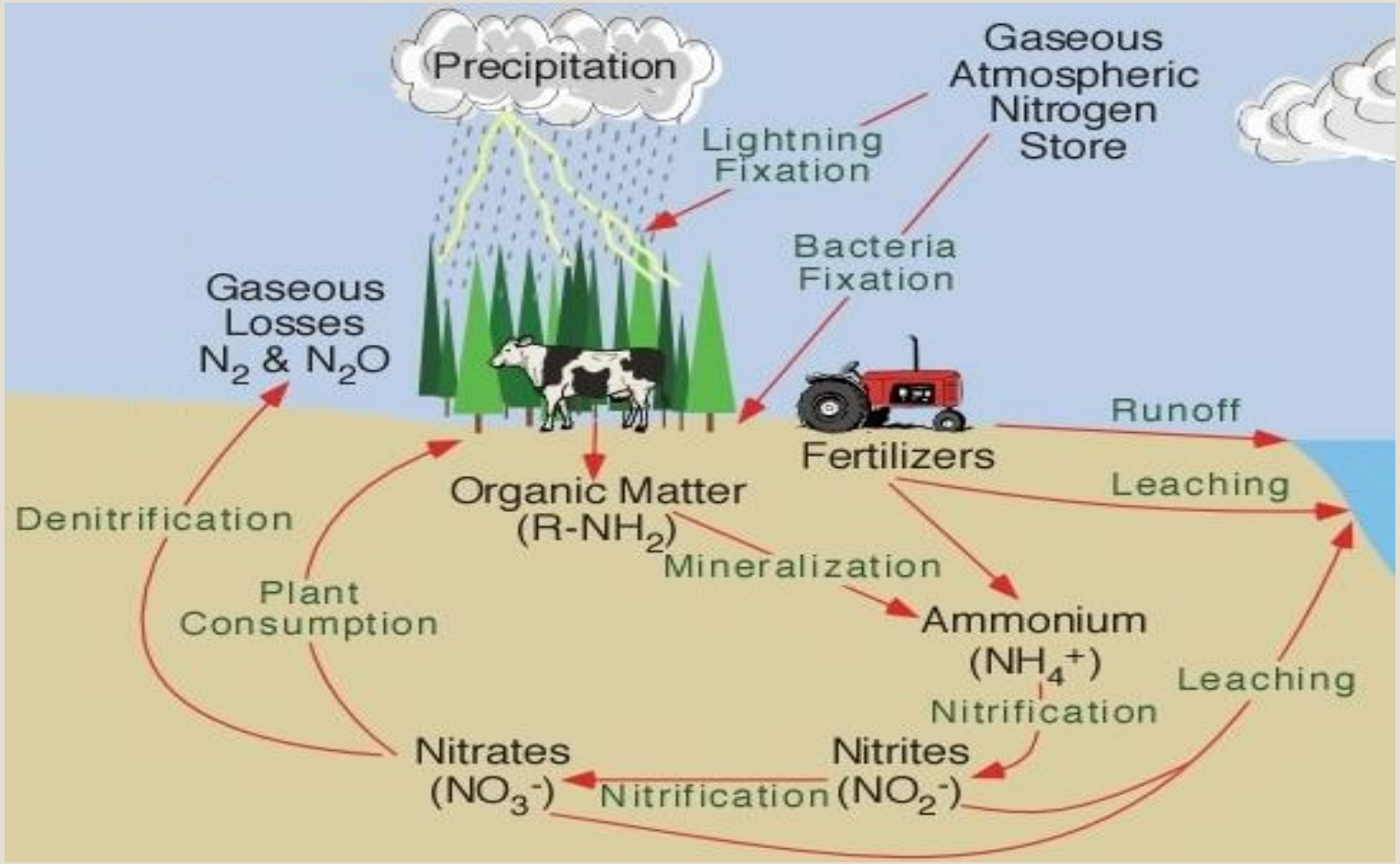
- Annual surface SOC was variable; tendencies confirmed during Year 10, *to right*
- By that time, WOR had apparently affected most of the root zone.
- Results were significant in the upper foot of soil, where wood chips had been incorporated.
- Yields were improved with WOR

Holtz et al., 2018

Jahanzad and Gaudin, 2019

DNDC - Biogeochemical Modelling

De**N**itrification-**D**e**C**omposition Model calculates daily emissions of carbon- and nitrogen-based gases from changes in organic and mineral carbon and nitrogen.



DNDC Model Validation and Predictions of Greenhouse Gases with WOR

Soil Organic Carbon:

Modeled increase with WOR was conservative:

A. In orchard near Fresno, with 60 tons/acre, **3.57-6.7** short tons SOC per acre were seen after 9 years, depending on depth.

B. For that site, the model predicted **2.22** tons of SOC down to 50 cm.

For Projections in Comet Planner:

A. low WOR biomass of 14 dry tons/acre is assumed

B. In the Valley, we can expect 30 dry tons on average in almond.

C. With 14 tons of wood chips, 1.20 tons/acre sequestration is projected over 20 year lifetimes.

Depends in part on crop growth:

DNDC modeled yields were very close to 'Butte' cultivar's average (1917 modeled vs. 1930 average).

DNDC Model Predictions of other GHGs

Nitrous Oxide (N_2O):

- Model predicts increase with WOR, offsetting some CO_2 sequestration.
- There is no research to validate that prediction.
- Two N_2O studies of WOR are currently under way, one as a Healthy Soils Demonstration Project.
- Model's overall N_2O rates are higher than field research indicates.
- Therefore, as for SOC, N_2O predictions favor "conservative" GHG benefit estimates.

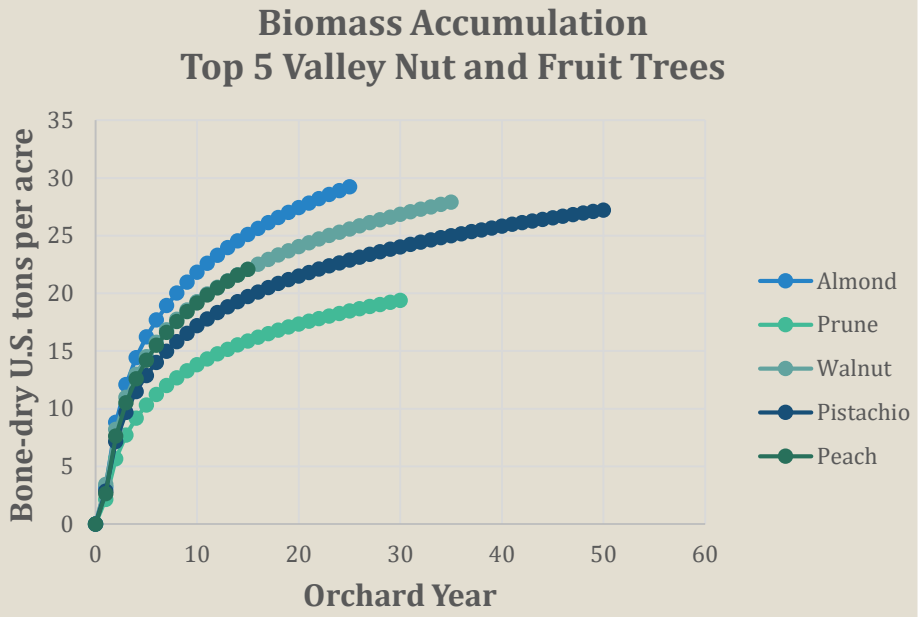
Methane (CH_4):

- Model predicts methane to be consumed at a higher rate with WOR: "good" for GHG benefits.
- Scale of effects is negligible in the model and in field studies.
- No further research expected.

Notwithstanding conservative results, all counties and regions of the State show positive overall Soil GHG impacts with WOR. And it is very unlikely that increased N_2O emissions could be shown to outweigh sequestered CO_2 in future research.

Orchard Age Requirement and Quantification Methodology

- Orchards accumulate approximately ¾ of their final biomass in their first 10 years.*
- At 10 years, prunes estimated at 13.8 dry tons per acre of exportable biomass*: the lowest major crop (*see right*).
- At 10 years, almond orchards expected to have at least 21.80.*
- At 20 years, almond orchards expected to have at least 27.44.*
- ***Therefore***, "**14 tons per acre**" is a conservative estimate of biomass for carbon sequestration, applicable across multiple tree crops.



** Orchard Life Cycle Analysis, Brodt et al., 2015, unpublished results; Co-funded by Calif. Dept. of Food and Agriculture and Almond Board*

Proposed Practice Requirements

Based on analyzed data, modeling parameters and current field practices:

1. ~~WOR can be repeated no more than once every ten years for an APN or field (DNDC modelled conditions).~~WOR can only be incentivized in orchards whose trees are at least 10 years of age (DNDC modelled conditions, to ensure minimum biomass is reached for carbon sequestration).
2. ~~WOR is only to be implemented with new (replanting) tree crops.~~ Following woodchip incorporation, land must be fallowed or replanted with trees within 3 years (consistent with the HSP grant term of 3 years and DNDC modelled conditions).
3. ~~Mature orchards should be chipped in place without exporting chips off-site or to new fields~~. Orchards must be chipped and incorporated in place on the field in which they were grown (for verification and DNDC modelled conditions).
4. The WOR practice shall not be implemented in soils with Soil Organic Matter greater than 20% (DNDC modelled conditions).
5. Chips must be evenly distributed throughout the orchard (consistent with DNDC modelled conditions). If a service provider is contracted, their commitment to spread the wood chips must be in the contract/invoice for verification purposes.
6. Chips must be incorporated into the soil to at least 6 inches depth (DNDC modelled conditions).

Comments Received *available online*

- 5 Organizations
- 6 Individuals or Private Companies
- Publicly available on CDFA Healthy Soils website.

Comments/Questions	Source	Response
Consider allowing leaving fields fallow after incorporation of chipped orchards to allow for land-uses other than production, such as fallowing induced due to Sustainable Groundwater Management Act (SGMA).	Almond Board of California, Almond Alliance of California, CalCAN, CA Farm Bureau Federation, UC Cooperative Extension, Amber Kerr, Evergreen College	Comment evaluated and included in current requirements.
Consider allowing planting of perennial vegetative cover after incorporation of chipped orchards and funding them through HSP funding, such as cover crops, conservation cover or forage and biomass planting.	CalCAN	Practices to establish permanent vegetative cover (e.g. conservation cover) are intended to take land out of production permanently and must not be used where an orchard may be re-planted after a few years. Cover crops do not constitute permanent vegetative cover since agricultural land is not taken out of production. WOR and cover crops can be implemented on the same field. Forage and biomass planting practices only apply in cases of livestock forage or biomass production, not fruit and nut tree crops.
Consider enforcing a minimum number of tons of chips per acre when incentivizing the whole orchard recycling practice.	Amber Kerr, Evergreen College	CDFA has used prunes to define the lowest likely orchard biomass of 14 tons/acre, enforced by requiring 10 years of age in fruit and nut trees for WOR.

Comments Received: Others

Comments/Questions	Source	Response
Allow removal of sick trees.	Amber Kerr, Evergreen College	Management of pests and diseased trees is handled by the grower outside the scope of the HSP practice.
If WOR increases tree growth, higher biomass in trees should be counted as temporary CO_2 sequestration.	Brian Kolodji, Black Swan	*Temporary* carbon sequestration in biomass is not considered in HSP methodology, nor in most agricultural greenhouse gas metrics.
Deeper soil profiles should be modeled in order to capture the full benefits of the practice.	Almond Alliance of California	DNDC modeling considers effects down to 20 inches. Additional science is needed to validate DNDC beyond this depth.
Allow exportation of wood chips above a certain limit of biomass.	Amber Kerr, Evergreen College	CDFA has determined the tree age metric because measuring tonnage and depth on farm is not practical. CDFA has made inquiries and has learned of no cases where up-to-date equipment was unable to incorporate wood chips satisfactorily due to quantity.

Estimated WOR Costs

- 5 operators were consulted.
- Anonymity was assured to operators consulted.
- Quotes describe a 50-acre contract with average almond biomass (30-40 tons/acre).
- Estimated cost of WOR:
  A. Omits “pulling” trees.
  B. Disking cost is *additional* to normal cultivation.
  C. Additional ripping is recommended by some operators with WOR, but was not included in DNDC modeling, and is detrimental to soil carbon sequestration.

County	**Chipping**	**Spreading**	**Disking**	**Estimated Cost**	**Additional Ripping**
Butte	$650 min.	$250	$50	**$950**	advised, $250
San Joaquin	$700	$250 min.	$50	**$1,000**	advised, $100 min.
Stanislaus	$650 min.	$200	$40	**$890**	
Fresno	$750	$200	$50	**$1,000**	
Kern	$650 min.	$180	$50	**$880**	advised, $150 min.
			Average:	**$944**	

USDA NRCS–EQIP payments and recommended Healthy Soils rate

Following recent decisions, Whole Orchard Recycling will be incentivized under NRCS–EQIP, but it does not currently have a practice methodology.

It would be supported as the following practices (2020 costs):

#384: Woody Residue: Chipping and hauling, $231.70/acre

#484: Mulching: Natural Materials, $199.01/acre

***-> OEFI-CDFA recommends incentivizing at double the rate offered by NRCS-EQIP*: 2 x (231.70 + 199.01) = $861.42/acre**

-> Average quote of $944 for almonds discussed previously.

Proposed Practice Requirements

Based on analyzed data, modeling parameters and current field practices:

1. *WOR can only be incentivized in orchards whose trees are at least 10 years of age (DNDC modelled conditions, to ensure minimum biomass is reached for carbon sequestration).*
2. *Following woodchip incorporation, land must be fallowed or replanted with trees within 3 years (consistent with the HSP grant term of 3 years and DNDC modelled conditions).*
3. *Orchards must be chipped and incorporated in place on the field in which they were grown (for verification and DNDC modelled conditions).*
4. The WOR practice shall not be implemented in soils with Soil Organic Matter greater than 20% (DNDC modelled conditions).
5. Chips must be evenly distributed throughout the orchard (consistent with DNDC modelled conditions). If a service provider is contracted, their commitment to spread the wood chips must be in the contract/invoice for verification purposes.
6. Chips must be incorporated into the soil to at least 6 inches depth (DNDC modelled conditions).

Thank you *to our sources*

- Brent Holtz, UC Cooperative Extension
- Emad Jahanzad and Amelie Gaudin, UC Davis Dept. of Land, Air and Water Resources
- Sonja Brodt and Elias Marvinney, Agricultural Sustainability Institute
- Surveyed WOR operators
- Lei Guo of the California Air Resources Board
- Members of the public, and of organizations, who contributed comments...

Written Testimony in Support of
Sec. 2307(c)(7): Soil Health Demonstration Trial

The American Coalition of Ethanol (ACE), Environmental Entrepreneurs (E2), National Corn Growers Association (NCGA), Natural Resources Defense Council (NRDC) and the Minnesota Farmers Union developed the concept and supported inclusion of the Soil Health Demonstration Trial included in Section 2307(c)(7)[1] of the Agriculture Improvement Act of 2018.[2]

We look forward to working with USDA to implement this important tool to encourage farmers to implement practices that improve soil health to increase drought resiliency, improve nutrient utilization, and enhance soil carbon sequestration. As envisioned, the Soil Health Demonstration Trial will advance climate resiliency, conservation, and producer participation in carbon markets by using NRCS incentives and partner assistance to plan, adopt and measure soil conservation practices that sequester carbon and reduce greenhouse gas emissions.

That soil organic carbon (SOC) mitigates climate change is well recognized by policymakers. USDA estimates that U.S. producers store 20 million metric tons of carbon per year, and further estimates that agriculture could potentially store an additional 180 million metric tons per year. These SOC sequestration benefits represent an estimated 12-14% of total U.S. carbon emissions annually. International policymakers similarly recognize these important benefits. In the 2015 Paris U.N. Climate Change Conference negotiators recognized the importance of SOC sequestration in the global response to climate change.

The demonstration trial will leverage federal and state research by providing NRCS conservation incentives to assist willing farmers in a diverse set of states to assess baseline SOC conditions, cost-share practices to improve SOC sequestration, and measure associated sequestration benefits.

Taken together, this demonstration trial will create new opportunities to improve the economic viability of agriculture and create significant co-benefits in soil health, water quality and conservation, habitat, air quality and climate change mitigation.

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[1] ''(7) SOIL HEALTH DEMONSTRATION TRIAL.—Using funds made available to carry out this subsection, the Secretary shall carry out a soil health demonstration trial under which the Secretary coordinates with eligible entities—

''(A) to provide incentives to producers to implement conservation practices that—

''(i) improve soil health;

''(ii) increase carbon levels in the soil; or

''(iii) meet the goals described in clauses (i) and (ii);

''(B) to establish protocols for measuring carbon levels in the soil and testing carbon levels on land where conservation practices described in subparagraph (A) were applied to evaluate gains in soil health as a result of the practices implemented by the producers in the soil health demonstration trial; and

''(C)(i) not later than September 30, 2020, to initiate a study regarding changes in soil health and, if feasible, economic outcomes, generated as a result of the conservation practices described in subparagraph (A) that were applied by producers through the soil health demonstration trial; and

''(ii) to submit to the Committee on Agriculture of the House of Representatives and the Committee on Agri- culture, Nutrition, and Forestry of the Senate annual reports on the progress and results of the study under clause (i).

[2] See attached support statement from July 16, 2018.

Specifically, we worked with our champions in Congress to include this demonstration trial in order to provide economic assistance to farmers to establish a SOC baseline, incentives to adopt conservation crop and soil management practices that sequester SOC, and economic assistance to complete full soil profile SOC measurement after practices have been instituted. Expanding practice adoption will accomplish NRCS national objectives of improving soil health, water quality, water quantity, air quality, habitat, energy and climate resiliency. By providing producers with financial assistance to document the changes in soil carbon sequestration, this trial will help quantify the SOC sequestration benefits for the project area, facilitate extrapolation over a larger region, and establish the necessary predicates for lucrative producer access to mandated low carbon fuel (LCF) markets (*e.g.,* CA, OR) and voluntary carbon markets.

This demonstration trial can help provide the scientific foundation for demonstrating the carbon sequestration benefits of crops under various conservation tillage and soil health practices and facilitate greater adoption of conservation tillage and soil health practices using low carbon markets as the driver.

The trial would also provide valuable information to USDA's Rapid Assessment of U.S. Soil Carbon (RaCA). This program was created by USDA-NRCS Soil Science Division in 2010 to develop quantitative estimates of distribution of carbon stocks for the nation's soils under different land cover and agricultural management practices. It is also designed to provide data to support models of soil carbon changes based upon land use and conservation practice changes. The demonstration trial can provide valuable data to RaCA through its focus on measuring existing SOC, extending agricultural management practices that would sequester carbon, and measuring and extrapolating the benefits of those practices.

The vision behind this provision of the Farm Bill is to facilitate the continued development of a Soil Organic Carbon Conservation Activity Plan (SOC CAP) embodying carbon sequestration measurement and modeling protocols accepted by climate market validators. Under the SOC CAP, producers would partner with NRCS to set SOC baselines, continue to refine recommended soil health practices that producers would be incented to adopt under existing EQIP practice codes, and measure SOC gains after deployment of these practices. We want to work with NRCS to develop ranking and scoring criteria reflecting NRCS's Greenhouse Gas and Carbon Sequestration Ranking Tool, prioritizing EQIP practice codes which score in the highest two sections of the tool (*e.g.*, delivering the best SOC benefits).

We look forward to working with NRCS to conduct producer outreach, the development of the SOC CAP and associated payment schedule, and the ranking/scoring criteria for those SOC CAPs. Further, per Congressional instruction, we look forward to working with NRCS to conduct a study regarding changes in soil health and economic outcomes generated as a result of the conservation practices incentivized by this provision.

Certified B Corporation

This company meets the highest standards of social and environmental impact

LOCUS®

AGRICULTURAL SOLUTIONS

January 2020

This company works to directly impact the following UN Sustainability Goals

Problem: The World is Facing a Climate Emergency

13 CLIMATE ACTION

CLIMATE ACTION: WHY IT MATTERS

What's the goal here?

Taking urgent action to tackle climate change and its impacts.

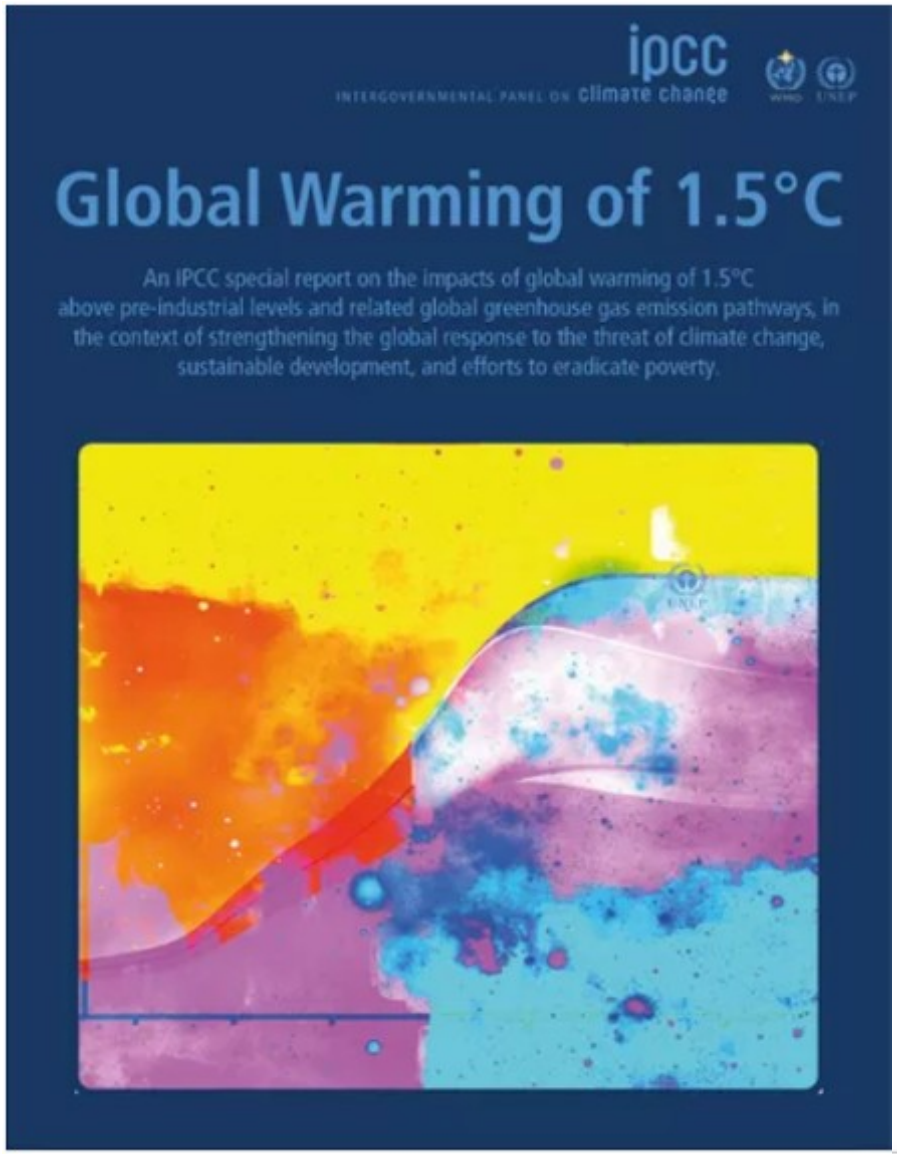
Why?

