# Carbon Farming

## What is this measure?

This measure would increase the carbon stored in working lands by providing financial assistance to ranchers and farmers who implement one or more defined conservation measures. These measures including applying compost to rangelands and croplands, changing grazing and cropland management practices, planting hedgerows, and restoring riparian areas.

## Why would someone do this as mitigation?

Conservation practices on working lands provide greenhouse gas benefits through several mechanisms. Some measures increase the rate at which plants sequester $CO_2$ from the atmosphere into organic carbon in soil or trees. Other measures reduce $N_2O$ emissions associated with fertilizer use. The USDA has evaluated a range of conservation measures and provided technical guides for implementing measures[1] and guidance for evaluating their greenhouse gas impacts[2]. The California Department of Food and Agriculture has developed additional recommendations for compost application to cropland and rangeland[3].

Several ranches in Marin County have demonstrated management practices that increase carbon sequestration[4]; one ranch in Santa Barbara County is currently participating in another demonstration project[5]. Currently, field trials are ongoing at the ranch to verify the impacts from implementing the management practices. The ranches have seen improvements in soil health, forage, and productivity. There are opportunities to expand these practices in Santa Barbara County. The cost of implementation, and especially the cost of obtaining high quality compost, is an obstacle to further expansion of these practices, so mitigation funds that facilitate these projects could lead to greater adoption throughout the county.

Under AB 1826 local jurisdictions around the state are implementing programs to divert organic waste from landfills[6]. This reduces greenhouse gas emissions of methane from landfills and also means more compost and mulch will be available for use. Finding beneficial uses for the compost and mulch can support the implementation of AB 1826.

## How would you implement this measure?

### *Implementing Agency*

It's expected the Cachuma Resource Conservation District (CRCD) would work with local farms and ranches to develop and implement carbon farm plans. These plans would identify the specific practices that each farm or ranch would adopt, taking into account the specific conditions at each location. The plans also identify the monitoring and recordkeeping necessary to track the implementation and effectiveness of each measure.

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[1] https://efotg.sc.egov.usda.gov/treemenuFS.aspx
[2] https://www.usda.gov/oce/climate_change/estimation.htm
[3] https://www.cdfa.ca.gov/oefi/healthysoils/docs/CompostApplicationRate_WhitePaper.pdf
[4] http://www.marincarbonproject.org/
[5] http://www.rcdsantabarbara.org/climate/carbon-farming/
[6] http://www.calrecycle.ca.gov/recycle/commercial/organics/

### *Enforceability*

It's expected that projects funded by this program would commit to implementing the practices identified in the carbon farm plans. The conservation practice standards provide guidance for determining whether a practice is appropriate for local conditions, and provide guidance for ongoing operation and maintenance.

### *Interaction with Existing Programs*

The Community Environmental Council (CEC) is currently conducting an analysis of compost supply[7] in San Luis Obispo, Santa Barbara, and Ventura Counties, to determine the availability of compost suitable for rangeland application.

Some funding is available statewide through the Healthy Soils Initiative[8] to implement management practices statewide. It's unlikely that this funding would be sufficient for all of the farms and ranches in the county that could implement conservation practices.

CAPCOA has approved a GHG banking protocol for compost additions to grazed grasslands[9]. This protocol could be used to bank GHG credits for one type of practice. It does not provide a method for quantifying the benefits of the many other practices that might be implemented. To date, no projects have generated credits using the CAPCOA protocol. Anecdotally, it appears that the cost of verification has been an obstacle to implementing the protocol.

## How would you quantify the benefits?

For projects funded through the Healthy Soils Initiative, CARB has published a quantification methodology[10]. The methodology uses two on-line tools, COMET-Planner[11] and Compost-Planner[12]. These tools are publicly available and free of charge. The total area affected by each practice is tracked and input into the tools to calculate the GHG benefits from implementing the defined conservation measures.

