

August 3, 2021

California Air Resources Board (CARB)
1001 I Street
Sacramento, California, 95814
Submitted Online

Re: Agroecology and pesticide reduction strategies must be included in the 2022 Scoping Plan Update

Dear Members of the California Air Resources Board:

Our food and farm system plays a critical role in greenhouse gas emissions (GHG) reductions, and at the same time, it can directly address air quality, environmental justice, public health, biodiversity and a myriad of other issues that face our state and the world. When considered holistically, such as by incorporating the production emissions from inputs like pesticides and fertilizers, food systems account for over 1/3 of global greenhouse gas emissions¹. Pesticide production, as well as use, has an impact on GHGs by both directly emitting them into the atmosphere and by inhibiting the ability of the soil to sequester carbon. Furthermore, and of deepest concern to our organization and the impacted residents we work with, pesticides are an issue of racial and environmental justice, posing a threat to public health, air quality, water quality, worker safety, biodiversity and community wellbeing.

Leadership Counsel for Justice & Accountability works alongside low-income communities of color, including rural residents and agricultural workers, to advocate for just, sound policies at the local, regional and state levels. We write as a follow up to the Natural and Working Lands workshop on July 20, 2021 to reiterate the importance of including pesticides in the Scoping Plan Update, particularly if CARB values and wants to respond to environmental justice concerns.

Pesticide reduction is both a climate and an environmental justice issue

Hundreds of rural communities are surrounded by large-scale industrial agriculture and experience extreme pollution burden from common agricultural activities that also release greenhouse gases. Residents in the low-income communities of color we work with in the most pesticide-burdened regions of California often experience the detrimental impacts of heavy pesticide application and drift incidents on top of agricultural burning, extreme dust pollution events caused by machinery used to harvest almonds, and other effects of industrial, resource intensive agriculture. Community members that we work with in La Viña, Madera County, for example, have expressed for years the devastating health and wellbeing impacts they experience from being carelessly exposed to pesticides at work and in the community: "it's like they want the community of La Viña to go away, because little by little, they're trying to kill off the

¹ United Nations. "Food systems account for over one-third of global greenhouse gas emissions." UN News. Accessed July 29th, 2021 at <https://news.un.org/en/story/2021/03/1086822>.

people with the chemicals they are spraying,” [one resident said](#). Both the greenhouse gas and air quality impacts of such practices are a relevant, intersectional environmental justice and climate issue that CARB must address in the Scoping Plan.

CARB has stated many times the importance of environmental justice in this Scoping Plan process and has an environmental justice advisory committee--several members of which brought up the issue of pesticides during the July 20th workshop--yet CARB continues to dismiss one of the major asks of environmental justice and public health communities who represent farmworkers, rural communities of color, and other pesticide-impacted communities. Pesticides pollute air and water and impact community health, putting the health of Latinx and farmworker communities in particular at disproportionate risk:

- According to the latest DPR data, about 20% of the 200 million pounds of pesticides applied each year in California are carcinogenic and many more are linked to a variety of health impacts including asthma, autism, Parkinson’s Disease, and developmental and reproductive harms.²
- Research by the California Environmental Protection Agency found that “60% of zip codes with the highest proportion of residents of color host [more than] 95% of agricultural pesticide use in the state.”³ Pesticides were one of the top two pollutants whose distribution was most correlated with race and ethnicity.
- In California, more than 90% of farmworkers are from Mexico.⁴ Farmworkers and their families experience high rates of exposure to pesticides because of lack of protective clothing or gear, their homes’ proximity to pesticide application, crowded and low quality housing, and lack of access to supplies needed to clean work clothes.⁵
- According to DPR, the top counties in terms of overall volume of pesticides applied are the Central Valley counties of Fresno, Kern and Tulare. All three counties are majority Latinx.⁶
- A 2013 report from the Center for Biological Diversity found that more than half of all glyphosate applications in California occurred in the 8 lowest-income counties in California, with a combined population that is 53% Latinx, compared with 38% for California as a whole.⁷

² Department of Pesticide Regulation annual Pesticide Use Reports. <https://www.cdpr.ca.gov/docs/pur/purmain.htm>.