As greenhouse gas levels continue to climb, climate change is occurring at much higher rates than anticipated, and its effects are evident worldwide. By addressing climate change, we can build a sustainable world for everyone. But we need to act now.

Are people's lives really being affected by climate change?

Yes. Severe weather and rising sea levels are affecting people and their property in developed and developing countries. From a small farmer in the Philippines to a businessman in London, climate change is affecting everyone, especially the poor and vulnerable, as well as marginalized groups like women, children, and the elderly.

To limit global warming to 1.5°C, global carbon emissions need to fall by a staggering 45 per cent by 2030 from 2010 levels

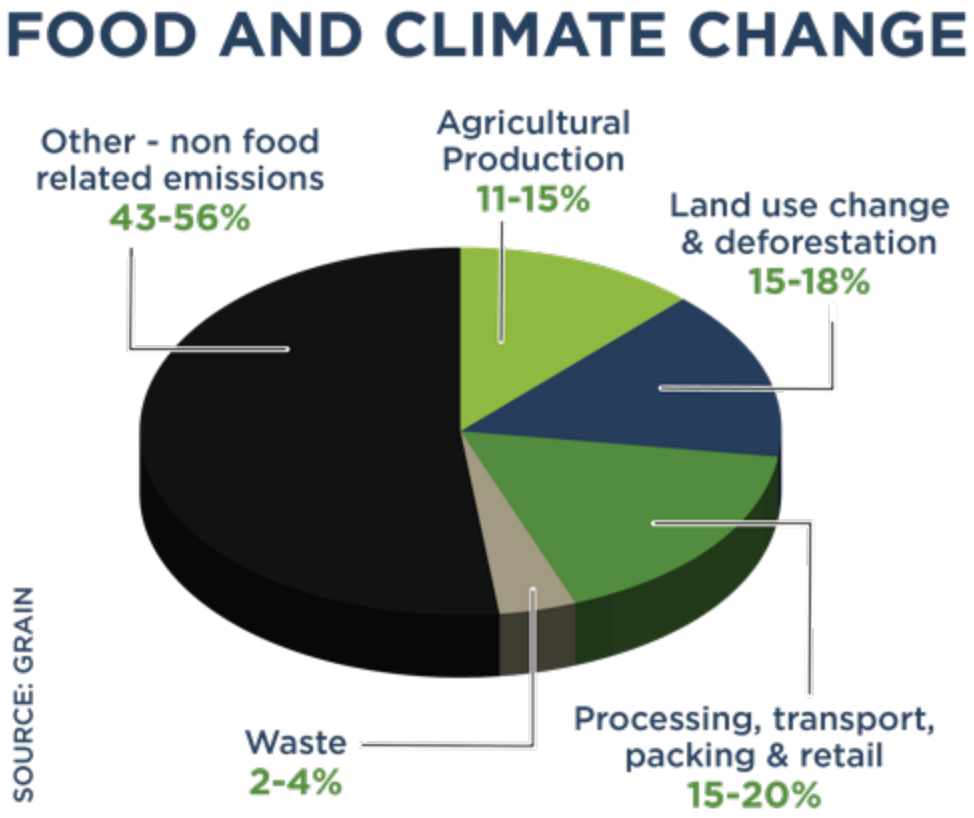


Over 20 countries have committed being net zero by 2050 but have no path to it. Most new technologies in development aim to mitigate future emissions, but do not remove carbon already in the atmosphere.

The 2019 UN Environment Program states that if <u>emissions can be reduced by 7.6% annually</u>, the world can avoid going over the 1.5°C global temperature increase threshold level.

Recognizing Agriculture as Part of the Problem

Industrial agriculture causes between 11-33% of global greenhouse gas (GHG) emissions

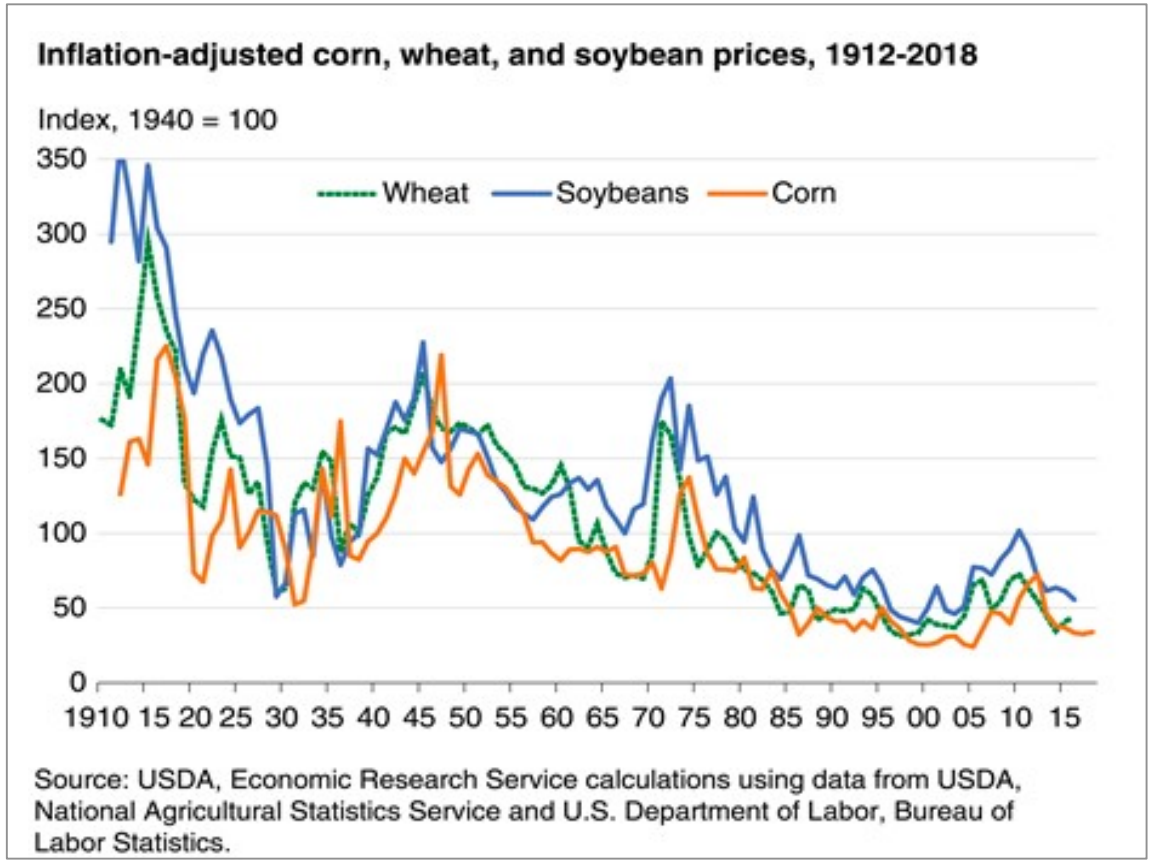


- The UN estimates[1] that almost all fertile topsoil will be lost due to industrial agriculture
- Regenerative agricultural practices, such as minimum tillage and cover cropping, can help put carbon back into the soil at rates of 0.2-0.5 tons per acre annually[2]

[1]https://www.scientificamerican.com/article/only-60-years-of-farming-left-if-soil-degradation-continues/ [2]Rodale Institute

Farmers Barely Make Ends Meet, Making Change More Difficult

While cost rises, produce prices remain depressed. Climate change effects, such as increasingly unpredictable weather patterns, add to these challenges



Agriculture Is Also Part of the Solution

What If It Were Possible…

..to substantially reduce agriculture's carbon footprint?

..for farmers to grow more with less, improving their bottom-lines as well as the health of their soils?

..for farmers to be secure against weather changes?

Locus AG is Working to Accomplish All of This and More

Rhizolizer® Soil “Probiotic” Technology

Locus Ag working to grow more food on less land, fight climate change AND reduce the use of chemical inputs TODAY on a worldwide basis

- **10%+ reduced fertilizer inputs without impacting yields**
  Money to farmer, reduction in carbon intensity, improved soil health
- **75%+ reduction in soil nitrous oxide emissions**
  One of the key contributors to global warming
- **Initial data to support up to 9 tons of carbon sequestered/acre annually**
  Working with recognized third parties to validate, determine variability and assess permanence to contribute to negative-carbon food and fuel when combined with other sustainability practices
- **OMRI and California OIM certified treatments fully compatible with grower practice**
  Cost-effective and easy to apply. Registered in 42 States.
- **Significant yield increases to incentivize farmers**
  Across most crops, soil types and geographies

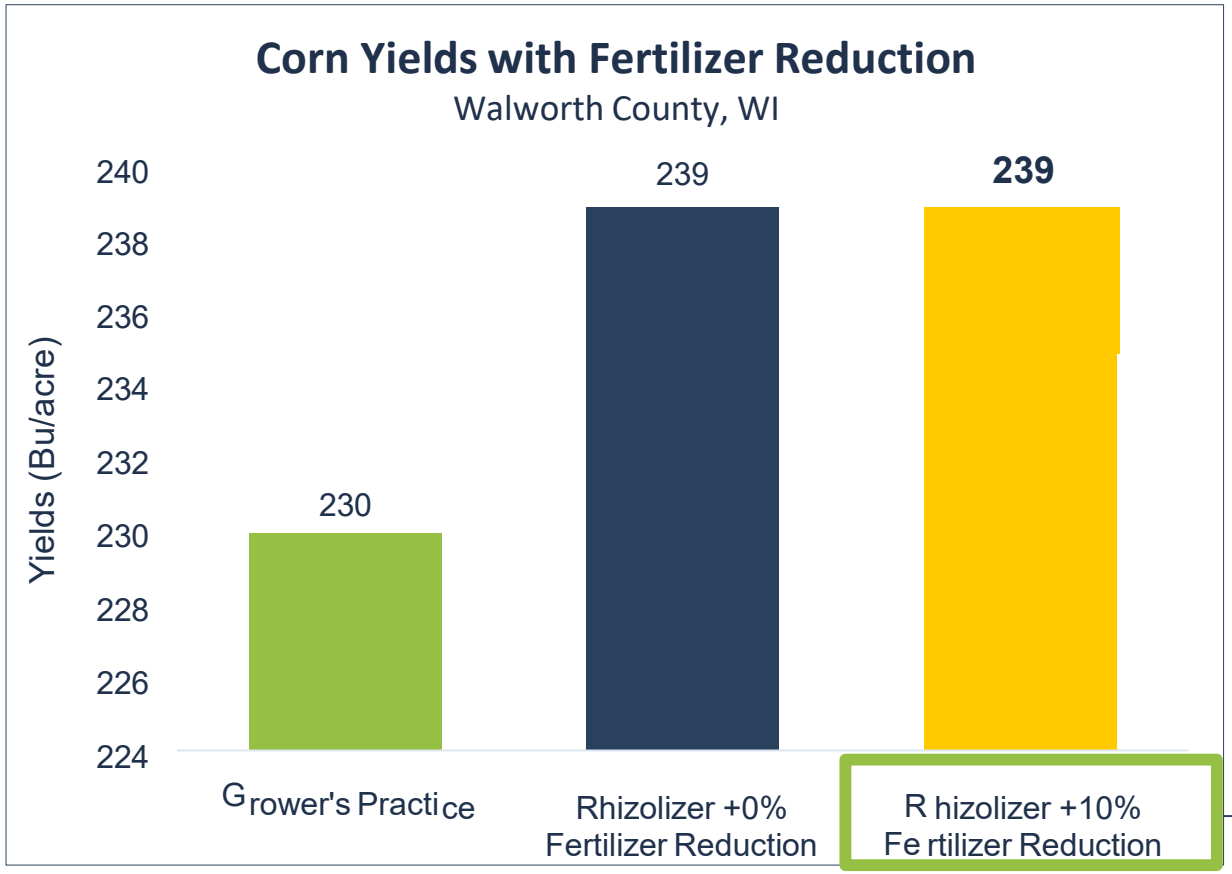
Typical Agronomic Results

Crop yield increases up to:

- 42% Cantaloupe
- 34% Citrus
- 10% Corn
- 14% Cotton
- 31% Peanuts
- 31% Potatoes
- 17% Sod
- 21% Strawberries
- 18% Apples
- 40% Tomatoes
- 20% Watermelon

Yield Increases with Reduction in Fertilizer Inputs

Fertilizer inputs add to the carbon intensity of agriculture



Growers in numerous crops have **reduced NPK fertilizer by 10%-50% on their own** after the second year of treatments without impacting yield

Reduction in fertilizer use directly impacts **downstream water bodies**

A 10% reduction in fertilizer use (without including yield increases) approximates to savings of $15-$20/acre for a corn farmer who averages between $40-$75/acre in profitability

Increasing Root Mass: The Key to Superior Results

Sod/Turf Grass

Grower's Practice | **Rhizolizer**

Strawberries

Grower's Practice | **Rhizolizer**

Up to 150%+ additional root mass, with more fibrous and brace roots

Corn

Grower's Practice | **Rhizolizer**

Rhizolizer

Earth worms are indicators of healthy soil

Soybean

Grower's Practice

Rhizolizer

And significantly higher nodulation

Rhizolizer: A Multitude of Benefits

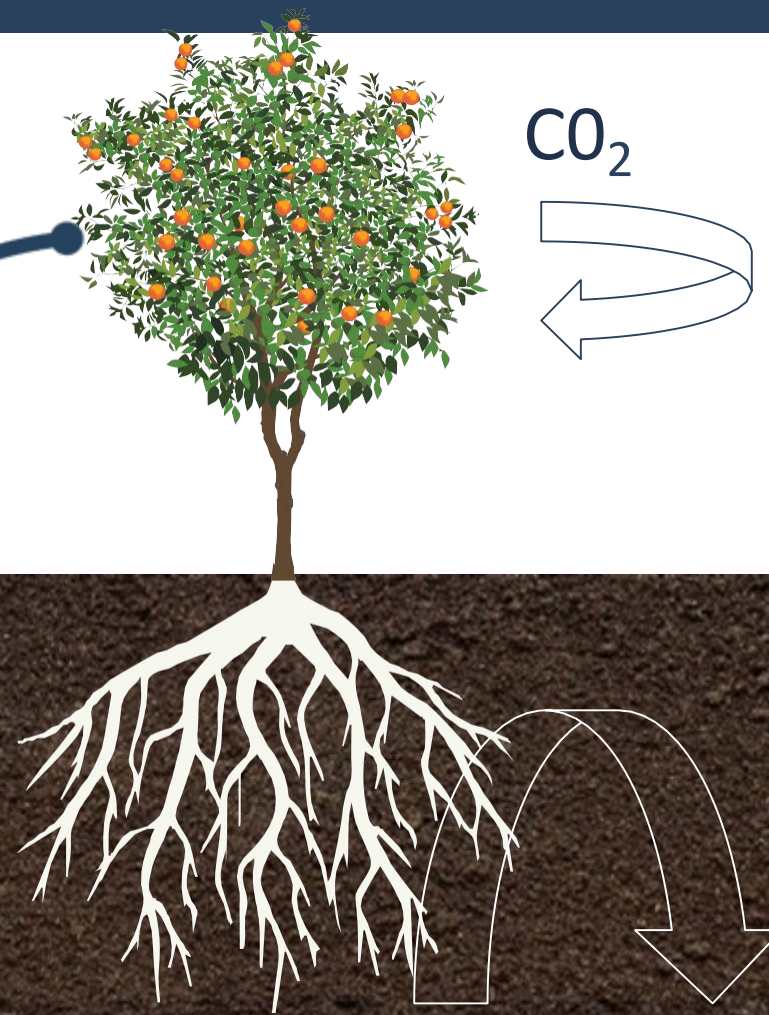
Greater Canopy Vigor and Crop Quality

Optimized Productivity

Increased Root Mass and Stress Tolerance

Enhanced Nutrient Uptake

Improved Soil Health and Carbon Sequestration



Pathway to Reduction in Carbon Intensity

Ethanol Plants through Locus Technology can Start Reducing the Carbon Intensity of Input Streams

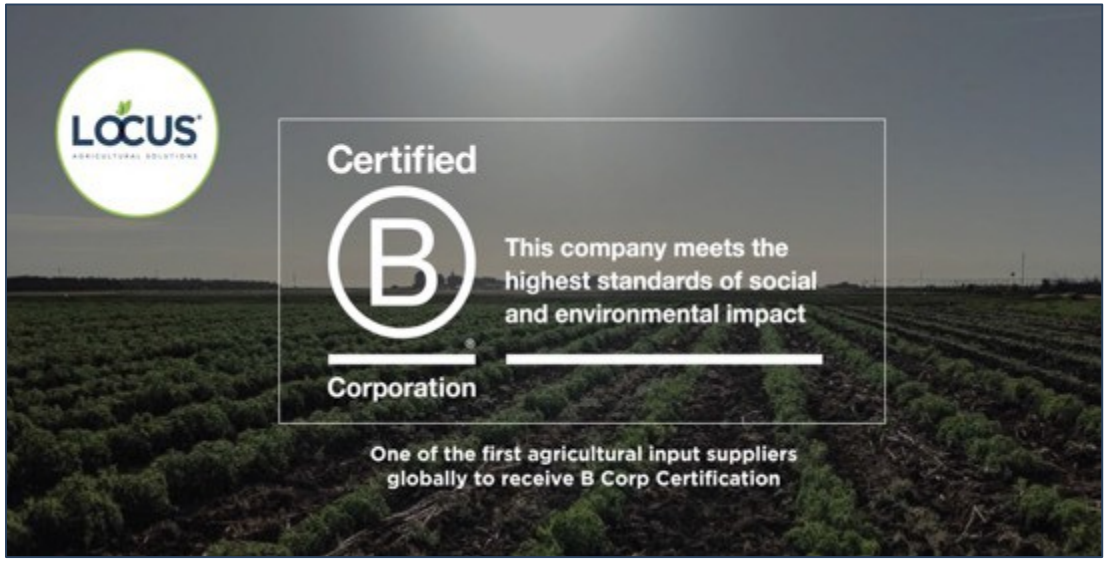
Partnering with ethanol plants to treat the acres feeding into them with Rhizolizer

Impact Realization Milestone Progression

Immediate:	At Harvest:	2-3 Years:	4-5 Years:
• Lower fertilizer usage immediately, starting with a 10% reduction, without negatively impacting yields	• Increased yields in-spite of lower fertilizer inputs (typically 5% in corn and soybeans)	• Work with low carbon authorities to adopt protocols to show substantial ongoing reductions in soil N_20 emissions (60-85%) following the application	• Work with low carbon authorities to adopt protocols to show consistent carbon sequestration (most applicable to strip-till, no-till and conservation tillage farms) and help growers to

Industry Recognition

Invited Panelist at UN Climate Change Conference, Madrid 2019



…..for what was only commercialized in January 2018

More Cutting-Edge Products in Development to Replace Chemicals

In Commercial Trials

Soil amendments to improve phosphorous uptake from soils that also sequesters carbon

- Reducing phosphorous fertilizer use
- Phosphorous run-off is a key enabler of algae blooms

Bio-pesticides to replace more toxic chemical pesticides

- Help farmers, even in more difficult geographies transition to regenerative and organic farming

Reduce soil salinity and improve water use efficiency

- Unique byproducts of non-GMO microorganisms that reduce water use and wash out salts from soil profile - increasing yields for farmers

Carbon-Focused Partnerships: Gevo

GEVO is trialing Locus AG's probiotics and their potential to produce corn-based "carbon negative" jet fuel

Gevo Begins Field Trials To Amplify Soil Carbon Sequestration Using Locus AG "Probiotics"

ENGLEWOOD, Colorado (July 31, 2019) Gevo, Inc. (NASDAQ: GEVO) announces a partnership with Locus Agricultural Solutions® (Locus AG) to trial a new technology, developed by Locus AG, that is expected to improve capture of soil carbon, reduce applied nitrogen fertilizer needs and improve yield. Locus AG's Rhizolizer® is a line of fresh, non-GMO soil "probiotic" treatments which are produced from proven microorganisms and tailored to meet the needs of local farmers. Rhizolizer has been used to treat 40,000 commercial agriculture acres across several crops, with positive results in improving crop productivity, crop quality, vigor and sustainability. Treatments are now being tested on Gevo's 30-acre farm co-located at its Luverne, MN facility.

https://locusag.com/gevo-begins-field-trials-to-amplify-soil-carbon-sequestration-using-locus-ag-probiotics/

Leadership Team

Andrew Lefkowitz
Founder, Chairman

Responsible for building all Locus businesses. Previous co-founder & Chairman of Ganeden Biotech, Inc., the premier probiotic supplier in the U.S., where he was responsible for driving overall performance, strategic direction, and shareholder value

EY Entrepreneur Of The Year
2019 Award Winner

Sean Farmer
Founder & Chief Scientific Officer

Responsible for envisioning and developing research capabilities, scientific products, and intellectual property (currently over 135 issued patents). Previous co-founder & Chief Scientific Officer of Ganeden Biotech, Inc., and responsible for the discovery of best-in- class oral and topical probiotics

Dr. Kenneth Alibek
Senior Vice President, R&D

Former lead scientific administrator of the Soviet Union's biological R&D program, supervising 32 facilities and 40,000 administrators and awarded Barkley Medal in 1994 for his public service and contributions to world peace

Don Sweeney
Chief Financial Officer

Certified Public Accountant and responsible for the reporting and accounting functions at all Locus companies

Paul Zorner
Chief Agronomist

40+ years of experience in global agricultural product development, operations and investment with 35 issued U.S. patents. Is an adjunct Professor of Horticulture and first U.S. citizen to be named a Queensland Champion

Karthik Karathur
President

Designated with building the low-carbon business platform for Locus AG. Instrumental in launching Locus Bio-Energy, an affiliate of Locus AG, into a high-growth business. Management consultant by background with McKinsey & Company

Alex Fotsch
Vice President – Field Operations

Responsible for the development of Locus AG's field testing program and agricultural business plan. 2019 AgGrad and Forbes 30 Under 30 recognition. Elected delegate to the Roundtable for Sustainable Biomaterials

Supported by 17 experienced scientists from around the world

Locus AG – Key Advisors

David Kolsrud
24 years of proven experience in the renewable energy industries and an active member of E2. Currently on the board of Badger State Ethanol

Jerry Lynch
Served in leadership capacities of numerous stakeholder initiatives including co-chair of the Board of Trustees of the Keystone Policy Center

Tony Michaels
Former Chief Executive Officer and Board Member at Midwestern BioAg and respected leader in the study of nutrient cycling at local and global scales

Founders' Proven Track Record

Probiotic Experience

- Co-founders previously built **Ganeden, Inc.** into the leading science- and IP-based probiotic supplier globally
- **135 patents issued; 27 studies published in peer reviewed journals, 3 ingredients approved by FDA for safety, first probiotic certified as non-GMO** and meets US Pharmacopeia standards, including the first spore-former approved in China and India
- **GanedenBC$^{30®}$,** Ganeden's main product is now present in over **1,000 products on sale in over 60 countries**

- Ganeden sold its OTC brands to a portfolio company of TPG in 2011 for **3.0x revenue** in a process run by Houlihan Lokey
- Ganeden sold the business in 2017 to Kerry Holdings for **7.7x Revenue** and 24x EBITDA, in a process run by Rothschild; achieved historic multiples in the food and beverage ingredients sector

Certified B Corporation

This company meets the highest standards of social and environmental impact

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02.07.19 | WORLD CHANGING IDEAS

These probiotics for plants help farms suck up extra carbon dioxide

A mix of fungi and bacteria added to the soil makes agriculture more productive–and helps stop climate change.

