

**Comment 1 for Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) - 1st Workshop.**

First Name: David

Last Name: Morell

Email Address: dmorell17@gmail.com

Affiliation: Sonoma Ecology Center

Subject: Using Biochar to Sequester Carbon in CA Agriculture

Comment:

Closing the Circle:

Linked Responses to California's Critical Environmental Challenges

Presentation by David Morell, PhD

Sonoma Ecology Center/Sonoma Biochar Initiative

I am pleased to present these insights and recommendations to this ARB workshop as we focus on preparing the best possible scoping plan for the ongoing effective implementation of AB 32.

California at this time faces three difficult environment-based challenges: continuing water shortages and ever-higher water costs; risks of massive forest fires associated with millions of dead trees caused by the drought and its related bark beetle infestation; and growing need to increasingly reduce CO2 and other greenhouse gas emissions in response to climate change imperatives.

Meeting these three challenges simultaneously sounds daunting; and it surely is. But an efficient new integrated response to these related challenges is now available: biochar.

Biochar is a specialized form of charcoal made at high temperature in a low oxygen environment (a process termed "pyrolysis"). Combined with compost or similar nutrients, biochar has been demonstrated to retain soil moisture, improve soil health, increase soil organic matter, expand crop yields, and sequester carbon safely for decades or longer. The physical structure of biochar, with its literally millions of tiny pores, holds water from leaching away; its chemical characteristics stimulate uptake of nutrients in the soils by the plants' roots.

Over the past several years the team that I lead at the Sonoma Ecology Center has been exploring and demonstrating the value of using biochar in local agriculture. With support from USDA Natural Resources Conservation Service and the Sonoma County Water Agency, among others, we have had several impressive positive results. At one high-end vegetable farm near Sonoma, for example, our results showed literally 50 percent more soil moisture in the test plot (in which biochar and compost were applied) as compared to the adjacent control plot (with compost alone).

Using biochar as a soil amendment in California agriculture can

save millions of acre/feet of water saved every year. This is true for the state's almond, walnut, and citrus orchards, vegetable fields, vineyards...across the board. Research efforts and field demonstrations like ours in Sonoma document significant savings – sometimes more, sometimes less, with variations due to soil conditions, crops being grown, historical farm practices, and irrigation techniques.

Saving that much water will allow California farmers to save many millions of dollars. New financial instruments can be designed to allow eligible farmers to cover the costs of applying biochar to their farm's soil with repayments made over 10 years or so out of money gained by their water savings. These loans could be guaranteed by the state's new Water Bond or AB 32 funds.

Where can we obtain all this new biochar? At what cost? Here's where the forest challenge comes in and we begin to close the circle, since the biochar can be created from the millions of dead trees in California's drought-ridden forests. A few of the state's dozen or so existing biomass-to-energy facilities can be readily converted make biochar rather than wood ash while still producing heat and energy from the woody biomass. One such facility in Northern California has already been converted – it is now producing high-quality biochar that is being made available to farmers at prices impossible before: less than \$100/cubic yard delivered to local farms.

These facilities currently face closure as their electricity sales contracts come to an end; biochar sales can play a role in helping to sustain them, retaining their highly skilled operators. Using dead and dying trees in this way allows us to thin the state's forests carefully, thereby greatly reducing forest fire risks. At the same time, many new jobs will be created in rural areas. (As for cost concerns, California has spent over \$3 billion in recent years fighting these fires, and that's not counting the costs to devastated communities.)

Finally, there's climate change. California already leads globally in creating renewable energy supplies (solar, wind, and geothermal), encouraging energy conservation in residential and commercial buildings, and creating appropriate legislative incentives: AB 32 and Sonoma Clean Power are two excellent examples. While these initiatives all help reduce new carbon emissions into the atmosphere, moving us towards "carbon neutral", none of them work to remove carbon from the atmosphere by placing carbon underground, an action that is truly "carbon negative." Using biochar in California agriculture does just this, burying thousands of tons of elemental carbon in the ground for decades, where it will save water while reducing forest fire risk. Now the circle is truly closed, proving once again the classic ecological principle that all systems are linked to one another in nature. By adding this approach to the AB 32 scoping plan we can accelerate its implementation throughout water-using California agriculture.

Dr. David Morell ([dmorell17@gmail.com](mailto:dmorell17@gmail.com)) is Vice Chair of the Board of Directors and Treasurer of the Sonoma Ecology Center, where he directs the organization's biochar activities including the Sonoma County Biochar Project. His career includes senior positions in the US Environmental Protection Agency, State of California Department of Health Services, Santa Clara County, and Princeton University's Center for Energy and Environmental Studies.

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2016-04-27 08:31:18

No Duplicates.