³ Cushing, L., Faust, J., August, L. M., Cendak, R., Wieland, W., & Alexeeff, G. (2015). Racial/ethnic disparities in cumulative environmental health impacts in California: evidence from a statewide environmental justice screening tool (CalEnviroScreen 1.1). *American journal of public health*, 105(11), 2341-2348.

⁴ <https://www.alrb.ca.gov/wp-content/uploads/sites/196/2018/05/CalifFarmLaborForceNAWS.pdf>

⁵ McCauley, L. A., Lasarev, M. R., Higgins, G., Rothlein, J., Muniz, J., Ebbert, C., & Phillips, J. (2001). Work characteristics and pesticide exposures among migrant agricultural families: a community-based research approach. *Environmental health perspectives*, 109(5), 533-538.

⁶ US Census Bureau.

<https://www.census.gov/quickfacts/fact/table/tularecountycalifornia,kerncountycalifornia,fresnocountycalifornia/PS/T045219>.

⁷ Donnalay, N. (2015). Lost in the Mist. *The Center for Biological Diversity*.

https://www.biologicaldiversity.org/campaigns/pesticides_reduction/pdfs/LostInTheMist.pdf.

- Pesticides also put Latinx children in particular at higher risk. Data from the California Department of Public Health shows Latinx children are 91% more likely than white children to attend schools near the highest levels of most hazardous pesticide use.⁸

It is critical that emissions reductions included in CARB's Scoping Plan account not only for climate benefits but also public health and human wellbeing co-equal benefits for farmworkers, Black, Indigenous and People of Color (BIPOC) farmers, communities of color, and environmental justice communities.

Pesticides play a role in climate change and soil carbon sequestration

Numerous studies have concluded that use of synthetic pesticides results in greenhouse gas emissions. For example:

- Soil fumigants, which are injected as a gas or applied via irrigation into soil to control weeds, pests and soil borne diseases, can directly emit nitrous oxide (N₂O).
- Eighty to ninety percent of pesticides may volatilize within a few days of application.^{9,10} Volatile organic compounds (VOCs), including pesticide VOCs, react with sunlight and NO_x to form tropospheric ozone (O₃),¹¹ a GHG and harmful to plants and animals. In the San Joaquin Valley, 65% of VOC emissions are from non-fumigant pesticides including abamectin, chlorpyrifos, gibberellins and oxyfluorfen.¹²

Additionally, GHG emissions also occur from pesticide production itself, which is an energy-intensive process. A review of multiple studies also shows that organic farming has consistently lower energy use per acre than conventional farming.¹³ One study showed energy use to be reduced by up to 53% on organic farms compared to conventional.¹⁴

CARB discusses the importance of carbon sequestration on natural and working lands, which include agricultural soils, to help meet our state's climate goals. We would like to echo the points made by our partners at Californians for Pesticide Reform and Pesticide Action Network outlining the impact that pesticides have on soil carbon sequestration, which has been demonstrated in numerous research studies:

⁸ California Department of Public Health. (2014). Agricultural Pesticide Use Near Public Schools in California. *California Environmental Health Tracking Program*.

<https://www.phi.org/thought-leadership/agricultural-pesticide-use-near-public-schools-in-california/>.

⁹ Majewski, M. S. & Capel, P. D. (1996) *Pesticides in the atmosphere: distribution, trends, and governing factors*. Vol. 1 (Ann Arbor Press, Inc.; CRC Press.

¹⁰ Aktar, M. W., Sengupta, D. & Chowdhury, A. (2009) Impact of pesticides use in agriculture: their benefits and hazards. *Interdisciplinary toxicology* 2, 1-12, doi:10.2478/v10102-009-0001-7.

¹¹ Marty, M., Spurlock, F. & Barry, T. (2010) in *Hayes' Handbook of Pesticide Toxicology (Third Edition)* (ed Robert Krieger) 571-585 (Academic Press.