BY ADELE PETERS 3 MINUTE READ

On thousands of acres of orange groves in Florida, farmers are adding beneficial fungi and bacteria to the soil, which makes the oranges grow bigger and sweeter–and makes the soil suck up enough extra CO_2 so that each acre offsets the emissions from a passenger car. Call it probiotics for soil.

"Agricultural soils are one of the world's largest carbon sinks," says Paul Zorner, CEO of Locus Agricultural Solutions, the startup that makes the particular combination of probiotics in use on the farms. "If they're treated right, you're going to absorb a lot of carbon dioxide out of the atmosphere."

Unlike the ocean, which has absorbed the brunt of human emissions so far–becoming more acidic and hotter and threatening marine life as that happens–soil can benefit from extra carbon. "Soil is the exact opposite," Zorner says. "Soil actually enriches its productivity when you're sequestering carbon, and so the soil and crop and ultimately the growers benefit by sucking as much CO_2 from the atmosphere to the plant into the soil as possible."

When plants take up CO_2 during photosynthesis, creating sugar that they use for growth, they also release sugars through their roots, attracting microbes. Healthy soil is full of these microbes, which then keep the carbon in the ground. But conventional farming–including the overapplication of chemical fertilizer–has destroyed the microbial balance. Adding "probiotics" helps restore it.

Other companies also sell microbes, though Locus is selling a particular combination (*Trichoderma harzianum*, a beneficial fungus, and *Bacillus amyloliquefaciens*, a beneficial bacteria) and using a unique production system that delivers the microbes fresh and at a high density. "We decided to create what I often refer to as a microbrewery for agriculture, where we build facilities that are local," Zorner says.

The facilities are smaller than a beer brewery; the fermentation devices are small, and in a space roughly the size of a conference room, the company can produce enough of its product for 30,000 acres of farms a month. The microbes are applied while the field is irrigated or just spread on the surface. The first production system is in Cleveland, though the company plans to begin building them locally near farms across the country. "One of the key features of this local microbrewery is we can actually optimize for local conditions–soil type, crop, temperature, a whole variety of things–where we can work with individual growers to better understand how to solve their specific problems, as opposed to just having one product that would be used the same, regardless of where in the country you're trying to operate," he says. Eventually, it could also be produced in parts of the developing world. "It's a system that could be shipped in a boxcar and set up relatively easily, as long as you have a basic power source."

The company started working in Florida, where it's currently being used on 32,000 acres, because of the particular challenges of citrus growers, who have been struggling with massive drops in production due to citrus diseases and hurricanes. The product, called "Rhizolizer," increases production; on one 38-acre orange grove where the company tested it last year, the grove saw a 14% increase in yields by weight. Other tests showed that it increases "brix," a measure of sweetness, in fruit like oranges and strawberries. For farmers, the immediate benefit may be better sales. But there are longer-term benefits for the climate. In another 2018 test at a different Florida orange grove, the part of the farm treated with the product took up an extra 4.38 metric tons of CO_2 per acre. Farmers could eventually be paid in the form of carbon credits for making the change; Locus is working on the first steps to try to make it possible to sell this service in carbon markets.

"I think people are really waking up to the fact that agricultural soils really are a remarkable part of the solution [to climate change]," says Zorner. "We need to empower growers to do this."

Our natural and sustainable "probiotic" trend is gaining national awareness and rapid adoption across a variety of audiences.

https://www.fastcompany.com/90303108/these-probiotics-for-plants-help-farms-suck-up-extra-carbon-dioxide

National Publicity: AgFunder

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Sunrise in soybean field, sunlight beaming through the leaves of small green young plants of soya

If we really want to sequester more carbon, agriculture can't be made the enemy, says microbial input startup Locus

August 19, 2019 Lauren Stine

Last week, the Intergovernmental Panel on Climate Change (IPCC) released a report stressing the importance of land management in the ongoing battle to fight climate change. Through deforestation, general human activities, and agriculture, 70% of the Earth's land surface has been altered, it states, adding to climate-warming emissions and making it more difficult for forests and other ecosystems to store greenhouse gases.

"The report basically concludes that land management is critical, including agricultural lands, forestry, pasture, horticulture, homeowners' lawns. These sources can emit carbon as well as methane and nitrous oxide, but they can be a sink for carbon," Paul Zorner, CEO of agtech startup Locus AG, tells *AFN*. "At this point in time, we are still realizing a net benefit through the forests and lands we have, but intensive agriculture is still a serious concern because if you don't have the right practices like cover crops, minimum tillage - practices generally referred to as regenerative - the land will emit more carbon than it can absorb."

Carbon sequestration is a phrase that's becoming commonplace in the media, in food policy circles, and more recently around the dinner table. Put simply, Zorner says, carbon sequestration describes the process that plants use to absorb carbon from the air through photosynthesis, convert it to sugars that are used to create plant structural materials. Roughly 30% of the sugars are secreted into the soil surrounding to feed the plant microbiome. The microbiome surrounding the plant is just as important to the plant's health and vitality as the human microbiome is to gut health.

As the microbes turn over or produce secretions, their bodies and secretions accumulate as organic matter and that contributes to a significant portion of organic matter in soil. The more organic matter in the soil, the healthier it will be. Healthy soil often resembles cottage cheese in texture, while degraded soil often feels dry and sandy.

Conventional farming practices like tilling disrupt this process, turning over the first foot of soil in most cases. This destroys microbial communities and releases carbon back into the atmosphere.

"We'd be better off if we didn't disturb the soil," Zorner says. "My view is that the way we are farming today is different than the way we farmed 50 years ago. People are beginning to appreciate that regenerative practices are important not only for carbon sequestration but for water conservation and minimizing soil erosion, too."

Locus Ag recently released data showing that its microbial soil amendment product Rhizolizer helps treated plots pull up 121% more carbon into the soil than non-treated plots within a year, which is the largest impact any soil carbon tool as had to date according to the startup. The product also increases yields by as much as 43% for 25 crops.

The organic-certified product enhances the soil microbiome, maximizing root growth and foliar canopy, improving nutrient uptake and ultimately supercharging photosynthesis.

But distributing a living organism through existing supply chain channels presents a challenging feat for biologics startups.

"When you ship living organisms in an extended supply chain that consists of nine to 12-months of hot loading docks and inconsistent storage temps, it's difficult. You wouldn't take a cup of yogurt, set it on the porch, and eat it nine months later," Zorner explains. "We brew in a modular, small-scale, high-concentration fermenter, which is highly cost-effective. Our product is so concentrated that 3-ounces per acre is all that's needed. Other microbial products might need a half-gallon to a gallon per acre, which could mean 1,000 gallons if you are treating 1,000 acres."

The company plans to scale by constructing regional centers in key locations, which will further enable it to optimize concentrations for the specific needs of farmers in each region. For now, Locus is working with large growers and has developed distribution partnerships throughout the country. It has registrations in 40 states and hopes to expand into a variety of other products including a yeast-based product coming this fall, products targeting phosphate and potassium levels in cropping, and biopesticides.

It also hopes to provide farmers with a new source of income down the road by helping them get paid to sequester more carbon in the carbon credit market through a program called CarbonNOW.

A similar initiative is popping up in the livestock world. The Western Sustainability Exchange partnered with a number of stakeholders to help farmers who adopt rotational grazing management practices find a way to sell carbon credits. Rotational grazing - also referred to as mob grazing, management intensive grazing, and holistic grazing - involves limiting cattle's access to pasture so that they graze an area more

Although the IPCC points to transportation and fossil fuel emissions as the main areas where incremental improvements need to be made, in the ongoing conversation surrounding agriculture's impact on climate change stakeholders increasingly point to livestock as the primary culprit. The dialogue buoys many marketing claims from Silicon Valley darlings Beyond Meat and Impossible Foods, who are touting their plant-based protein alternatives to meat as the way to solve climate change.

"The way our product works is by making the microbiome more complete. Think about grass-fed cattle and all the manure that they deposit back onto the grass full of bacteria and microbes," Zorner explains. "This feeds the plants and as the plants increase chlorophyll density, you increase photosynthesis, which increases fibrous root mass, which allows it to pump even more carbon into the soil and feed a lot more microbes. If you have more microbes in the soil, you have more carbon sequestration."

Grass performs better and grows more consistently when it's mowed compared to being left idle, he adds, often resulting in a weedy mess that stops growing at a certain point.

Biologics are a controversial and hotly debated new category of inputs among farmers. As Zorner notes, some refer to the new category of inputs as "inconsistent at best, snake oil at worst." When approaching growers, he often begins by asking how many of them are serious skeptics about biologics potential.

In general, farmers have come under increasing scrutiny in the debate about reducing climate change. As the IPCC report highlights and Zorner underscores, however, farmers are one of our first lines of defense in the battle to put more carbon back in the ground.

"Agriculture is not the enemy here. Growers are stewards of the land. What drives them first is profitability, but they also want to be environmentally sustainable. So let's understand the biology, how these processes work and give them tools to help them be even better stewards," Zorner says. "What usually ends up happening in the process is that more sustainability means better yields, and better yields means more profit."

"…So let's understand the biology, how these processes work and give them (growers) tools to help them be even better stewards," Zorner says.

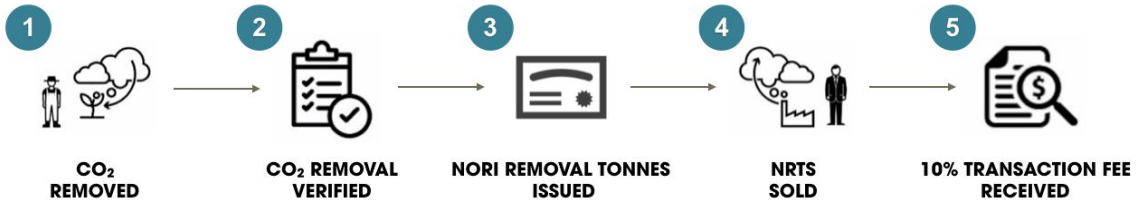
"What usually ends up happening in the process is that more sustainability means better yields, and better yields means more profit."

https://agfundernews.com/if-we-really-want-to-sequester-more-carbon-agriculture-cant-be-made-the-enemy-says-microbial-input-startup-locus.html

Nori Carbon Removal Marketplace

Nori's platform makes it straightforward for anyone to pay farmers for storing carbon in their soils. Nori's two-sided marketplace is a scalable incentive system to quantify and verify increases in soil carbon. Nori's platform integrates directly with COMET-Farm, a US Department of Agriculture tool to estimate increases in soil organic carbon, and relies on NRCS to advance standardized systems for additionality. We make it simple for companies and individuals to pay farmers to restore their soil health and pull carbon dioxide out of the air. Through our platform, farmers can sell NRTs—Nori Carbon Removal Tonnes—a digital carbon asset that represents one tonne of CO_2 removed.

The Nori marketplace makes it as simple as possible for anyone to pay farmers for storing carbon in their soil.



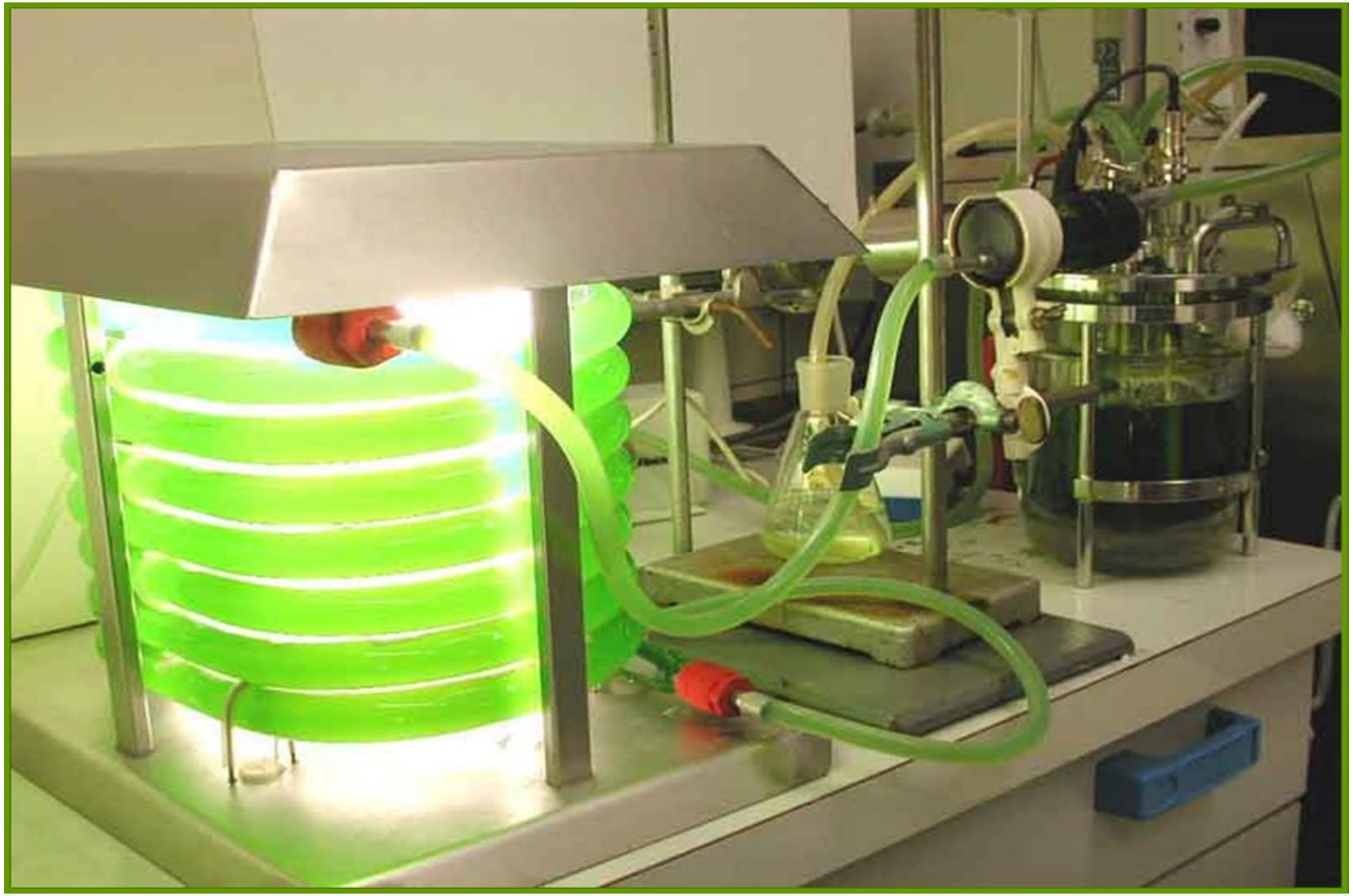
What is the opportunity with Nori over the winter of 2020?

Row crop farmers managing at least 1,000 acres in the US and who made a switch in your farming since 2010 known to increase carbon in your soils, including, but not limited to: changing or expanding crop rotations/cropping intensity, introducing cover crops, reducing tillage events/intensity, and/or substituting synthetic fertilizers with organic matter additions, qualify and potentially sell up to **5 years' worth of grandfathered NRTs.**

Visit https://nori.com/resources to learn more and contact us at pilot@nori.com

January 21, 2020

UNPRECEDENTED OPPORTUNITY: A THOUGHT EXPERIMENT



IMAGINE IF THERE WAS A SCIENTIFIC BREAKTHROUGH: A FUEL ADDITIVE THAT ALLOWED US TO BURN FOSSIL FUELS WITH NO EMISSIONS…

In fact what if the magical new additive converted atmospheric emissions to power the engine…

CARBON FARMING IS THE BIG NEWS WE NEED ON CLIMATE

"A mere 2% increase in the carbon content of the planet's soils could offset 100% of all greenhouse gas emissions going into the atmosphere."

—Dr. Rattan Lal, Ohio State University

The Washington Post

Business

The new plan to remove a trillion tons of carbon dioxide from the atmosphere: Bury it

To reduce emissions by 1 trillion tons and lower global temperatures by 2050, society must invest $28 trillion in climate solutions ranging from renewable energy to carbon farming. This is equal 1% of GDP for 30 years.

Carbon Farming offers $30 of public benefit per dollar invested—over 10 times the benefit of all other climate solutions.

—Drawdown.org

The Concept

Healthy Soils Program

PFI/Restore CA work in parallel to HSP to distribute funds to projects across the state

A California Food Economy Rooted in Healthy Soil

ZFP members & diners voluntarily contribute to Restore CA Fund

Producers & growers provide ecosystem services, marketing to restaurants

Why the Restaurant Industry

- **Big Economic Footprint**: Restaurant industry is a $97 billion industry in CA, more than agriculture and retail grocery; food service sector accounts for 10% of the CA workforce
- **History of California Cuisine**: Chez Panisse transformed “Organic” from a niche lifestyle choice to mainstream culinary and economic value in California and beyond
- **An Influential Voice with Consumers**: Restaurants are a critical liaison between producers and consumers, as educators, marketers, and brokers; they tell the story of California food to locals and visitors alike
- **Highly Motivated, But Poorly Situated**: Like producers, restaurants are deeply affected by climate change, but are not set up to make a difference on their own
- **A Solution Created By, and With, the Industry**: PFI has a 5-year track record of helping restaurants understand their impact through life cycle assessments; ZFP’s 1% surcharge model adds value to restaurants, producers, diners and the entire food system

The Restore California Process

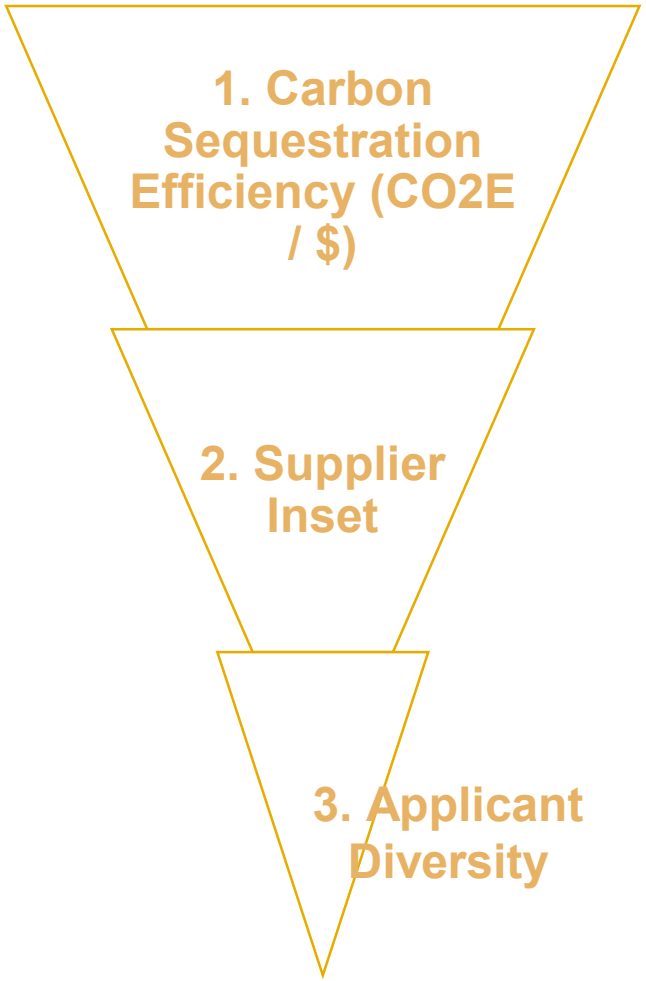
Outreach channels:
- Past HSP applicants(?)
- Existing CFPs via RCDs
- Restaurant suppliers
- Broad PR/media

- Only HSP-eligible on-farm projects
- Producers name price in competitive bidding process
- Initial review by RCD
- Applications ranked based on COMET model and other supporting criteria*

- Awardee enters into contract with PFI
- Funding is received upfront

- Awardees/RCDs report on project implementation
- PFI to undertake marketing efforts to promote funded projects and producers (e.g., impact reports, case studies, media outreach)

Restore California Scoring Matrix



- Applications will be **ranked** according to carbon sequestration efficiency, based on COMET model
- Applicants supplying ZFP member restaurants AND in the top 50% of COMET-ranked applications are **approved**
- Applicants that demonstrate geographic, product, practice, and/or demographic diversity are **prioritized**

EXAMPLE: **500 Total Applications**

1. RANKED:
1
2
…/…
500

2. APPROVED:
1
2
…/…
51
…/…
250

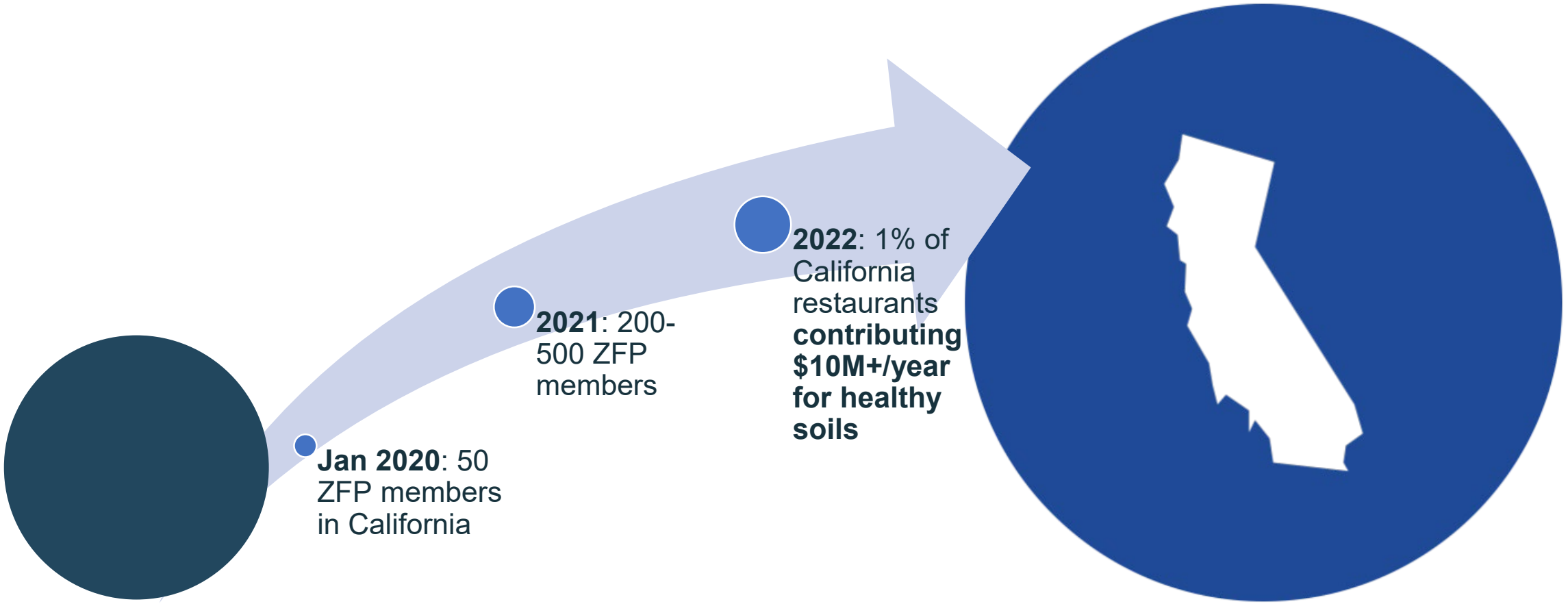
3. PRIORITIZED:
1
…/…
18
…/…
67
68
…/…
480

Moves up 10% (48 / 480 remaining applications) to #20

Key Milestones

Jan 1	**Distribute Restore CA application to RCDs**; begin collecting 1% from pre-recruited ZFP member restaurants
Jan 13	Soft launch party in LA
Jan 20	**Restore CA begins accepting applications for Q1 funds**
Jan 22-30	SF Restaurant Week, collecting 1% on pre-fixe meals
Jan 22	Press Conference with GGRA
Feb 4	Soft launch party in SF
Mar 4	PFI-CDFA talk at UC Berkeley (w/ Karen Ross, Anthony Myint, and Karen Leibowitz)
Mar 31	**Application period closes**; PFI begins initial review
Apr	PFI completes final review and makes funding decisions
Early May	**Announce selected projects; Launch Parties!**
Ongoing	Applications will be reviewed on a quarterly basis following a similar timeline

Recruiting ZFP Members in California



UNF%CK THE PLANET

Restaurants are leading the way on climate.