[7] http://www.cecsb.org/rethink-food/carbon-farming/
[8] https://www.cdfa.ca.gov/oefi/healthysoils/HSInitiative.html
[9] http://www.ghgrx.org/
[10] https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/cdfahsfinalqm16-17.pdf
[11] http://www.comet-planner.com/
[12] http://www.compost-planner.com/

## Input Received

### *Comments Made at Workshops*

Opportunities:

- Demonstrated local support for this measure, including a demonstration project that is underway.
- Complements goals of increasing composting in the county.
- Potential to support composting on-site at farms or ranches, to reduce trucking.
- Potential to improve soil quality and productivity at farms and ranches.
- Potential to do mitigation projects very near proposed oil and gas projects that will be seeking GHG mitigation.

Challenges:

- Compost and application is still expensive.
- Concerns about the quality of compost from the proposed materials recovery facility at Tajiguas.
- Should limit trucking of green waste before it is composted, to limit the potential spread of pests and diseases.
- Ensuring good compost quality and correct carbon:nitrogen ratios requires training and experience. On-farm composting may require farmers and ranchers to take on a new task that is not part of their core operations.
- Orchard and vineyard cuttings, food scraps, and other organic material are still viewed as waste, rather than potential resources for creating a beneficial product.

Potential Implementers:

- Cachuma Resource Conservation District
- County Ag Commission
- Local nonprofit organizations

### *Comments Submitted in Writing*

The Community Environmental Council (CEC) submitted a letter on July 5, 2017.[13] Below are the comments from the letter related to EV charging infrastructure:

- In addition to compost applications, include other carbon farming practices as mitigation.
- Provide clarification on the methods and assumptions used in the spreadsheet.
- Consider co-benefits including: enhanced soil health, increased agricultural revenue, higher agricultural production, natural resource protection, and greater land and agricultural resiliency.

The Community Environmental Research Project of the Santa Maria Valley submitted a letter at the Santa Maria workshop. Below is a summary of the comments from the letter:

- There should be more study as to the desirable plant community to be established, and local soil and weather conditions should be considered.
- Changing management practices is a more ecologically sound approach than mass mulching.

[13] Comments from the Community Environmental Council (CEC) were received July 5, 2017 (prior to the workshops), see www.ourair.org/ghgmitigation-sbc/.

- Could applying dark mulch produce temperature impacts similar to dark pavement?
- Concern that mulch could cause negative environmental impacts, including impacts on soil, species composition, burrowing and ground dwelling animals, and water.

## Additional District Discussion

- Considering the environmental impacts of proposed management practices on soil quality and plant and animal communities is important to establishing a successful program. The following features can address potential negative impacts:
    - **Limiting the program to working lands.** The program should not include actions that impact intact, healthy native plant communities.
    - **Consultation with a qualified expert.** A certified rangeland manager, NRCS Soil Conservationist, or Qualified Extension Agent should be consulted prior to implementing any conservation practices. The consultation should include an evaluation of the project area's soil types, current management practices, and existing plant and animal communities. The purpose of this is to identify which practices are appropriate for the farm or ranch. For rangelands, this consultation should also determine a sustainable stocking rate to ensure that the plant community species composition is not negatively impacted.
    - **Using USDA-NRCS Conservation Practice Standards or CDFA guidelines.** The USDA-NRCS Conservation Practice Standards were developed originally to promote conservation of soil, water, air, and related plant and animal resources. By following these standards, we would expect beneficial impacts at the project sites. Similarly, the CDFA guidelines on compost production, application rates, and carbon:nitrogen ratio are intended to ensure that compost application has beneficial impacts on soil health and minimize the potential for negative impacts on plant communities. It should be noted that the CDFA guidelines acknowledge that research on this is ongoing, and recommended application rates may be revised.
- One question that was asked was regarding whether dark compost additions could create a heat island effect. The urban heat island effect is documented to occur in urban areas where dark concrete or asphalt areas have higher temperatures, because dark surfaces absorb more solar radiation. Applying compost to rangeland or cropland wouldn't be expected to cause a heat island effect because any change in soil color would be minor and temporary, as the compost is incorporated into the soil.
- Compost quality, quantity, and price were identified as critical challenges to be overcome. One recommendation was to facilitate on-farm composting of materials before they are mixed into the waste stream. This could reduce trucking costs and reduce the chance for contaminating the organic material with plastics or other non-organics that would impact the quality of the compost.