¹² <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=11273>

¹³ Schader, C., Stolze, M., & Gattinger, A. (2011). Environmental performance of organic farming. *Green Technologies in Food Production and Processing*, 183–210. doi:10.1007/978-1-4614-1587-9_8

¹⁴ Mäder, P., A. Fließbach, D. Dubios, L. Gunst, P. Fried, and U. Niggli. 2002. Soil fertility and biodiversity in organic farming. *Science* 296: 1694–1697.

- A recent review of almost 400 studies showed pesticide use was associated with damage to soil invertebrates in more than 70% of the studies.¹⁵ Soil invertebrates are critical to carbon sequestration in soils, being responsible for the formation of more than 50% of soil aggregates, which are essential to building soil organic carbon.¹⁶
- Research shows that soil microbial activity decreases proportionally to the amount of pesticides applied to the soil.¹⁷ Not only are soil microbes essential for the breakdown of carbon from organic matter, but they also help form stable soil organic carbon and persistent soil organic matter (SOM) through the formation of soil microaggregates, which protect SOM from decomposition.¹⁸ This process is essential for carbon sequestration in soils.
- Organic agricultural systems, which avoid the use of synthetic fertilizers and pesticides, have been found to significantly reduce greenhouse emissions -- with one study showing organic management to increase soil organic carbon by 36 percent after 12 years in California cropping systems.¹⁹
- Multiple meta-analyses comparing thousands of farms have shown that organic farming results in higher stable soil organic carbon and reduced nitrous oxide emissions when compared to conventional farming.²⁰
 - One meta-analysis of 59 studies found total soil organic carbon to be on average 19% higher in organic than conventional systems.²¹
 - Another metaanalysis found that organic farming practices led to soil organic carbon stocks that were 3.50 ± 1.08 Mg C ha⁻¹ higher than in nonorganic systems over a 14 year period, and could offset 36% of total emissions from the agricultural sector in the United States.²²

Given the evidence that pesticides damage and decrease soil life and its ability to sequester carbon, and CARB's pursuance of using soil as a land-based carbon sink to help meet the

¹⁵ Gunstone et al. (2021) Pesticides and Soil Invertebrates: A Hazard Assessment, *Frontiers in Environmental Science*. 9, 122. <https://www.frontiersin.org/article/10.3389/fenvs.2021.643847>.

¹⁶ Stork, N. E., and Eggleton, P. (1992). Invertebrates as determinants and indicators of soil quality. *Am. J. Altern. Agric.* 7, 38–47. doi: 10.1017/S0889189300004446.

¹⁷ AL-Ani, M. A., Hmoshi, R. M., Kanaan, I. A., & Thanoon, A. A. (2019, September). Effect of pesticides on soil microorganisms. *Journal of Physics: Conference Series* (Vol. 1294, No. 7, p. 072007). IOP Publishing.

¹⁸ Gougoulas, C., Clark, J. M., & Shaw, L. J. (2014). The role of soil microbes in the global carbon cycle: tracking the below-ground microbial processing of plant-derived carbon for manipulating carbon dynamics in agricultural systems. *Journal of the Science of Food and Agriculture*, 94(12), 2362-2371.

¹⁹ Horwath, W. R., Devevre, O. C., Doane, T. A., Kramer, T. W., and van Kessel, C. (2002). Soil carbon sequestration management effects on nitrogen cycling and availability. In "Agricultural Practices and Policies for Carbon Sequestration in Soil" (J. M. Kimble, R. Lal, and R. F. Follett, Eds.), 155–164.

²⁰ Ghabbour E, G. Davies G, Misiewicz T, Alami R, Askounis E, Cuzzo N, Filice A, Haskell J, Moy A, Roach A, and Shade J. 2017. National Comparison of the Total and Sequestered Organic Matter Contents of Conventional and Organic Farm Soils. *Advances in Agronomy*. 146: 1-35. <https://doi.org/10.1016/bs.agron.2017.07.003>.

²¹ Lori M., Symnaczik S., Mäder P., De Deyn G., Gattinger A. 2017. Organic farming enhances soil microbial abundance and activity – A meta-analysis and meta-regression. *PLOS ONE*. 25. <https://doi.org/10.1371/journal.pone.0180442> July 12.