By joining Zero Foodprint, restaurants become part of the solution.

CA & BEYOND: ZERO FOODPRINT RESTAURANTS (Jan. 8)

CA Currently Paying

Atelier Crenn
Bamboo Sushi
benu
Cala
Central Kitchen
Chez Panisse
Creator
Douglas
Fig & Thistle
flour + water
flour + water pizzeria
Great Gold
Handline
Kitava
Linea Caffe
Lord Stanley
Mikkeller Bar (LA)
Mikkeller Bar (SF)
Mission Chinese Food
Namu Gaji
The Progress
Square Inc. Culinary San Francisco
State Bird Provisions

CA Pledged to begin participation January 1st

Bar Crenn
Border Grill
Cafe Gratitude
Cerf Club
Empress Tavern
Gracias Madre
Maybeck's
Mother
Mulvaney's B&L
Off the Grid Google Campus
Petit Crenn
Preux & Proper
Prubechu
Restaurant at CIA Copia
Salesforce (SF)
Socalo
SingleThread
Stag Dining
Spago
Stripe Inc. San Francisco
Whet Noodle
Wrench & Rodent

Rest of World Currently Paying

Amass
Hahnemanns Køkken
Hyggestund
La Neta Nørrebro
La Neta Vesterbro
noma
øl & Brød
Ramen to Biiru Nørrebro
Ramen to Biiru Vesterbro
Ramen to Biiru østerbro
Ramen to Biiru Frederiksberg
Restaurant 108
Selma
Vesterbro Chinese Food
WarPigs
Mission Chinese Food (NYC)
Mission Chinese Food* (Brooklyn)
Purslane
Rucola
Coquine
Farm Spirit
Barley Swine (TX)
Bresca (DC)
Emmer & Rye (TX)
Carmen Restaurante (Colombia)
Nectar (Hong Kong)

1% TO UNF%CK THE PLANET

Restaurants add a 1% surcharge, which is directed to ZFP's carbon farming funds. Consumers may opt out (it's pretty rare). ZFP provides materials to train staff and communicate the value of healthy soil to the public.

(Economic Footprint)

THANK YOU FOR DINING WITH US.
0180 TABLE 133 #Party 4
CHRIS S SvrCk: 4 12:44p 12/08/11

1 BAVARIAN BLACK PNT	7.50
2 QUAD BOCK 11 PNT	15.00
1 FARMER JON OATMEAL PNT	6.95
1 CALAMARI	10.95
1 ONIION RINGS	7.95
1 SHADY BROOK FARMS TURKEY	13.25
1 PULLED PORK SANDWICH	14.50
1 HEATLAND STEAK FAJITAS	16.95
1 DIET COKE	3.50
Sub Total:	96.55
Tax :	8.57
Sub Total:	105.12
Carbon Farming	0.97

12/08 2:07p TOTAL: $107.09

YOUR MEAL WAS CARBON NEUTRAL! Joe's Cafe is joining a growing number of restaurants taking environmental responsibility by sending 20 cents from each diner to local farms and ranches whose practices are REVERSING CLIMATE CHANGE. If you'd rather not contribute, simply check this box [ ] and you will be refunded.

CHECK OUT OUR OTHER LOCATIONS AT

*ZFP contracts with farmers to create **Soil Carbon** through compost application, cover cropping etc.*

OR GO CARBON NEUTRAL

Members complete a Life Cycle Assessment survey. Sustainability experts create a report, recommend operational improvements, and provide training materials. Member businesses are officially **Carbon Neutral** after investing in carbon farming and offsets, proportionate to their carbon footprint.

(Environmental Footprint)

Soil carbon investment based on ingredient footprint. Energy, transport, etc. addressed by traditional carbon offsets.

TACKLING CLIMATE CHANGE THROUGH BETTER FOOD.

JOIN THE WORLD'S BEST CHEFS IN SOLVING BIG PROBLEMS WITH BETTER FARMING.

The Value of Adding an Organic Transition Option to the Healthy Soils Program

Adding an Organic Transition Option to the Healthy Soils Program will meet the goals of CDFA and the Greenhouse Gas Reduction Fund while also providing social and economic co-benefits.

The Organic Transition Option to CDFA's Healthy Soils Program (HSP) would offer a one-time payment of $4,300[1] for a producer to hire an organic crop consultant to help them complete an Organic System Plan. An Organic System Plan is a detailed description of the practices and procedures used to produce organic crops and livestock. With an Organic System Plan in place, a producer is ready to be certified after the ground has undergone three years of transition during which no prohibited materials are applied.

An Organic Transition Option Facilitates GHG Emission Reduction and Soil Carbon Sequestration
Organic farming should be included as a climate change mitigation practice in HSP because it is an investment that meets the goals of CDFA and the Greenhouse Gas Reduction Fund (GGRF) to "achieve feasible and cost-effective GHG emission reductions."[2] Scientific studies, including those conducted by UC Davis researchers, consistently find that organic farming builds soil organic matter[3]--which stores carbon in the soil--and has lower net GHG emissions.[4]

Certified organic producers are required by federal law to maintain or improve their soil organic matter and must use crop rotation, so assisting producers transition to organic certification will ensure they continue to use (and earn an organic premium to help offset the cost of) healthy soils practices.

An Organic Transition Option Benefits Disadvantaged Communities
An Organic Transition Option would help the HSP meet GGRF requirements to benefit disadvantaged communities by reducing exposure to synthetic herbicides, insecticides, and fungicides in communities already disproportionately burdened by multiple sources of pollution. The Organic Transition Option would also make organic certification more accessible to limited resource, beginning, and socially disadvantaged farmers and ranchers by removing financial and technical barriers to transition.

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[1] This is the amount that NRCS offers through its Environmental Quality Incentives Program (EQIP) Organic Initiative, which provides funding for producers to hire a consultant to develop a conservation plan and an Organic System Plan for the farm.
[2] California Air Resources Board. (2019). Cap-and-Trade Auction Proceeds Third Investment Plan: Fiscal Years 2019-20 through 2021-22. Retrieved from https://ww3.arb.ca.gov/cc/capandtrade/auctionproceeds/2019_thirdinvestmentplan_final_021519.pdf?_ga=2.44130916.1147759135.1574730304-744090955.1563814456
[3] Greater carbon storage in organically managed plots has been found in numerous published studies including reports on UC Davis trials, USDA Agricultural Research Service studies in Salinas, a national soil survey, and an international meta-analysis of soil quality data. See Wolf, K., Herrera, I., Tomich, T.P., & Scow, K. (2017). Long-term agricultural experiments inform the development of climate-smart agricultural practices. *California Agriculture*, 71, 120-124; Brennan, E.B., & Acosta Martinez, V. (2017); Cover cropping frequency is the main driver of soil microbial changes during six years of organic vegetable production. *Soil Biology and Biochemistry*, 109, 188-204; Ghabbour, E.A., Davies, G., Misiewicz, T., Alami, R.A., Askounis, E.M., Cuozzo, N.P., . . . Shade, J. (2017). Chapter one - national comparison of the total and sequestered organic matter contents of conventional and organic farm soil. Advances in Agronomy, 146, 1-35; Sanders, J. & Hess, J. (Eds), 2019. Leistungen des ökologischen Landbaus für Umwelt und Gesellschaft . Braunschweig: Johann Heinrich von Thünen-Institut, 364 p, Thünen Report 65. Accessed May 2, 2019 at: https://www.thuenen.de/media/ publikationen/thuenen-report/Thuenen_Report_65.pdf.
[4] De Gryze, S., Wolf, A., Kaffka, S. R., Mitchell, J., Rolston, D. E., Temple, . . . Six, J. (2010). Simulating greenhouse gas budgets of four California cropping systems under conventional and alternative management. *Ecological Applications*, 20(7), 1805-1819.

An Organic Transition Option Maximizes Economic, Environmental, and Public Health Co-Benefits
An Organic Transition Option would meet the goal of CDFA and the GGRF to provide co-benefits because organic agriculture benefits the economy, environment, and public health. Organic agriculture improves soil water holding capacity, improves soil structure, reduces pollution from soil erosion and nutrient leaching, creates jobs, and improves environmental health. (Refer to CCOF's *Roadmap to an Organic California: Benefits Report* for detailed citations.)

Increasingly, organic farming is receiving recognition as an important strategy in preparing agriculture for climate change. The National Sustainable Agriculture Coalition (NSAC) recently published a report calling for the U.S. Department of Agriculture to **"***Promote organic agriculture to make agriculture more resilient in the face of climate change while reducing GHG emissions from the agriculture production sector."*[5]

An Organic Transition Option Ensures the Continued Use of Healthy Soils Practices
Supporting farmers and ranchers with an Organic Transition Option will make the organic transition economically feasible, provide them with experience in using healthy soils practices, and position them to become certified organic, which will incentivize the ongoing use of healthy soils practices beyond the three years of the HSP grant.

High consumer demand for organic products makes organic farming attractive to many producers, but the three-year transition is the most challenging part of the certification process. Transitional growers incur higher production costs when substituting organic management for chemical inputs, but they are not able to access the organic premium to offset these costs until the land has been managed organically for three years. Including an Organic Transition Option will support producers who choose to transition to organic.

An Organic Transition Option Supports CDFA in Expending Additional Funding
As the HSP budget almost doubles in the coming year, CDFA will need to find ways to increase grower participation in the program. Offering an organic option will be popular with farmers and ranchers and attract more applicants to the HSP.

An Organic Transition Option is Needed Beyond the NRCS Program
The federal Natural Resources Conservation Service (NRCS) offers conservation payments and funding to hire a consultant to develop an Organic System Plan through its Environmental Quality Incentives Program (EQIP). Some drawbacks of the EQIP Organic Initiative include a contract cap of $140,000, which is much lower than the cap on general EQIP contracts of $450,000. Also, payments for specific practices offered by NRCS are significantly lower than payments offered by HSP. Finally, EQIP Organic Initiative funding levels in California are insufficient to meet demand: in FY 2018, California NRCS bolstered the initial $100,000 that was allocated for the Organic Initiative by an additional $90,673, and in FY 2019 they allocated $200,000 due to high grower demand.[6]

[5] National Sustainable Agriculture Coalition. 2019. Agriculture and Climate Change: Policy Imperatives and Opportunities to Help Producers Meet the Challenge. Washington D.C.
[6] NRCS California Farm Bill Programs Summary for FY 2018 EQIP, prepared for the State Technical Advisory Committee; and personal communication with RaeAnn Dubay, NRCS Assistant State Conservationist—Programs, personal communication Nov. 19, 2019.

cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

HEALTHY SOILS PROGRAM

Guihua Chen, Ph.D.

Office of Environmental Farming and Innovation (OEFI)

Environmental Farming Act - Science Advisory Panel Meeting

January 21, 2020

Sacramento, CA

CALIFORNIA CLIMATE INVESTMENTS
Cap and Trade Dollars at Work

Outline

2018 HSP Updates

- Funding
- Awards
- Awarded Projects - Grant Agreements Executed By Jan 6, 2020
- Data Analysis on Awarded Projects

2018 HSP FUNDING

2018-19 Funding Sources

- Budget Act of 2018 - $10 Million through Proposition 68 (California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access for All Act of 2018).
- Budget Act of 2018 (SB 856) - $5 Million through the Greenhouse Gas Reduction Fund (GGRF)

2018 HSP AWARDS

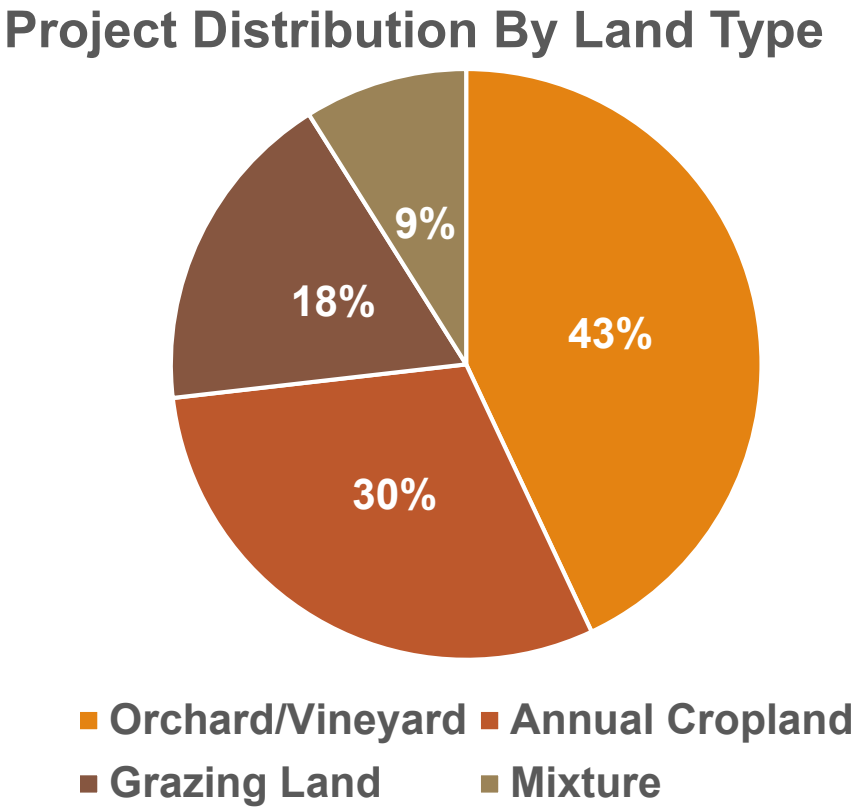
- Applications submitted:
  - HSP Incentives Program: 222 applications, $9.7 million requested.
  - HSP Demonstration Projects: 30 applications, $5 million requested.
    - 16 Type A projects, 14 Type B projects
- Projects Awarded*:
  - HSP Incentives Program: 188 projects totaling $8.7 million
    - Estimated GHG reduction 24,000 $MTCO_2e$/year across 27,700 acres
  - HSP Demonstration Projects: 21 projects totaling $3.6 million.
    - 11 Type A projects, 10 Type B projects
    - Estimated GHG reduction 980 $MTCO_2e$/year

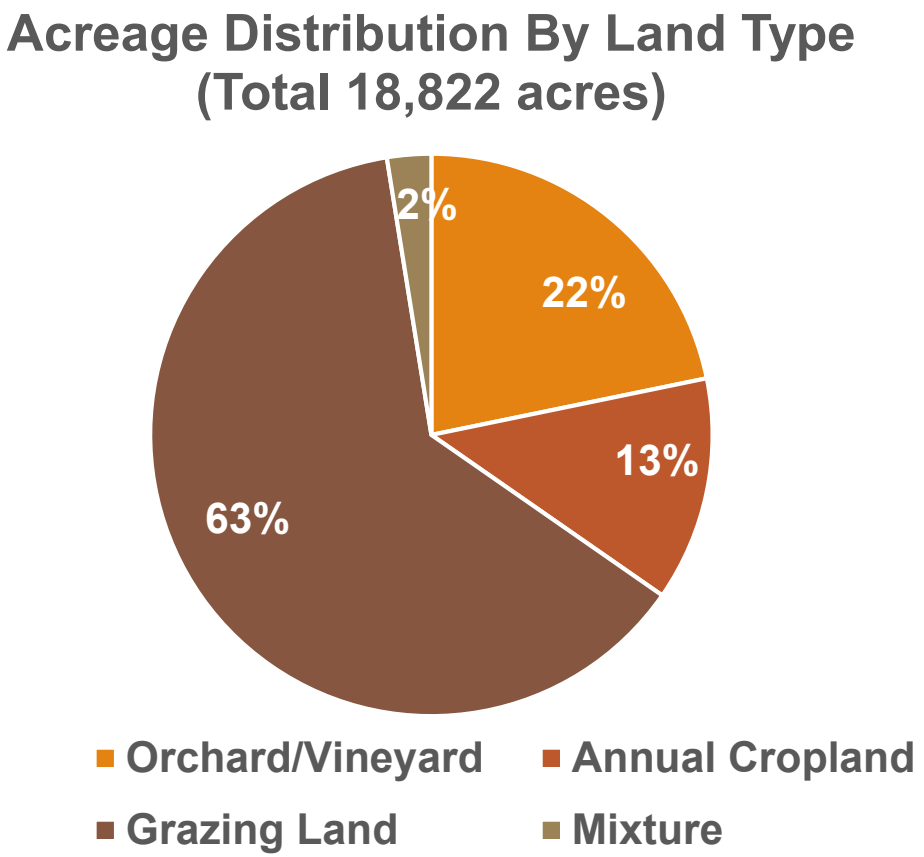
*Subject to change pending final execution of grant agreements.

2018 HSP AWARDED PROJECTS - UPDATES

- HSP Incentives Program:
  - 179 projects with grant agreement executed by Jan 6, 2020
  - $7.8 million total funding amount
  - 18,822 acres of land impacted
  - Estimated GHG reduction 16,708 $MTCO_2e$/year
- HSP Demonstration Projects
  - 20 projects with grant agreement executed by Jan 6, 2020
    (10 Type A and 10 Type B)
  - $3.3 million total funding amount
  - 1,382 acres land impacted
  - Estimated GHG reduction 938 $MTCO_2e$/year

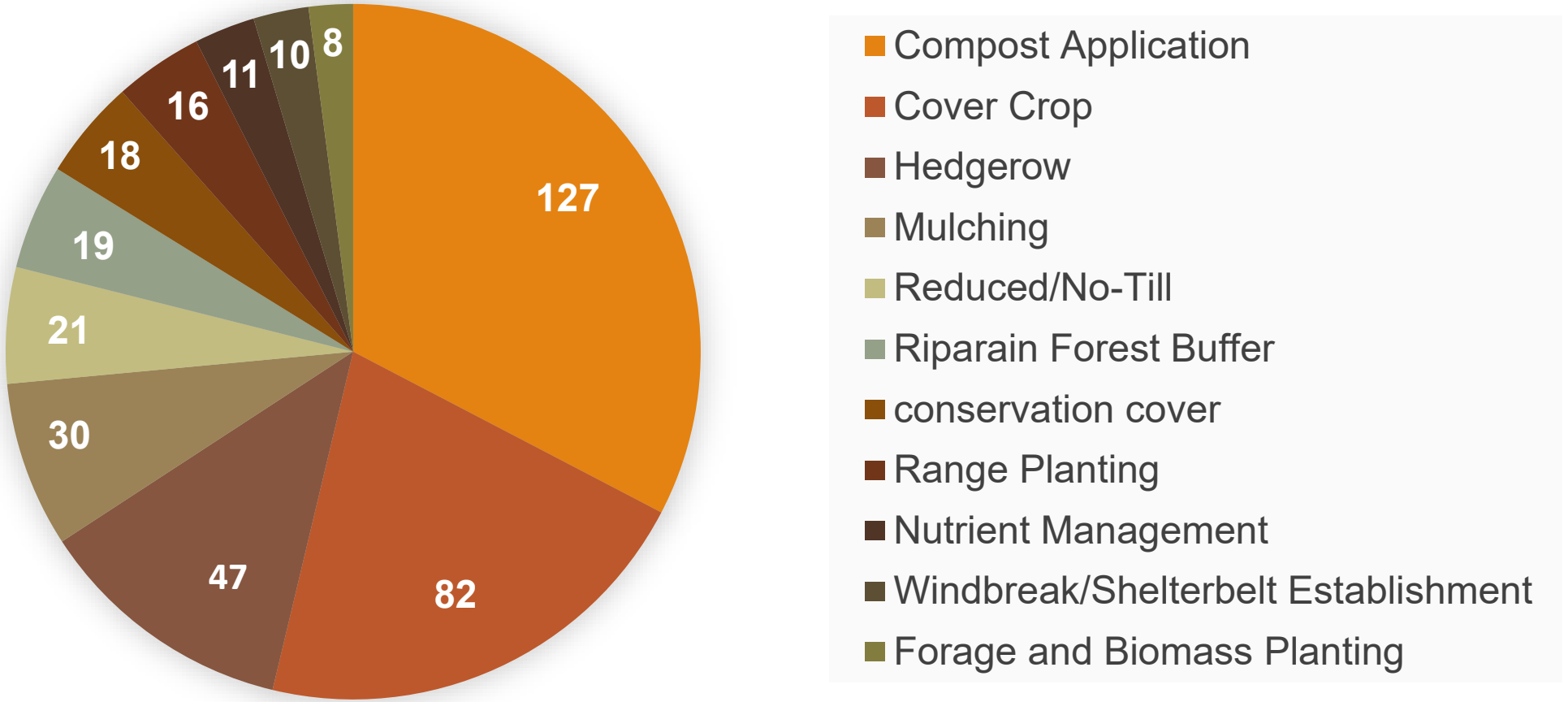
2018 HSP INCENTIVES PROGRAM – AWARDED PROJECTS DATA ANALYSIS (1)