**Comment 2 for Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) - 1st Workshop.**

First Name: Don

Last Name: Mosley

Email Address: plan2succeednow@yahoo.com

Affiliation:

Subject: Emission

Comment:

Hello,

I have a question for the panel: With the recent reduction of the amount of Co2 being released in the air, what can the citizens expect to gain. Being that most of us are footing the bill or have contributed to the researchers and the many test that is ran each day. I currently work for an agency were our client is reducing the CO2 by a considerable amount. Will they and others received any tax incentives? If not, other than clearing breathing air what can expect?

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2016-04-27 17:05:45

No Duplicates.

**Comment 3 for Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) - 1st Workshop.**

First Name: Hiroko  
Last Name: Yoshida  
Email Address: jvyoshi@gmail.com  
Affiliation:

Subject: Updating manure management practice  
Comment:

Hello,

I hope that you could include the most simple way to reduce methane emission from manure storage lagoon in the methane emission reduction: solid separation.

Keeping organic matter from lagoon can cut down the methane emissions without resorting to more elaborated measures. Separated solid can be either aerobically stabilized via composting or land applied to prevent methane emission.

Hope this will be also considered.

Hiroko Yoshida, PhD

Attachment:

Original File Name:

Date and Time Comment Was Submitted: 2016-05-04 14:48:18

No Duplicates.

**Comment 4 for Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) - 1st Workshop.**

First Name: Chris

Last Name: McGlothlin

Email Address: [chris@ccgga.org](mailto:chris@ccgga.org)

Affiliation:

Subject: Comment - Public Workshop on the Agricultural Sector on the 2030 Scoping Plan Update

Comment:

Please review the attached comments below.

Attachment: [www.arb.ca.gov/lists/com-attach/6-scoplan2030ag-ws-VjAAbwBvAjAEbgFe.docx](http://www.arb.ca.gov/lists/com-attach/6-scoplan2030ag-ws-VjAAbwBvAjAEbgFe.docx)

Original File Name: Final CCGGA - 2030 Scoping Plan.docx

Date and Time Comment Was Submitted: 2016-05-11 12:43:27

No Duplicates.

**Comment 5 for Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) - 1st Workshop.**

First Name: Chris

Last Name: McGlothlin

Email Address: [chris@agprocessors.org](mailto:chris@agprocessors.org)

Affiliation:

Subject: Comment - Public Workshop on the Agricultural Sector on the 2030 Scoping Plan Update

Comment:

Please see attached comments.

Attachment: [www.arb.ca.gov/lists/com-attach/7-scoplan2030ag-ws-UTdUOWZpAzFROwhX.docx](http://www.arb.ca.gov/lists/com-attach/7-scoplan2030ag-ws-UTdUOWZpAzFROwhX.docx)

Original File Name: Final WAPA - 2030 Scoping Plan.docx

Date and Time Comment Was Submitted: 2016-05-11 12:51:41

No Duplicates.

**Comment 6 for Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) - 1st Workshop.**

First Name: Giana

Last Name: Amador

Email Address: giana.amador@centerforcarbonremoval.org

Affiliation: Center for Carbon Removal

Subject: Center for Carbon Removal Comment on 2030 Target Scoping Update  
Comment:

See attached file.

Attachment: [www.arb.ca.gov/lists/com-attach/8-scoplan2030ag-ws-BmUFYAd0VVlXMglo.pdf](http://www.arb.ca.gov/lists/com-attach/8-scoplan2030ag-ws-BmUFYAd0VVlXMglo.pdf)

Original File Name: CCR\_CARB\_2030\_Scoping\_Plan\_Update\_Comments.pdf

Date and Time Comment Was Submitted: 2016-05-11 13:48:06

No Duplicates.



**Comment 7 for Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) - 1st Workshop.**

First Name: Robert

Last Name: Parkhurst

Email Address: [rparkhurst@edf.org](mailto:rparkhurst@edf.org)

Affiliation: Environmental Defense Fund

Subject: EDF Comments on the Public Workshop on the Ag Sector  
Comment:

Thank you for the opportunity to provide comments. Please see the attached letter from EDF in response to the Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update.

Attachment: [www.arb.ca.gov/lists/com-attach/9-scoplan2030ag-ws-B2JdP1UyBAgGY1M8.pdf](http://www.arb.ca.gov/lists/com-attach/9-scoplan2030ag-ws-B2JdP1UyBAgGY1M8.pdf)

Original File Name: EDF Comments on the Public Workshop on the Ag Sector.pdf

Date and Time Comment Was Submitted: 2016-05-11 16:15:03

No Duplicates.

**There are no comments posted to Public Workshop on the Agriculture Sector to Inform the 2030 Target Scoping Plan Update URL: (scoplan2030ag-ws) that were presented during the Workshop at this time.**