²² Gattinger, A., A. Muller, M. Haeni, C. Skinner., A. Fliessbach, N. Buchmann, P. Madder, M. Stolze, P. Smith, N.E. Scialabba, and U. Niggli. 2012. Enhanced topsoil carbon stocks under organic farming, *PNAS*. 109 (44) 18826-18231. <https://doi.org/10.1073/pnas.1209429109>

state's climate goals, it is critical that CARB address pesticides as part of the natural and working lands climate strategy in the Scoping Plan Update.

While the majority of the few global and site-specific studies indicate that pesticides increase GHG emissions, there is much research still to be conducted and there is a need for quantitative models that take into account both direct and indirect contributions of pesticides to GHGs. CARB should robustly analyze these impacts of pesticides on GHG emissions--from production to transportation to application and incorporate specific targets into the Scoping Plan.

Recommendations

In light of pesticides' climate change impacts and harms to human health, disproportionately to rural and Latinx communities, we urge CARB to:

- **Add pesticide reduction and organic farming to the practices under the agriculture pathway** that the state will use to meet its AB 32 goals under the Natural and Working Lands program, and include specific acreage and pesticide use reduction goals.
- **Adopt a holistic approach towards climate change mitigation in agricultural systems that incorporates outcomes to community health** rather than agriculture and climate change alone. This includes supporting interim direct community protections communities most affected by pesticide exposure, while adopting policies to move away from intensive chemical pesticide use in agriculture.
- **Add the Department of Pesticide Regulation (DPR) as a primary collaborating department** with CARB on the 2022 Scoping Plan Update, in accordance with § 38561(a) of the California Health and Safety Code.
- **Develop a greenhouse gas measurement tool** that enables the state to measure the greenhouse gas emissions from the full life cycle of synthetic pesticides (from production to end use).
- **Counter the siloization that has kept pesticides out of prior scoping plans** by coordinating efforts across agencies and departments to adopt the following solutions to help move agriculture in California away from reliance on chemical pesticides in support of the state's climate change goals:
 - Align any incentives to favor and directly support the reduction of pesticide use in agriculture, with priority for farmers and land managers of color
 - Identify a sustainable and equitable funding source to support just, agroecological and regenerative organic farming. All public funding, research and implementation support should be shifted away from chemical reliance to support agroecological and regenerative organic farming
 - Focus funding, technical assistance and other support to California farmers on *prevention* of pest and disease problems
 - Support the transition to organic farming by subsidizing expenses for small-to-midsized underresourced farms, including the development of organic plans and certification, with priority for farmers of color
 - Establish scheduled public procurement goals, requiring government institutions such as public schools, hospitals, etc., to gradually increase the percentage of

their purchases from organic farmers, especially small- and medium-sized operations and farmers of color, with a goal of 100% organic by 2040

- Allocate resources for studying the long-term impacts of pesticides on human health in California agriculture
- **Fully integrate the Environmental Justice Advisory Committee (EJAC) into future Workshops and Board Meetings**, rather than schedule separate EJAC sessions, and ensure the committee can provide meaningful input into all pre-scoping activities, research, workshops and the 2022 Scoping Plan itself. The EJAC must be equipped by CARB to participate in substantive discussions and routine decision making in the development of the Scoping Plan.

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Thank you for the opportunity to comment specifically on the issue of pesticides. Further, regarding other natural and working lands issues for climate, we point you to our [previous Scoping Plan letter](#) that emphasizes the need to prioritize just, agroecological farming in agricultural climate solutions. We outline there the false promise of dairy digesters and urge CARB to better account for a fuller picture of lifecycle emissions and impacts--we also recently submitted a [letter](#) in response to CARB's Analysis of SB 1383 for dairy/livestock that provides more detail on this issue. We also echo in this previous Scoping Plan letter the need to prioritize meaningful, direct benefits to Black, Indigenous, Asian, Latinx and People of Color farmers to reverse inequities in farmland ownership, management, and land stability through culturally appropriate funding and technical assistance.

Thank you again for the opportunity to comment, and we would welcome a discussion with you or your staff on these topics to address any further questions or comments.

Sincerely,

J Jordan, Policy Coordinator
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