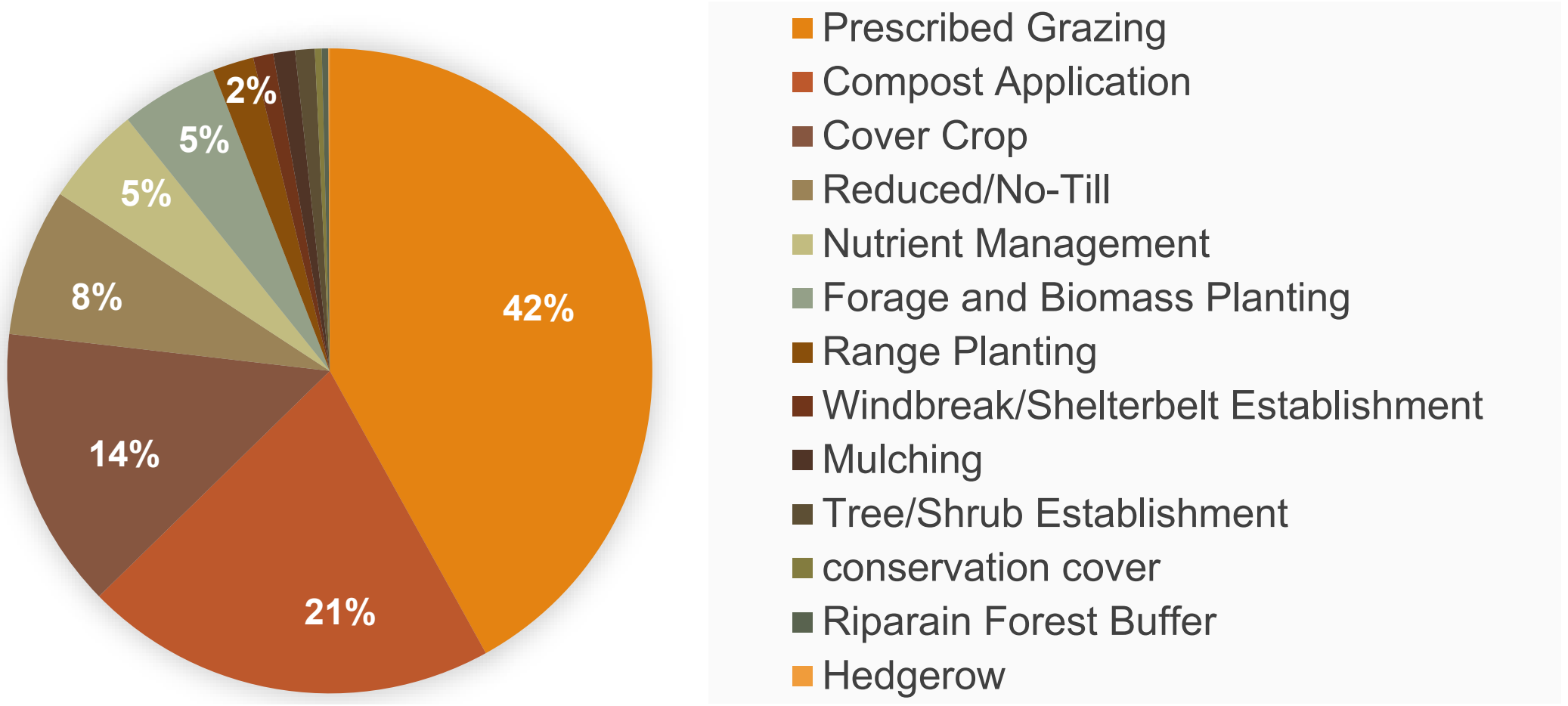
2018 HSP INCENTIVES PROGRAM – AWARDED PROJECTS DATA ANALYSIS (2)

Popular Practices: Most frequently Requested Practices for Implementation (Total 179 Projects)



2018 HSP INCENTIVES PROGRAM – AWARDED PROJECTS DATA ANALYSIS (3)

Acreage of Practices for Implementation (Total 22,043 Acres for All Practices)

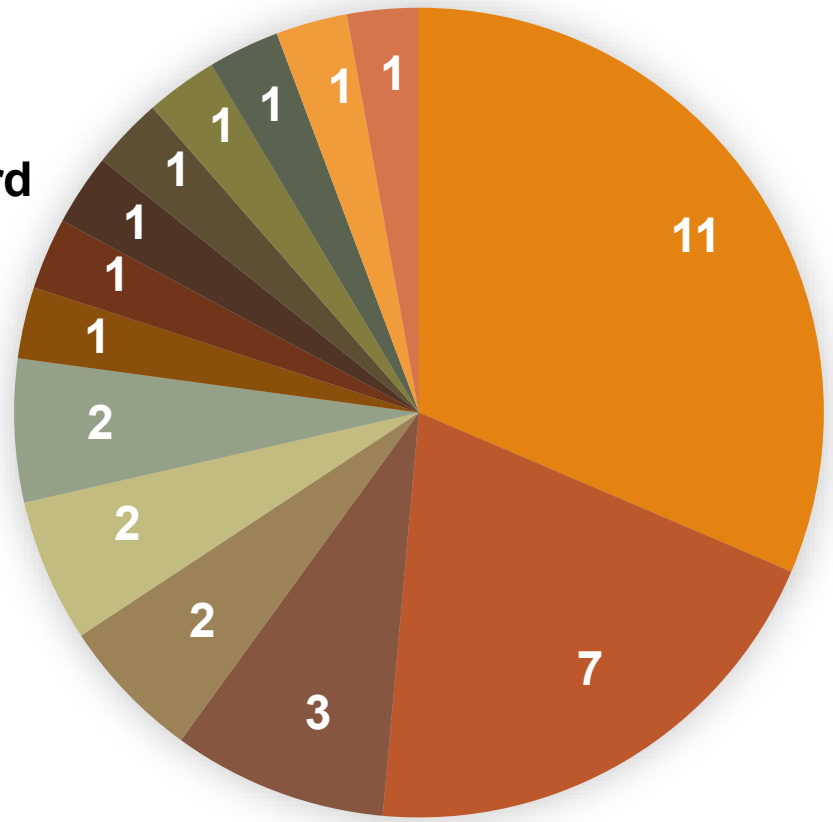


2018 HSP DEMONSTRATION PROJECTS – AWARDED PROJECTS DATA ANALYSIS

4 Projects on Grazing Land

7 Projects on Annual Cropland

9 Projects on Orchards/Vineyard



cdfa
CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

HEALTHY SOILS PROGRAM

Geetika Joshi, Ph.D.

Office of Environmental Farming and Innovation (OEFI)

Environmental Farming Act – Science Advisory Panel Meeting

January 21, 2020

Sacramento, CA

CALIFORNIA CLIMATE INVESTMENTS
Cap and Trade Dollars at Work

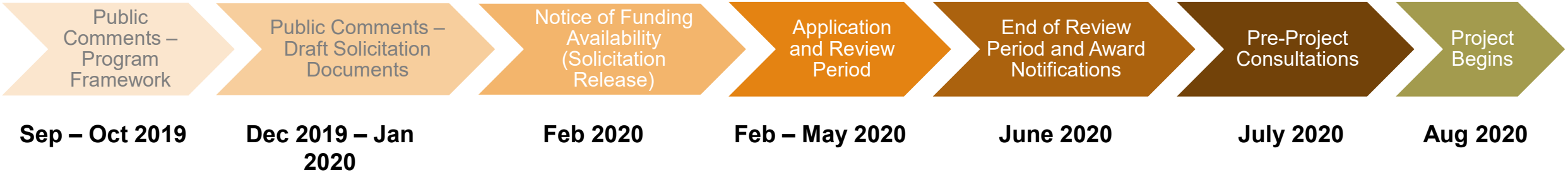
Outline

2020 HSP

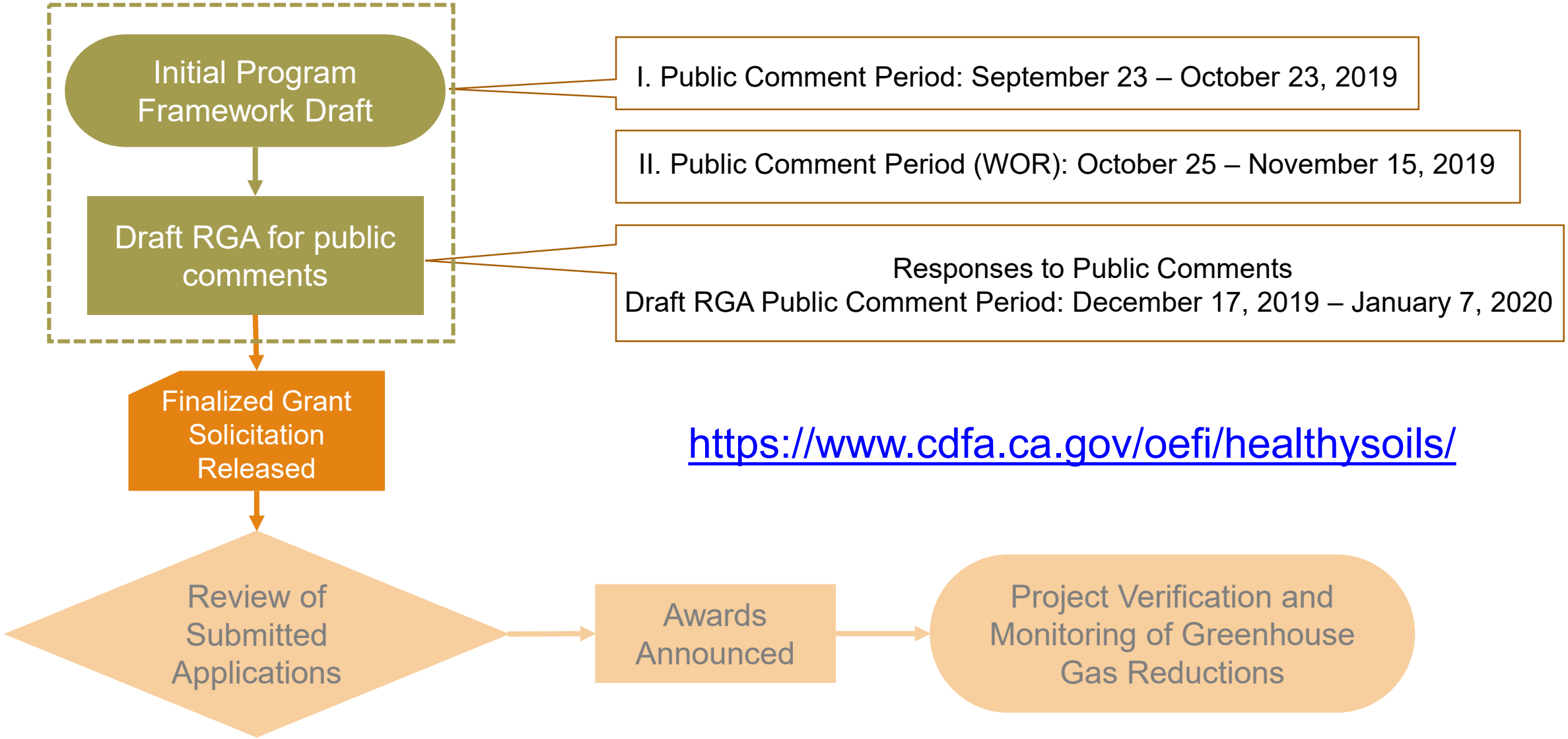
- Funding and Timeline
- Program Process
- Public Comments
- Overview of Changes

2020 HSP FUNDING AND TIMELINE

- Budget Act of 2019 - $28 Million through the Greenhouse Gas Reduction Fund (GGRF).
- Encumbrance by June 30, 2021
- Liquidation by June 30, 2023



2020 HSP PROCESS



2020 HSP PUBLIC COMMENTS AND RESPONSES SUMMARY SEP-OCT 2019

Project Site/Site for Practice Implementation

- ***Allow previously funded APNs to be eligible for funding.***
  - Previously funded APNs eligible for funding in future rounds of HSP; practices must be implemented on fields where not previously implemented to ensure GHG reduction from baseline conditions.
- ***Allow grant recipients flexibility to move locations where practices are implemented.***
  - Field locations where practices are implemented must stay the same for three years of project implementation to account for carbon sequestration and GHG benefits consistent with modeling methodologies used to quantify benefits.

2020 HSP PUBLIC COMMENTS AND RESPONSES SUMMARY SEP-OCT 2019

New Practices for HSP Eligibility

- ***Pesticide use reduction, mycorrhizae, vermiculture, re-saturation of Delta soils, one-time application of compost on rangelands at high rates.***
  - Certain proposed practices are outside the scope of the HSP (e.g. pesticide reduction). Other practices were evaluated during 2017-18 round of new practices evaluation and not recommended for inclusion in the HSP Incentives Program due to lack of peer-reviewed scientific data showing evidence of greenhouse gases reduction; some are supported through HSP Demonstration Projects Type A for the purposes of data collection. CDFA anticipates conducting a new practice evaluation process in early 2020 where new practices should be submitted.

2020 HSP PUBLIC COMMENTS AND RESPONSES SUMMARY SEP-OCT 2019

HSP Incentives Payments

- ***Payment rates for compost application are low and do not cover the cost of transportation.***
  - Cost of delivering of compost is not supported through the HSP because of greenhouse gas emissions associated with delivery. These greenhouse gas emissions are not included during modeling in Comet-Planner.
- ***Allow for itemized budgets instead of standard payment rates.***
  - Standard Payment Rates ease the burden of maintaining and submitting detailed receipts for each expense off farmers. Itemized budgets require inclusion of quotes for services obtained in advance to support budgets at the time of application.

2020 HSP PUBLIC COMMENTS AND RESPONSES SUMMARY SEP-OCT 2019

HSP Incentives Payments

- ***Establish a minimum payment for HSP similar to USDA-NRCS.***
  - Minimum payment through USDA-NRCS is provided through the CSP, not EQIP. CDFA has evaluated EQIP for alignment to HSP.
- ***Increase maximum grant award amount to $100,000.***
  - This amount was proposed as maximum during the second public comment period.
- ***Simplify the budget estimation for applications.***
  - CDFA and USDA-NRCS are working to integrate standard payment rates for HSP practices within COMET-Planner tool, eliminating the step of an additional worksheet calculation.

2020 HSP PUBLIC COMMENTS AND RESPONSES SUMMARY SEP-OCT 2019

Application Process

- ***Reduce essay-type questions and simplify the application.***
  - Several changes: integrated mapping-based input platform, integrated budget and GHG calculations, simplified work-plan, removed essay-type questions.
- ***Proposed application period too short.***
  - Rolling application period open for up to 4 months.
- ***Provide Spanish language application.***
  - Suggestion being evaluated to determine if adequate personnel and resources are available to support this effort.

2020 HSP PUBLIC COMMENTS AND RESPONSES SUMMARY SEP-OCT 2019

Demonstration Projects

- ***120 attendees are too many for outreach.***
  - Grant recipients may meet this requirement through outreach and education efforts conducted in addition to the mandatory field days.
- ***Allow inclusion of webinars and presentations to growers and growers' visits to the demo site outside formal field day events to count toward the required limit of outreach.***
  - These data are already allowed in many cases, however they may not replace the requirement to conduct on-farm field days.

2020 HSP CHANGES OVERVIEW

- Whole Orchard Recycling (WOR) included as an eligible practice under the HSP Incentives Program.
- Integration of HSP Incentives Program Project Budget calculations in COMET-Planner Tool.
- Reduction in essay-type questions in HSP Incentives Program application.
- Rolling, first-come-first-serve, application period for the HSP Incentives Program, allowing a longer application period.
- Technical Assistance Providers and UCCE Community Education Specialists available as resources for HSP Incentives Program applicants.
- HSP Incentives Program maximum grant award amount increased to $100,000 per project.
- 25% funds for Socially Disadvantaged Farmers and Ranchers and projects that benefit AB 1550 Priority Populations.
- Integrated mapping-based application input tool developed for the HSP.
- Multiple fields within the same APN eligible for funding in subsequent grant cycles.

2020 HSP PUBLIC COMMENTS SUMMARY DEC 2019 – JAN 2020

- **Application Layout**
  - Suggestions on adding alternate contacts, “N/A” options.
  - Streamline the application questions for making Priority Populations eligibility determinations.
- **Clarifying language**
  - Overlapping practices – only one will be funded
  - Previously funded APNs are eligible for funding, provided new fields where a specific practice was not previously implemented are proposed.
- **Practice Eligibility**
  - Soil fumigant reduction
  - Compost production
  - California specific tillage practices
  - Food waste hydrolysates
  - One-time compost application – rangelands, vineyards
  - Organic transition
- **Payment Rates**
  - Establish a minimum annual payment for small farms (e.g. $1,500 per year).
  - Compost payments too low.
- **Demonstration Projects**
  - Reduce the demonstration project farmer/rancher attendance requirement, which is unrealistic for some regions.
- **Data and Reporting**
  - Frequency of soil sampling
  - Data privacy

Comment letters available at:

https://www.cdfa.ca.gov/oefi/healthysoils/

CDFA HSP Team

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COMET-Planner HSP

Carbon and greenhouse gas evaluation for NRCS conservation practice planning for California Healthy Soils Program

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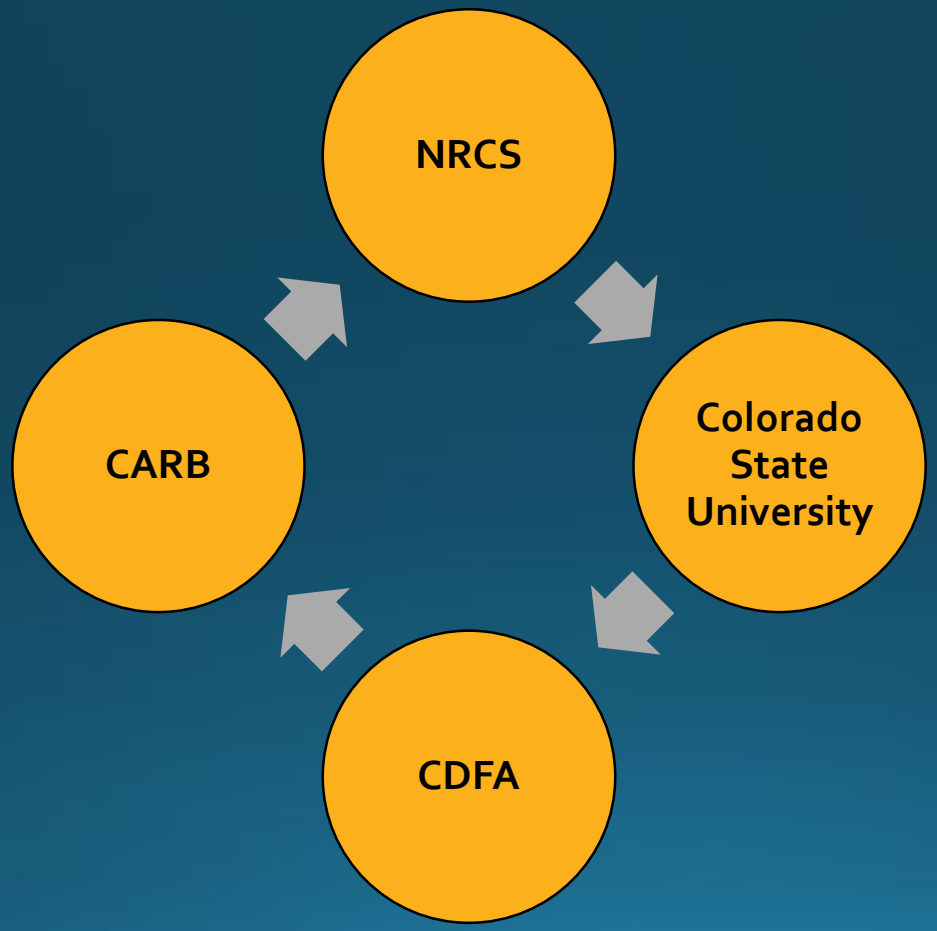
Amy Swan, Mark Easter, Steve Williams, Kevin Brown and Keith Paustian
Natural Resource Ecology Laboratory & Dept. Soil and Crop Sciences
Colorado State University
Fort Collins, CO

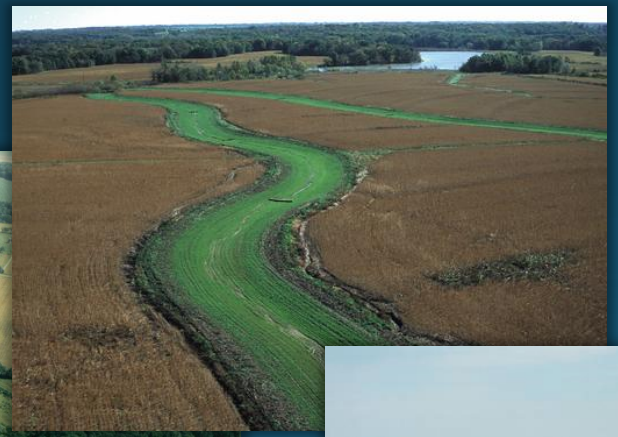
Team Work – It Works….Thank you



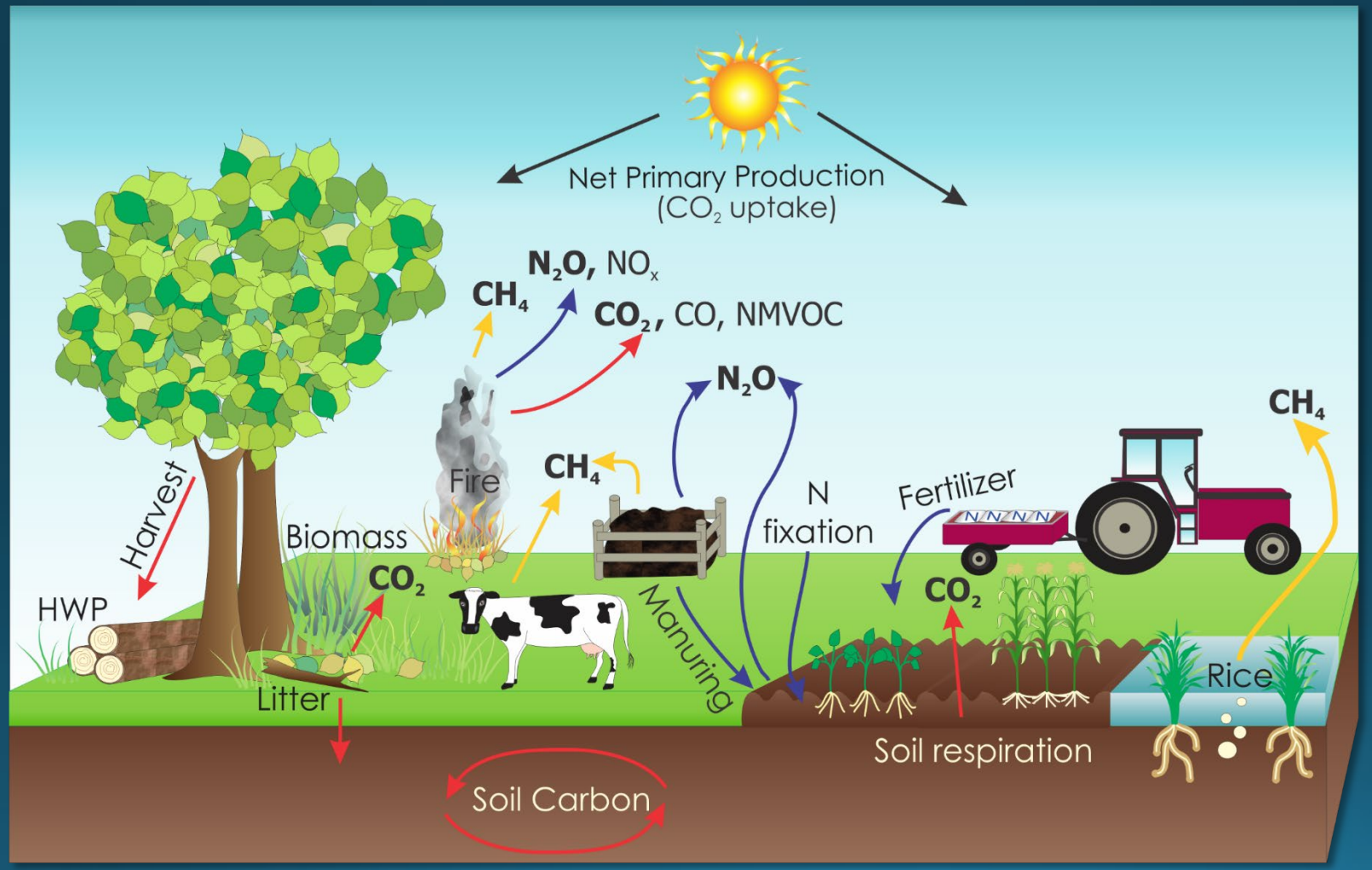
Agricultural Conservation Practices

Agricultural Conservation Practices

The Natural Resources Conservation Service (NRCS) has developed almost 200 agricultural conservation practice standards (CPS)

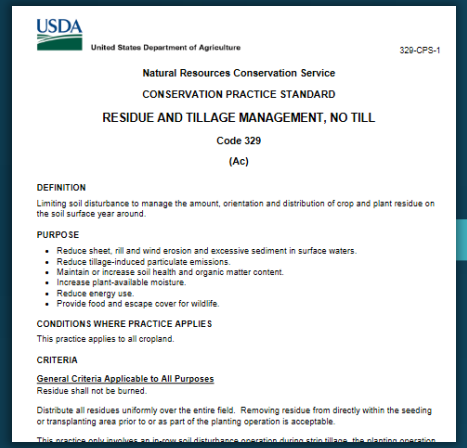


Carbon Sequestration and Greenhouse Gas Benefits of NRCS Conservation Practices



SO MANY ARROWS!

Constructing Conservation Scenarios



USDA
United States Department of Agriculture

329-CPS-1

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

RESIDUE AND TILLAGE MANAGEMENT, NO TILL

Code 329

(Ac)

DEFINITION

Limiting soil disturbance to manage the amount, orientation and distribution of crop and plant residue on the soil surface year around.

PURPOSE

- Reduce sheet, rill and wind erosion and excessive sediment in surface waters.
- Reduce tillage-induced particulate emissions.
- Maintain or increase soil health and organic matter content.
- Increase plant-available moisture.
- Reduce energy use.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

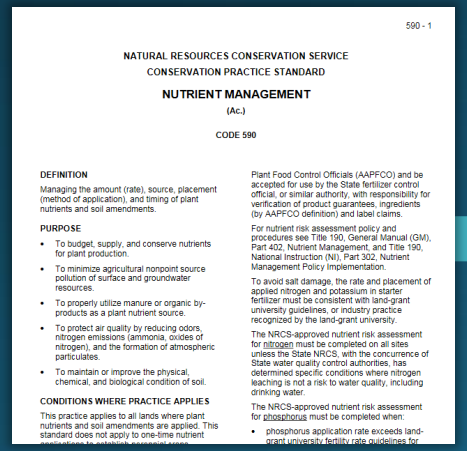
This practice applies to all cropland.

CRITERIA

General Criteria Applicable to All Purposes

Residue shall not be burned.

Distribute all residues uniformly over the entire field. Removing residue from directly within the seeding or transplanting area prior to or as part of the planting operation is acceptable.



590 - 1

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Ac.)

CODE 590

DEFINITION

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.

PURPOSE

- To budget, supply, and conserve nutrients for plant production.
- To minimize agricultural nonpoint source pollution of surface and groundwater resources.
- To properly utilize manure or organic by-products as a plant nutrient source.
- To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.
- To maintain or improve the physical, chemical, and biological condition of soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where plant nutrients and soil amendments are applied. This standard does not apply to one-time nutrient

Plant Food Control Officials (AAPFCO) and be accepted for use by the State fertilizer control official, or similar authority, with responsibility for verification of product guarantees, ingredients (by AAPFCO definition) and label claims.

For nutrient risk assessment policy and procedures see Title 190, General Manual (GM), Part 402, Nutrient Management, and Title 190, National Instruction (NI), Part 302, Nutrient Management Policy Implementation.

To avoid salt damage, the rate and placement of applied nitrogen and potassium in starter fertilizer must be consistent with land-grant university guidelines, or industry practice recognized by the land-grant university.

The NRCS-approved nutrient risk assessment for nitrogen must be completed on all sites unless the State NRCS, with the concurrence of State water quality control authorities, has determined specific conditions where nitrogen leaching is not a risk to water quality, including drinking water.

The NRCS-approved nutrient risk assessment for phosphorus must be completed when:

- phosphorus application rate exceeds land-grant university fertility rate guidelines for

Baseline

Intensive tillage

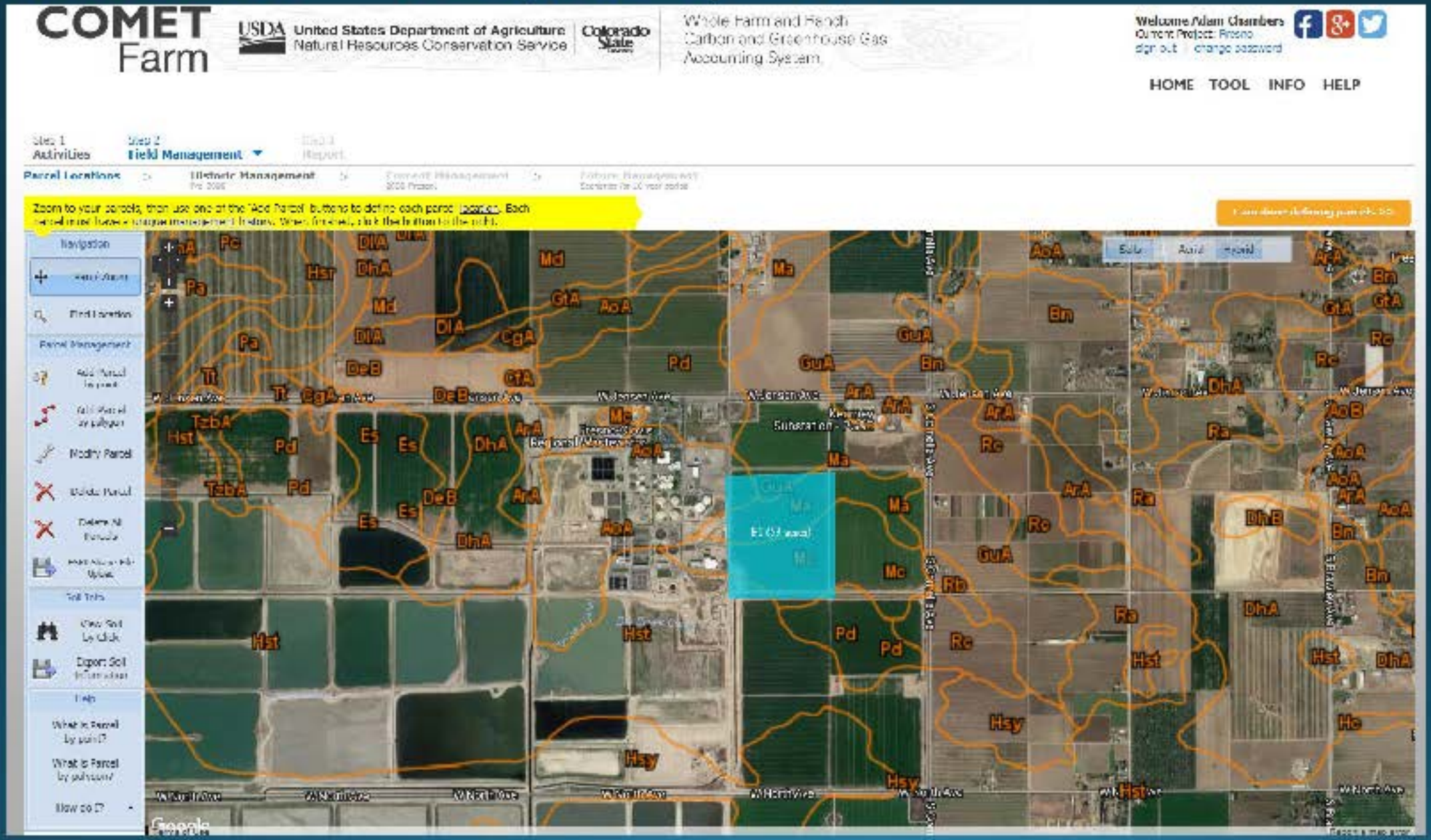
Synthetic N fertilizer

Conservation Practice

No tillage or strip tillage

Partial replacement of fertilizer with compost

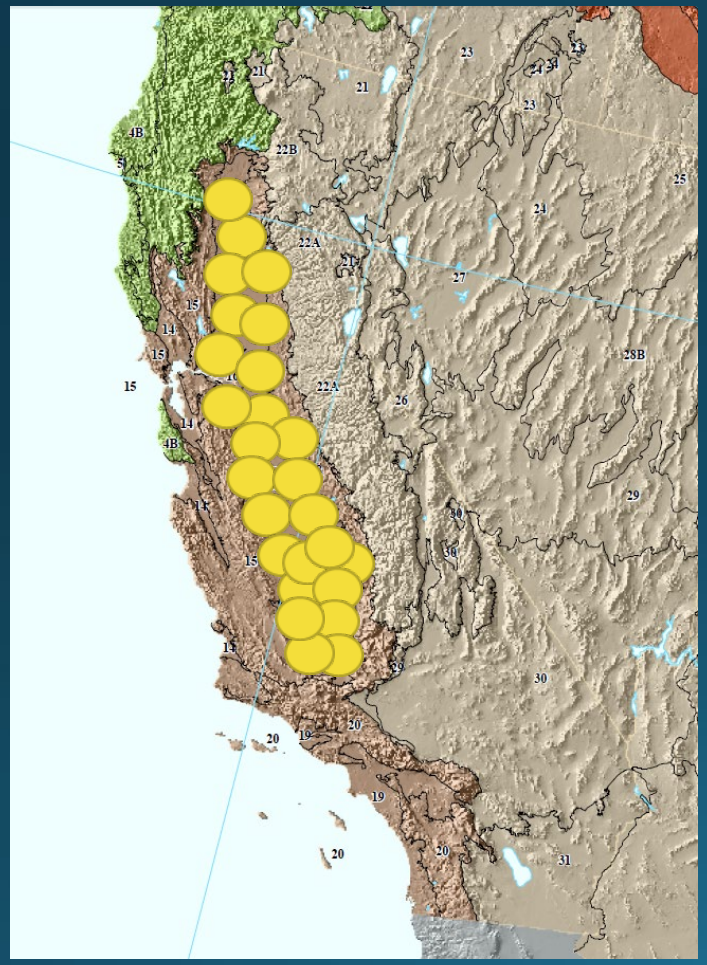
COMET-Farm — many, many details



Application Program Interface (API) for COMET-Farm

	A	B	C
1			
2		cometEmailId	adam.chambers@por.usda.gov
3		name	module:cropland|id:1022611|irrigated:Y|mlra:22A|practice:Intensive Tillage to No Tillage or Strip Tillage + Nutrient Management - Improved Nitrogen Fertilizer Management - Fertilizer Reductions|crop2009:winter wheat|crop2010:cotton|crop2011:cotton|crop2012:cotton|crop2013:cotton|crop2014:cotton|crop 2015:fallow
4		GEOM	POINT(-119.191 35.0)
5		SRID	4326
6		AREA	10
7		Pre-1980	Irrigation (Pre 1980s)
8		CRP	None
9		CRPStartYear	
10		CRPEndYear	
11		CRPType	None
12		Year1980-2000	Irrigated: Spring Grain-Potato
13		Year1980-2000_Tillage	Intensive Tillage
14		Name2	Current
15		Year	2000
16		CropNumber	1
17		CropName	cotton
18		PlantingDate	04/22/2000
19		ContinueFromPreviousYear	N
20		HarvestDate	10/21/2000
21		Grain	Yes
22		yield	1443
23		StrawStoverHayRemoval	0
24		GrazingList	
25		TillageDate	04/21/2000
26		TillageType	Intensive Tillage
27		NApplicationDate	04/22/2000
28		NApplicationType	UAN
29		NApplicationAmount	134.7
30		NApplicationMethod	Surface Band / Sidedress
31		LLP	None
32		OMADApplicationList	
33		IrrigationDate	04/22/2000
34		IrrigationInches	2.54

Batch COMET-Farm Runs via the API



- Approximately 100 API runs per MLRA

	A	B	C
1			
2		cometEmailId	adam.chambers@por.usda.gov
3		name	module:cropland|id:1022631|irrigated:Y|mlra:22A|practice:Intensive Tillage to No Tillage or Strip Tillage + Nutrient Management - Improved Nitrogen Fertilizer Management - Fertilizer Reductions|crop2009:winter wheat|crop2010:cotton|crop2011:cotton|crop2012:cotton|crop2013:cotton|crop2014:cotton|crop2015:fallow
4		GEOM	POINT(-119.191 36.0)
5		SRID	4326
6		AREA	10
7		Pre-1980	Irrigation (Pre 1980s)
8		CRP	None
9		CRPStartYear	
10		CRPEndYear	
11		CRPType	None
12		Year1980-2000	Irrigated: Spring Grain-Potato
13		Year1980-2000_Tillage	Intensive Tillage
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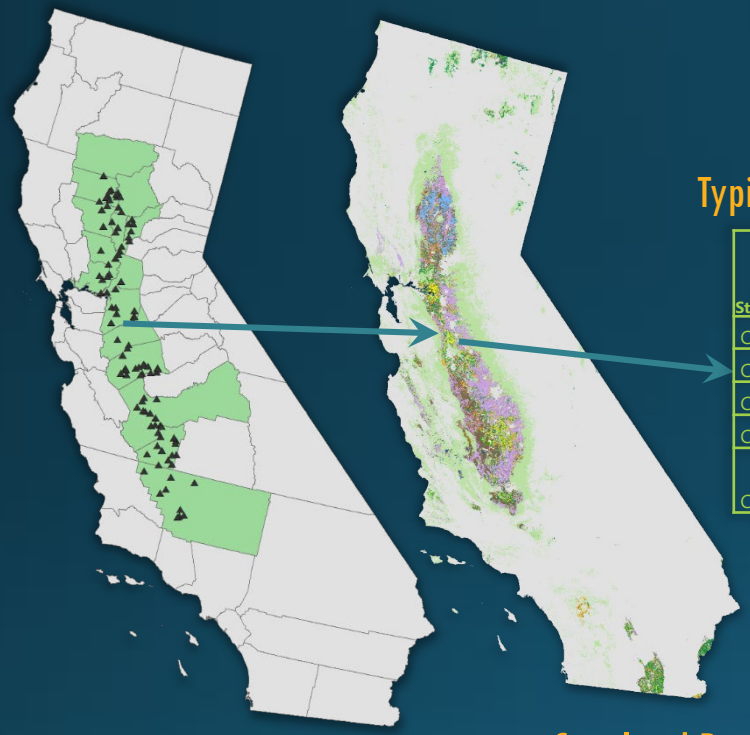
30		NApplicationMethod	Surface Band / Sidedress
31		EEP	None
32		OMADApplicationList	
33		IrrigationDate	04/22/2000
34		IrrigationInches	2.54

Tier 3 - Carbon Sequestration and GHG Estimation Methods



Random point sample

Cropland Data Layer Crops

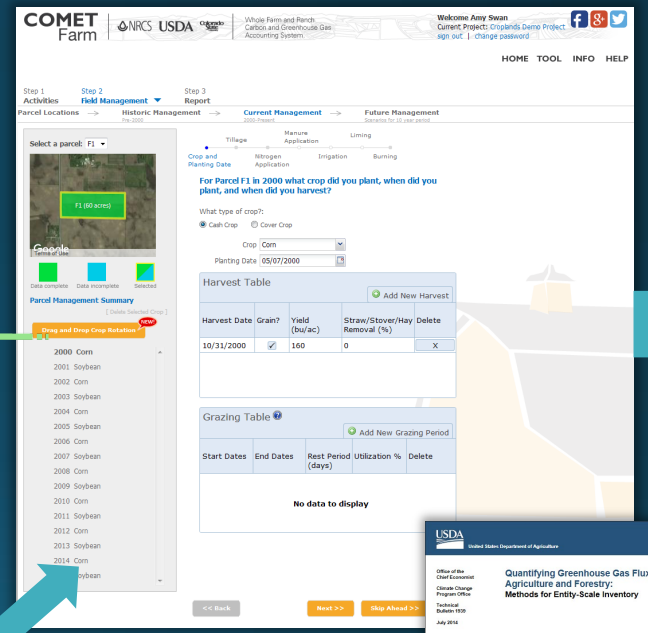
Typical practices/average inputs

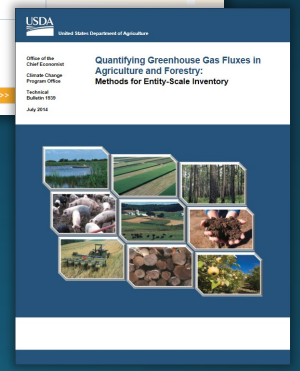
State	Crop	Non-Irri. N input	Irrigated N input
California	alfalfa	ZZ	ZZ
California	barley	ZZ	ZZ
California	corn	ZZ	ZZ
California	cotton	ZZ	ZZ
California	dry field beans	ZZ	ZZ

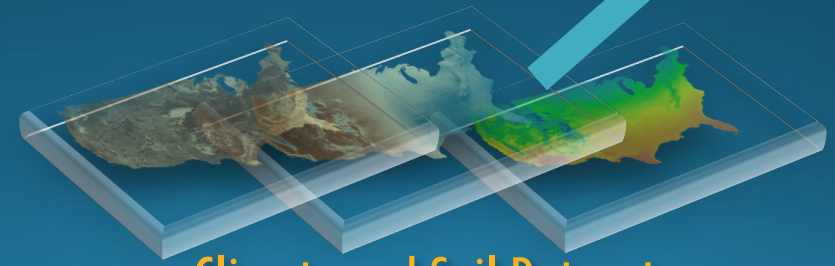
CPS

Baseline

COMET-Farm API

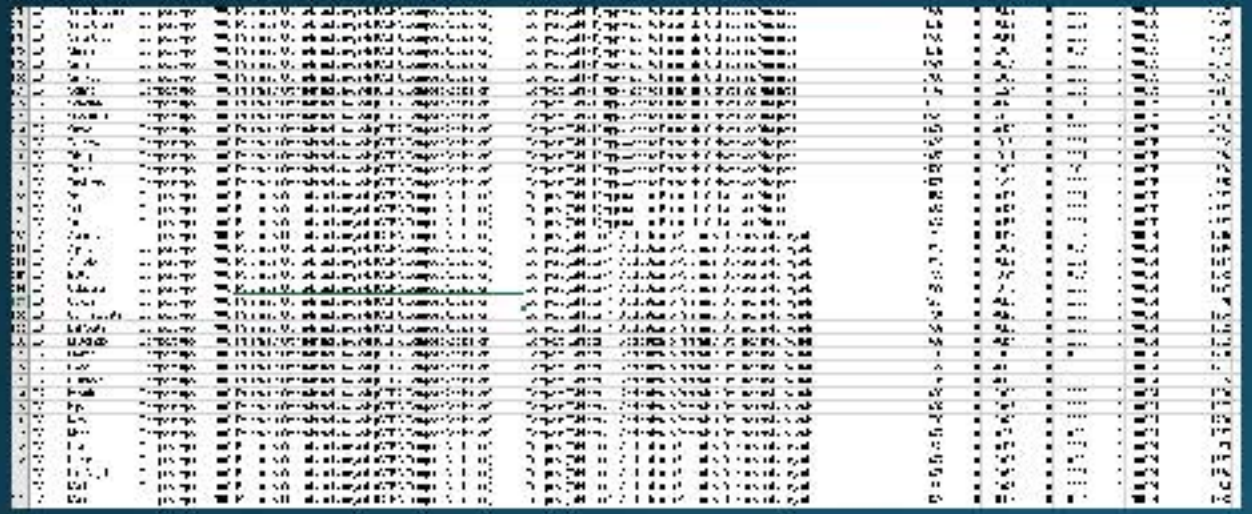


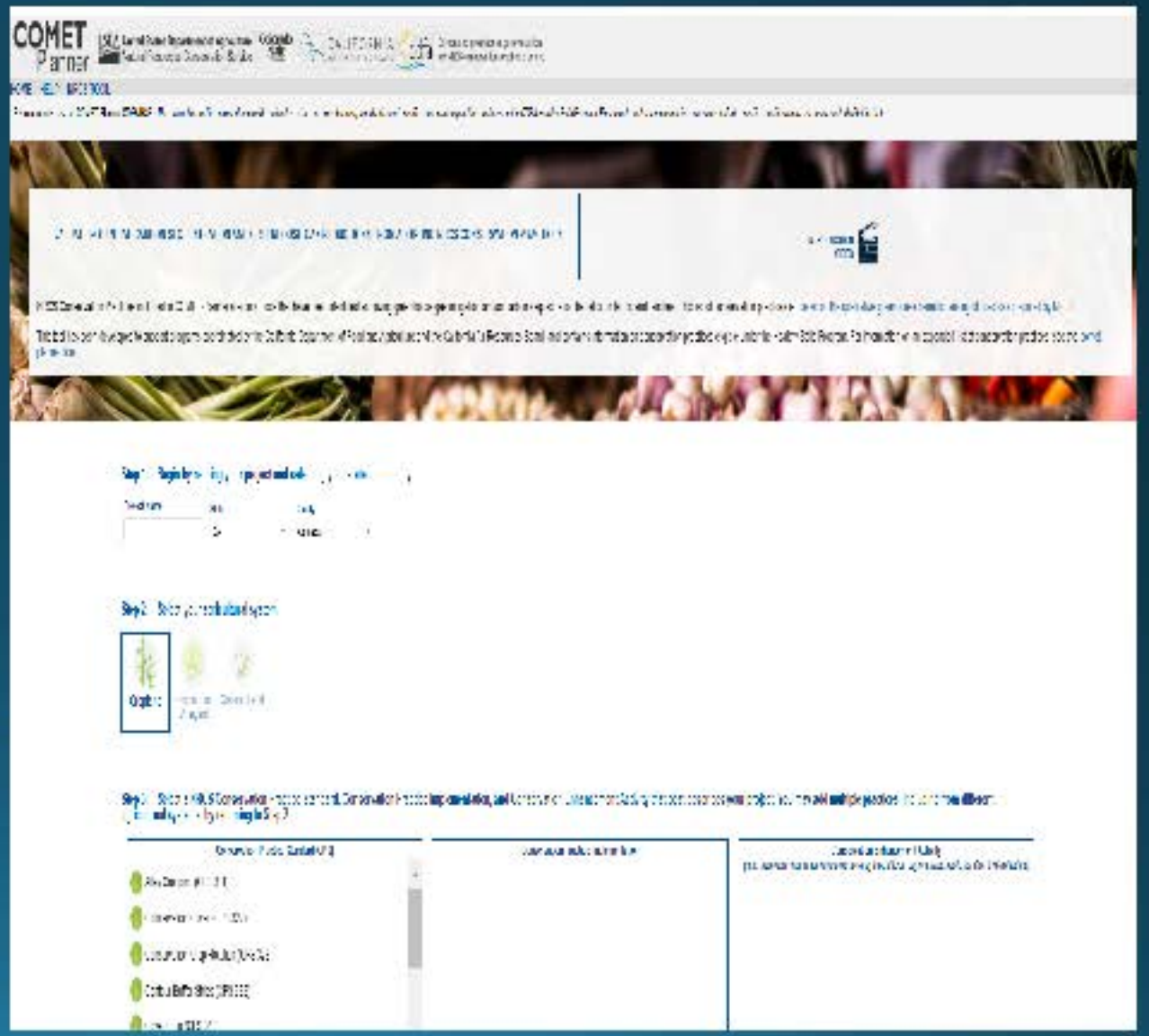




Climate and Soil Datasets

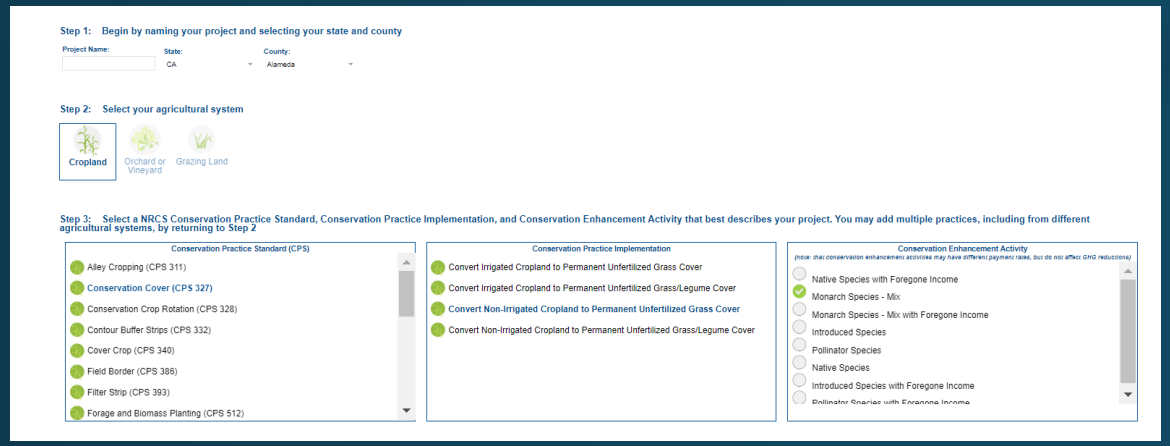
Develop a massive look-up table that supports the GUI and that's COMET-Planner



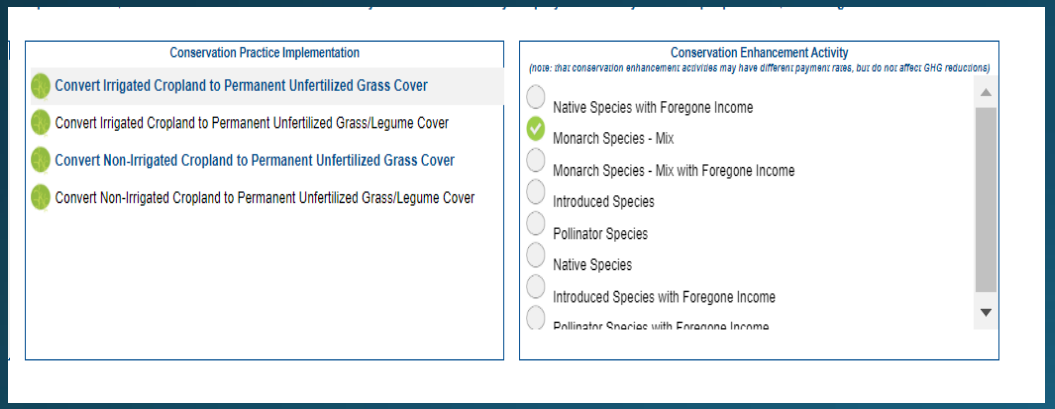


Web Tool and Reporting – Available at http://comet-planner.com/

Land Use Groups

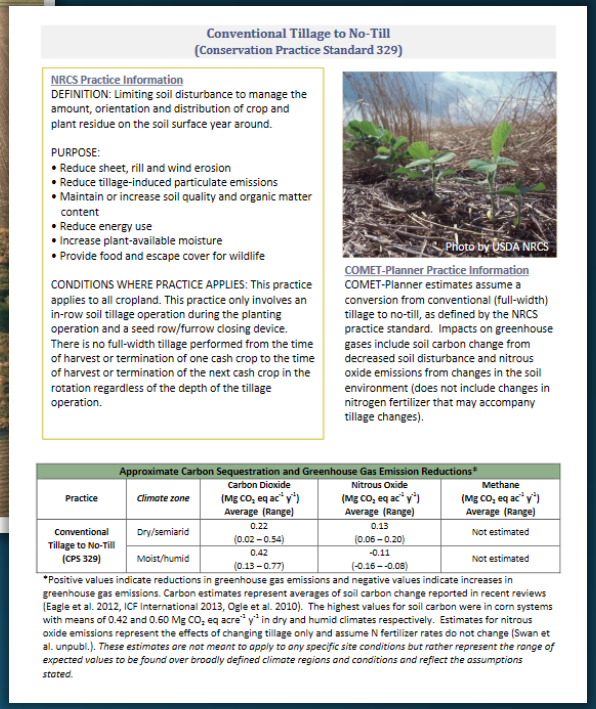


CPS Details

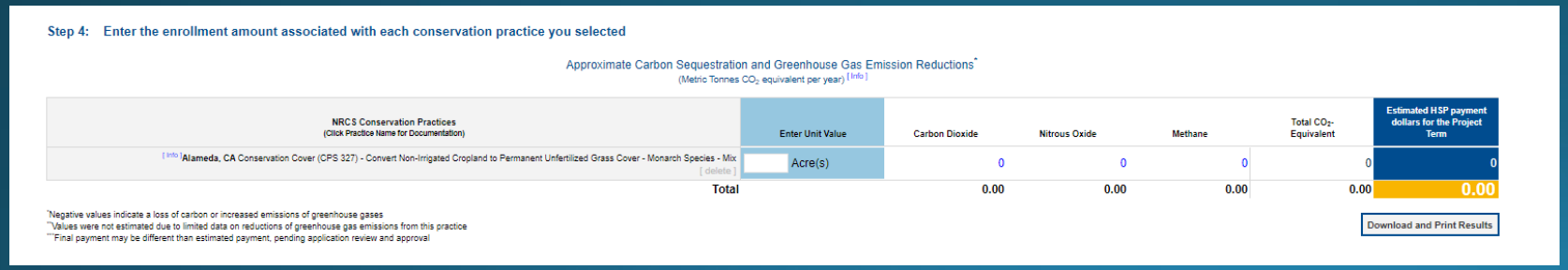


Practice Prescription

Plenty of Documentation Available



On-the-fly results

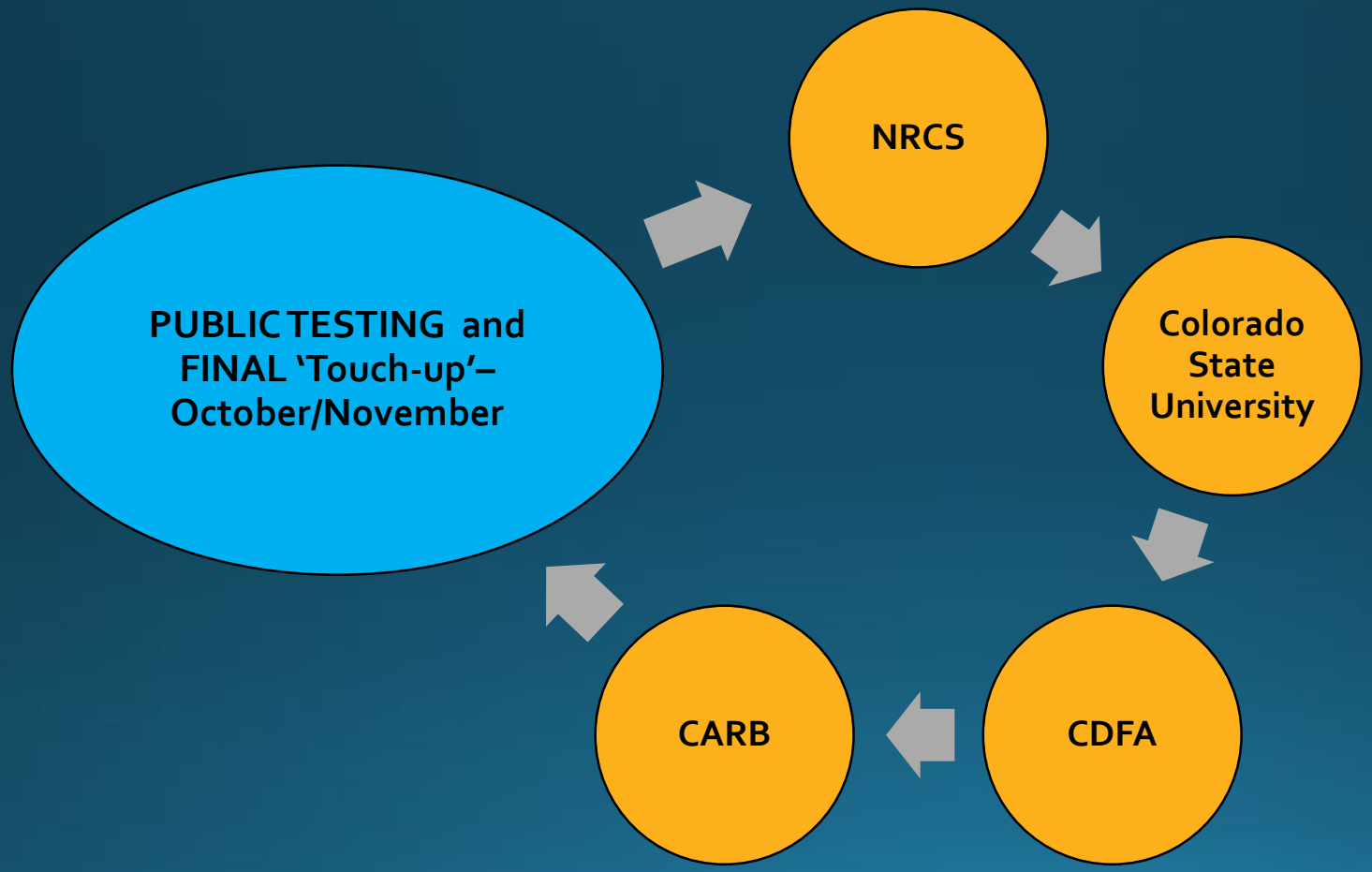


New This Year! Economics

New This Year – Economics

NRCS Conservation Practices (Click Practice Name for Documentation)	Enter Unit Value	Carbon Dioxide	Nitrous Oxide	Methane	Total CO_2-Equivalent	Estimated HSP payment dollars for the Project Term
[Info] **Alameda, CA** Conservation Cover (CPS 327) - Convert Non-Irrigated Cropland to Permanent Unfertilized Grass Cover - Monarch Species - Mix [delete]	10 Acre(s)	0.5	0.9	0	1	$22,222.60
[Info] **Alameda, CA** Conservation Cover (CPS 327) - Convert Non-Irrigated Cropland to Permanent Unfertilized Grass Cover - Native Species [delete]	10 Acre(s)	0.5	0.9	0	1	$2,807.40
[Info] **Alameda, CA** Cover Crop (CPS 340) - Add Legume Seasonal Cover Crop to Non-Irrigated Cropland - Multiple Species [delete]	10 Acre(s)	3	-0.7	0	2	$4,410.00
Total		**4.00**	**1.10**	**0.00**	**5.10**	**$29,440.00**

Team Work – It Works. . . .Public and Final Testing



cdfa

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

State Water Efficiency and Enhancement Program Update

ENVIRONMENTAL FARMING ACT SCIENCE ADVISORY PANEL
JANUARY 21, 2020

Proposition 68

On June 5, 2018 California voters approved Proposition 68.

$4 billion in bond funding was authorized for environmental protection project, water infrastructure, and flood protection.

CDFA's SWEEP program received $20 million.

CDFA planned two solicitations for the $20 million

- The first application period was held December 28, 2018 – March 13, 2019
- Projects began September 1, 2019
- Second solicitation held October 21 – December 16, 2019

Project Types

Water Conservation

- Sensors for Irrigation Scheduling *(weather, soil or plant based)*
- Micro-Irrigation or Drip Systems

AND

GHG Reductions

- Fuel Conversion
- Improved Energy Efficiency
- Low Pressure Systems
- Variable Frequency Drives
- Reduced Pumping

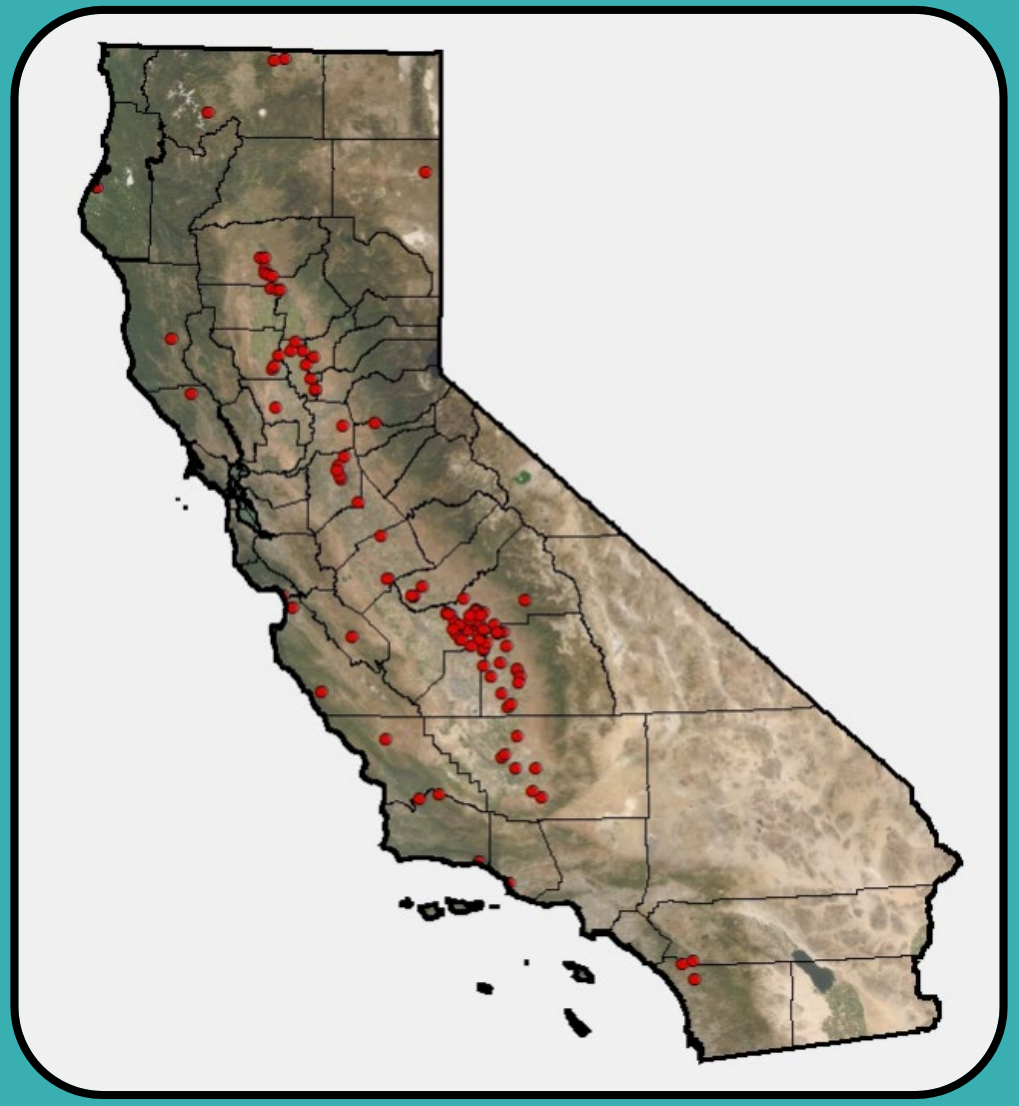
Review of 2018 SWEEP Outcome

2018 Applications

- 343 application received
- $27.6 million requested
- $19.3 million in matching funds

2018 Awards

- 109 executed agreements
- $9.4 million awarded
- $6.6 million in matching funds
- $3.1 million going to 36 projects benefitting Severely Disadvantaged Communities



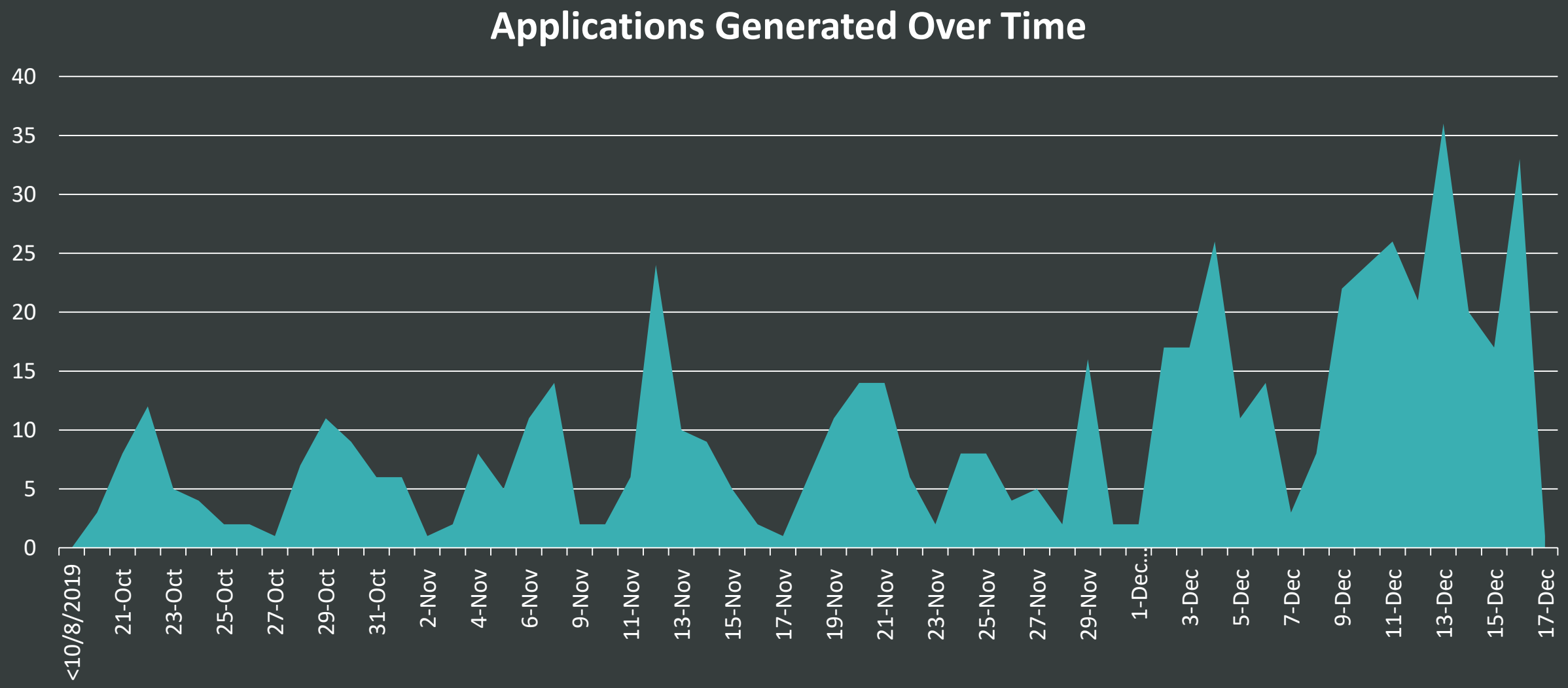
2019 SWEEP Application Period

SWEEP closed the 2019 solicitation on December 16, 2019 after an 8 week application period.

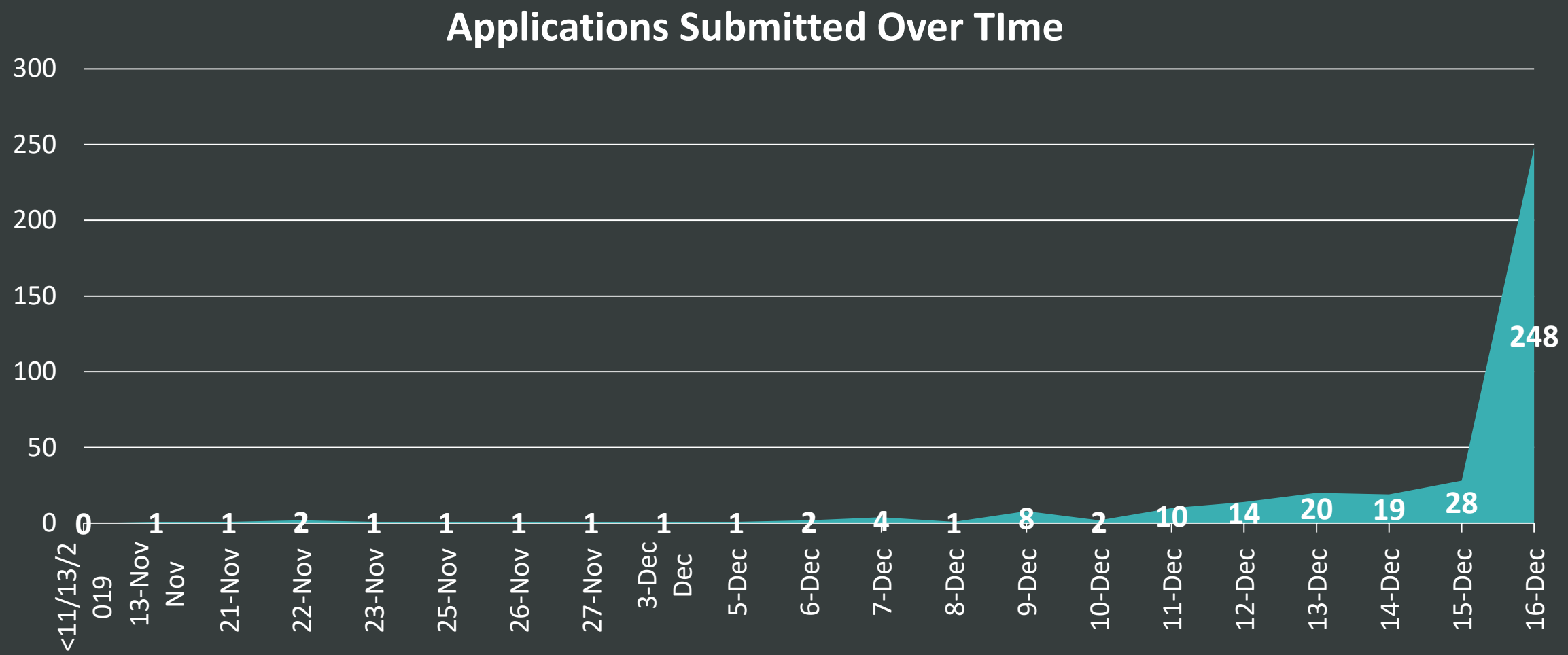
366 applications were submitted

- $28.7 million requested
- $14.9 million in matching funds
- $6 million requested from 80 Socially Disadvantaged Farmers and Ranchers (SDFRs)
- $6.5 million requested from 80 projects benefitting Severely Disadvantaged Communities (SDACs)

2019 SWEEP Applications Generated



2019 SWEEP Applications Submitted

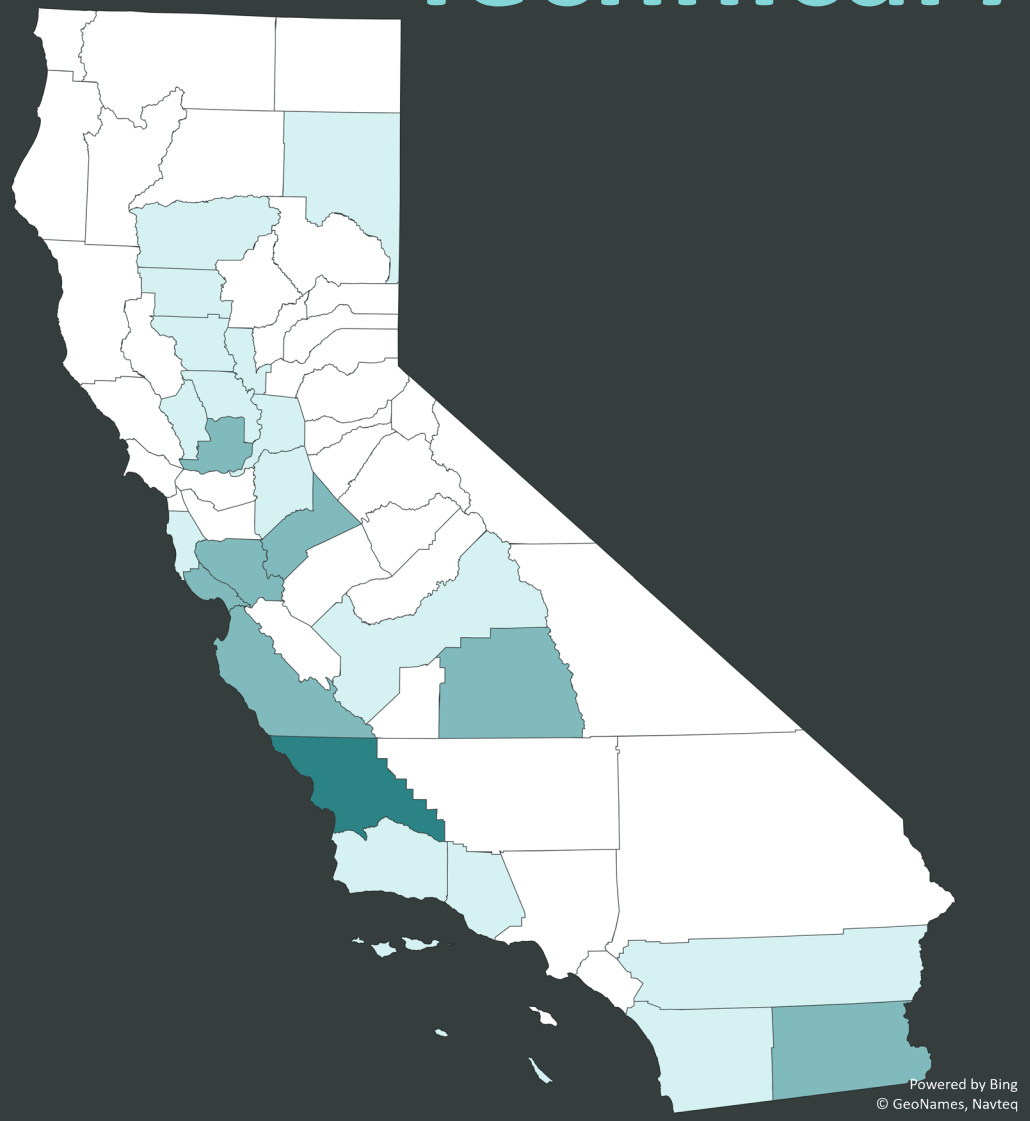


Request for Grant Applications and Timeline

- No changes to the Request for Grant Applications from previous round
- Approximately $7 million available to award
- Anticipate funding 70-90 projects

Item	Timeframe
Review Process	Winter 2019 - 20
Anticipate Announcing Awards	March - April 2020
Projects' Start Date	June 15, 2020
Implementation Timeframe	June 15, 2020 – December 31st, 2021

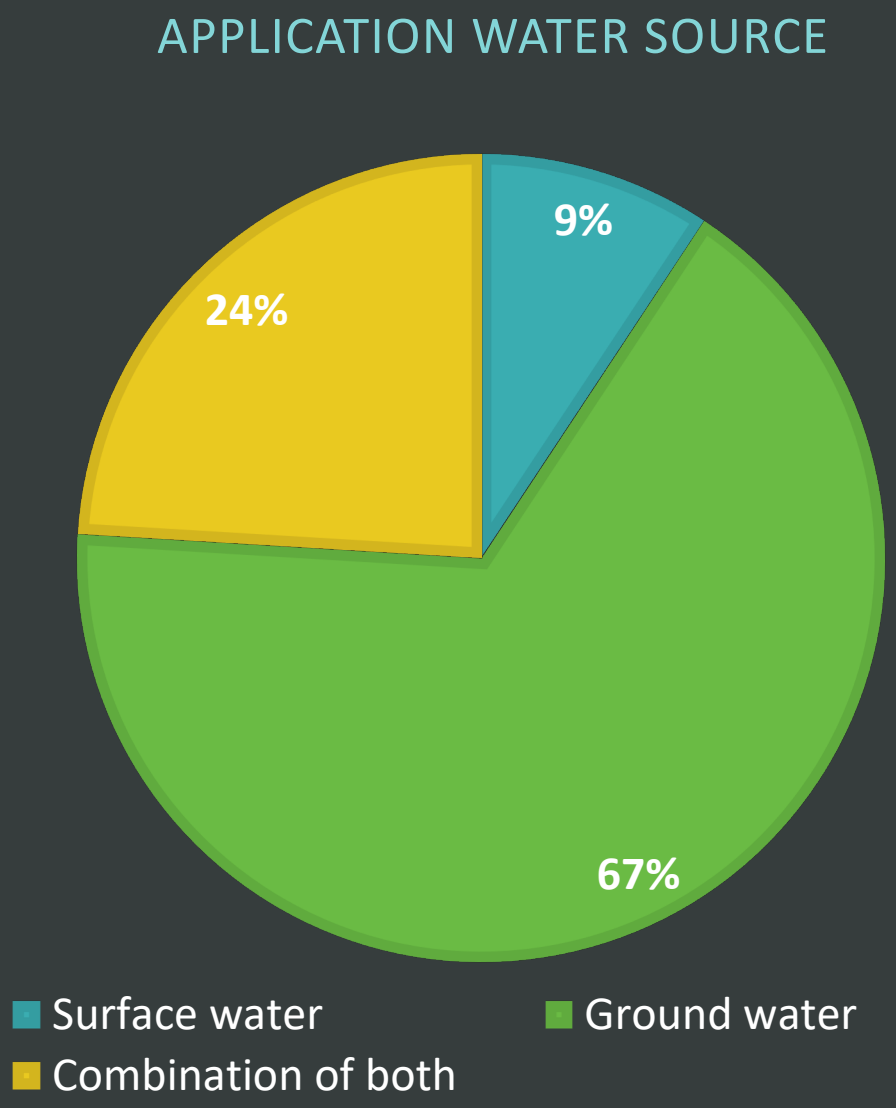
Technical Assistance Providers



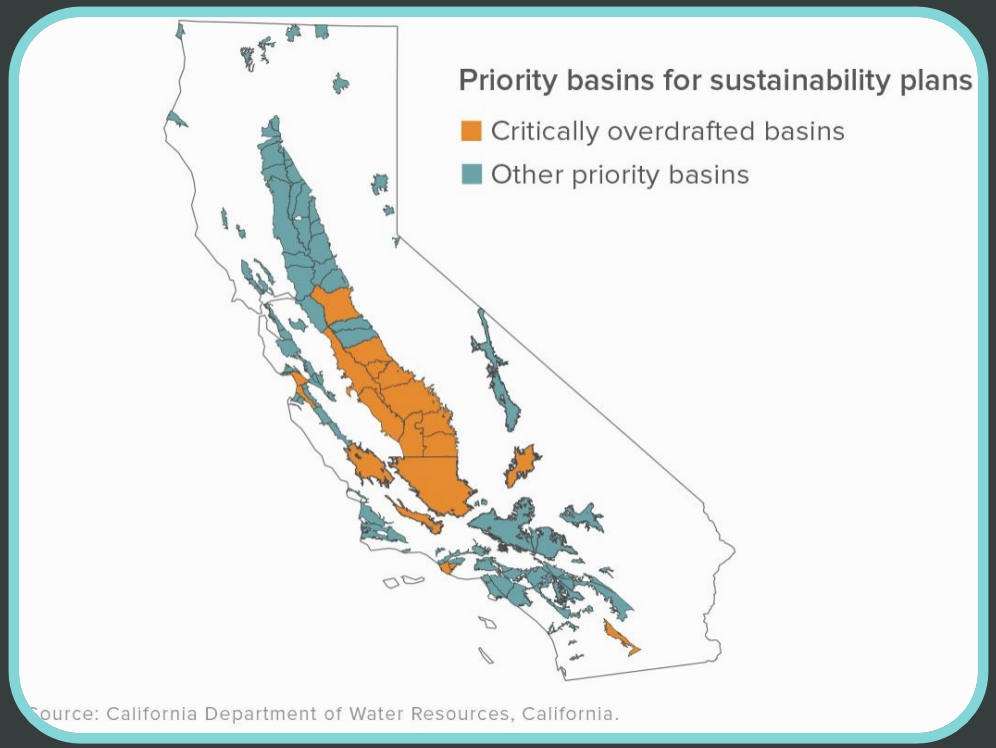
- 34 Technical Assistance Providers (TAPs)
  - 20 RCDs
  - 10 Non-Profit Organizations
  - 4 Universities

- 251 applications indicate that they received some form of technical assistance
  - TAPs
  - UCANR Community Outreach Specialists
  - Venders, irrigation districts, family members
  - Other farm agencies

2019 Applications Water Source

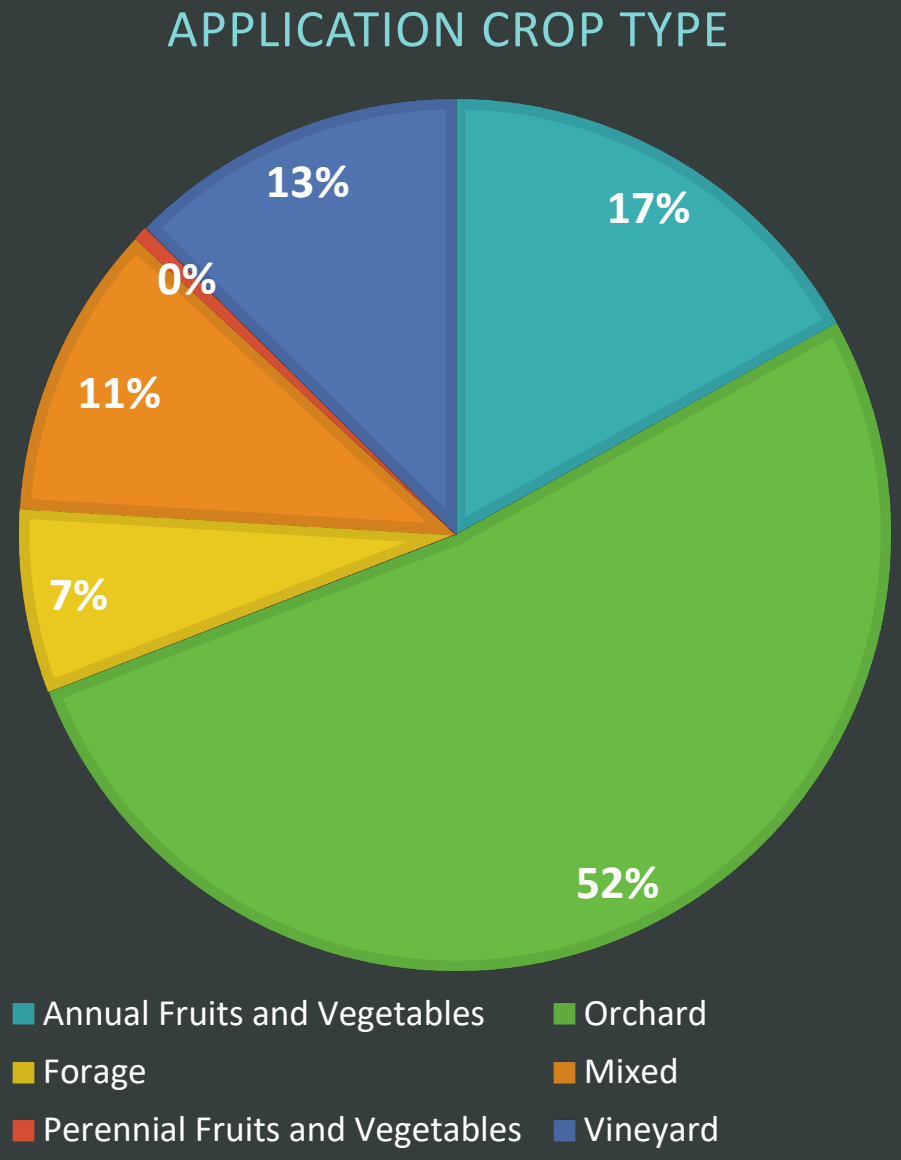


- 198 projects fall into a Critically Over-drafted Groundwater Basin
- 31 projects indicate that they will be utilizing recycled water or storm water capture



Application Information

- 238 applications would commit to one of the four of soil management practices – cover cropping being our highest subscribe practice
- 174 (48%) applications propose some kind of fuel conversion
- 345 (94%) applications agreed to attend irrigation training
- 33 (9%) of applicants indicated that they have previously received an SWEEP award



2019 Applications Received

County	#	County	#
Amador	2	San Benito	2
Butte	16	San Diego	8
Colusa	9	San Joaquin	18
Fresno	83	San Luis Obispo	17
Glenn	21	Santa Barbara	4
Imperial	4	Santa Clara	13
Kern	9	Santa Cruz	4
Kings	8	Siskiyou	2
Lassen	2	Solano	7
Madera	11	Sonoma	3
Mendocino	1	Stanislaus	12
Merced	14	Sutter	6
Modoc	1	Tehama	15
Monterey	16	Tulare	29
Placer	1	Ventura	12
Riverside	1	Yolo	11
Sacramento	2	Yuba	2

Thank you!

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

SWEEP TEAM

CAROLYN COOK

Senior Environmental Scientist, Supervisor

SCOTT WEEKS

Environmental Scientist

STEPH JAMIS

Environmental Scientist

AB2377 Climate Smart Agriculture Technical Assistance Grants

Update to the Environmental Farming Act Science Advisory Panel

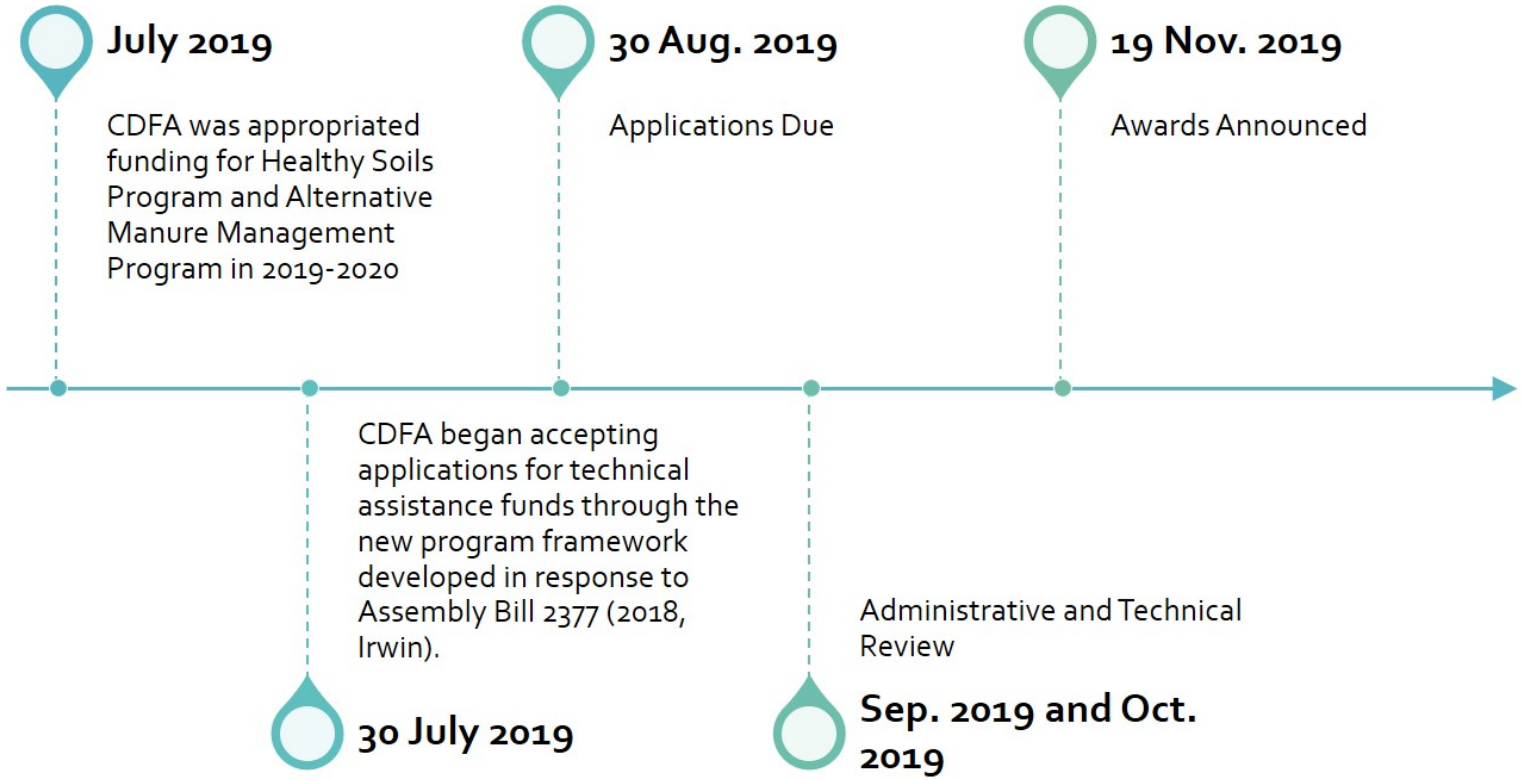
January 21, 2020

Carolyn Cook, MSc
Senior Environmental Scientist, Supervisor
Office of Environmental Farming and Innovation
Carolyn.cook@cdfa.ca.gov

cdfa

CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

Recap of 2019 Solicitation Timeline



News Release

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

Media Contacts: CDFA Public Affairs, (916) 654-0462, steve.lyle@cdfa.ca.gov

CDFA SELECTS 33 ORGANIZATIONS FOR CLIMATE SMART AGRICULTURE TECHNICAL ASSISTANCE FUNDING

Release #19-113

Print This Release

SACRAMENTO, November 19, 2019 – The California Department of Food and Agriculture (CDFA) has selected 33 organizations for Climate Smart Agriculture Technical Assistance awards, totaling $2.1 million. With these funds, the recipients will provide technical assistance

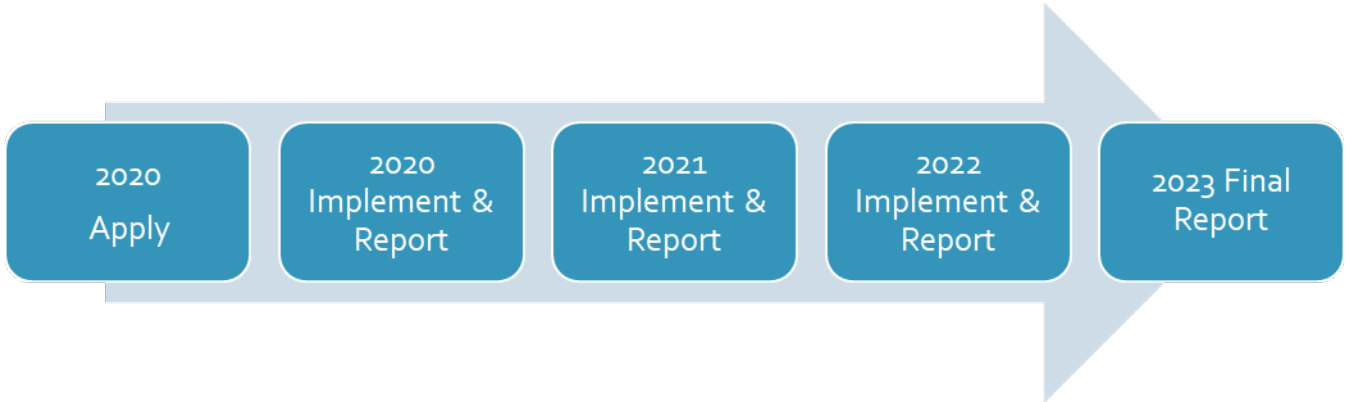
Summary of Awardees

Thirty-three Organizations

- CSA Program
  - 1 will provide assistance for AMMP only
  - 25 will provide assistance for HSP only
  - 7 will provide assistance for both programs
- Organization Type
  - 4 University of California awardees
  - 14 non-profits
  - 15 Resource Conservation Districts
- Funding Breakdown – California Climate Investments
  - AMMP - $394,000
  - HSP - $1,746,000
  - **Total of $2.1 million**
- Statewide coverage
- List of awardees

Next Steps

- Grant agreements' start date is January 13, 2020
- Three year grant term
- Training for technical assistance providers from Healthy Soils Team and Alternative Manure Management Team
- Technical assistance providers provide application assistance in early 2020
  - Priority to Socially Disadvantaged Farmers and Ranchers
  - Agricultural operations less than 500 acres
- Work with CSA awardees through implementation to March 31, 2023
- Attend annual coordination and information-sharing meeting



Thank you!

@CDFAClimateNews

https://www.cdfa.ca.gov/oefi/technical/index.html