October 15, 2021

RE: Requesting EJAC Support for Pesticide Reduction Strategies to be Included in 2022 Scoping Plan

Dear Environmental Justice Advisory Committee Members,

The below Environmental Justice organizations and members of EJAC, along with impacted community members, are writing to request EJAC support for the inclusion of pesticide reduction strategies in the 2022 Scoping Plan.

Many of us have been calling for inclusion of pesticide reduction strategies in the state's Scoping Plan since 2017, only to be told by CARB that there is insufficient research and/or that pesticides contribute only a negligible amount to GHG emissions when compared with other sources. We agree that additional research in this area is needed, yet we have made research requests for years and no state resources have been devoted to further research on this topic. Moreover, sufficient research exists to incorporate some pesticide reduction strategies now, even while additional research moves forward.

Without explicit incorporation of support for organic farming and other strategies that can lead to pesticide reduction, California's current climate plans are ripe for incentivizing increased use of pesticides that will worsen contamination of air and water of local communities, leave farms less resilient, leave soil less healthy, will make California farming less competitive and will continue the loss of California's globally-recognized biodiversity and associated ecosystem services. Most significantly, this increased use of pesticides will also continue to disproportionately impact low income communities and communities of color. Current climate plans support farming practices, such as no till, which have not been conclusively proven to reduce greenhouse gas emissions but which lead to increased pesticide use unless farms are organic. Pest pressures are predicted to increase with climate change, and unless the state supports ecological methods and farming systems for addressing this challenge, pesticide use will increase.

We provide more details in the attached letter (one of many) submitted to CARB on this issue, but in short:

1. Hundreds of studies document how organic farming, which prohibits use of nearly all synthetic pesticides and fertilizers, naturally sequesters carbon and other GHGs at higher rates than farming reliant on chemicals. **It is critical that the Scoping Plan include measures supporting rapid transition of chemical-reliant farming to organic farming that focuses on building soil and plant health.**

2. More than 30 million pounds of pesticide Volatile Organic Compounds (VOCs) are used each year in California. We know that VOCs react with sunlight and nitrogen oxides to form tropospheric ozone, the third most important greenhouse gas as determined by the Intergovernmental Panel on Climate Change. Approximately 20 million pounds of these VOC pesticides are fumigants that have been shown to increase nitrous oxide (NOx)

emissions by 700-800%, a greenhouse gas 300 times more potent than carbon. **It is critical that the Scoping Plan incorporate strategies to reduce use of these GHG-producing pesticides.**

3. We agree with CARB that more research is needed, and we have urged CARB to devote funding and resources to meeting this need. **It is critical that CARB fund a full life cycle analysis of pesticides' impact on greenhouse gas emissions, from production to transportation to storage to use to disposal.**

4. The state needs to make a public commitment and adopt a common vision for the kind of agriculture we want to support as a state. The European Union has recently recognized the importance of reducing pesticide use for health, climate, viability of farming into the future, competitiveness as demand for organic increases, and other benefits. The EU's agricultural goals include the following:
    - reduce by 50% the use and risk of chemical pesticides by 2030
    - reduce by 50% the use of more hazardous pesticides by 2030
    - achieve 25% of total farmland under organic farming by 2030

    It is critical that the Scoping Plan explore and adopt similar pesticide-reduction and organic farming goals for the state, in addition to concrete pesticide-reduction strategies.

5. To be in compliance with its stated commitment to racial equity and social justice, CARB must incorporate pesticides in the Scoping Plan. Resolution 20-33, A Commitment to Racial Equity and Social Justice, emphasizes CARB's "mandate to analyze and reduce air pollution and greenhouse gas emissions in disadvantaged communities and communities of color." Pesticides are a significant environmental justice issue that can't be left out of the Scoping Plan:
    - Researchers at the California Environmental Protection Agency found that pesticides were the pollutants with the greatest racial and income disparities in the state. Almost all pesticides used in the state were in the California zip codes with the highest proportion of people of color.
    - Analysis of the latest pesticide data combined with demographic data reveals a pronounced racial disparity in concentration of pesticide use between counties with the largest share of Latinx residents and those with the smallest. California counties with a majority Latinx population use 906% more pesticides per square mile than counties with fewer than 24% Latinx residents. The two groups of counties have a similar total population and area. In the 11 counties with a majority Latinx population, there were 22 pounds of pesticides used per person in 2018, or 2,373 pounds per square mile. By contrast, for the 25 counties with the lowest proportion of Latinx residents (fewer than 24%), pesticide use was just 2.4 pounds per person, or 262 pounds per square mile.
    - An average person who lives in the 11 California counties with a majority Latinx population as compared to the 25 counties with the smallest Latinx proportions:
        - Is more than four times (430%) as likely to suffer from an acute pesticide-related illness
        - Lives where there are fourteen times (1,362%) more Carcinogenic agricultural pesticides applied per person

    - Lives where there are eleven times (1,074%) more agricultural pesticides listed as Reproductive and Developmental Toxicants applied per person.
- The greatest burden continues to be borne by the San Joaquin Valley, with well over half of all pesticides (108 million pounds) used in just five counties – Fresno, Kern, Tulare, San Joaquin and Madera. That equates to 33 pounds of pesticides for every person in those counties. In 2018 Fresno County, where more pesticides are used than any other county, saw an increase over the prior year of 2.7 million pounds.

It is critical that CARB follow its own commitment to environmental justice principles and include pesticide reduction strategies in the 2022 Scoping Plan.

In light of the above, we ask the EJAC to publicly support our call for CARB to include pesticide reduction strategies in the 2022 Scoping Plan. We are happy to offer a presentation or meet with any interested EJAC members in greater detail on this issue.

With thanks for all the important work you do and for your consideration of our request,

Sarah C. Aird and Jane Sellen, Co-Directors
Californians for Pesticide Reform

Byanka Santoyo, Community Organizer
Center on Race, Poverty & the Environment

Catherine Garoupa White, Executive Director
Central Valley Air Quality Coalition

Mikey Rincon, Environmental Policy Researcher
Physicians for Social Responsibility-Los Angeles

Kevin Hamilton, Co-Director and Co-Founder
Central California Asthma Collaborative

Bianca Lopez
Valley Improvement Projects

Anabel Marquez, Kern County Resident
Shafter Steering Committee Member

Maria Reyes, Community Organizer
Tulare County Coalition Advocating for Pesticide Safety

PESTICIDE ACTION NETWORK • NORTH AMERICA

Californians For Pesticide Reform

August 3, 2021

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

Re: Pesticides must be included in the 2022 Scoping Plan Update

Dear Members of the California Air Resources Board:

On behalf of the Pesticide Action Network (PAN) and the statewide coalition Californians for Pesticide Reform (CPR), we thank you for the opportunity to comment.

We urge CARB to include pesticide reduction and organic farming strategies within the 2022 Scoping Plan Update. Reducing the use of synthetic pesticides and supporting organic farming not only mitigates climate change, but also addresses serious environmental justice concerns affecting predominantly Latinx rural and farm-working communities throughout California.

We remain extremely concerned that the scientific research and our many letters since 2017 pointing to the contribution to greenhouse gas emissions of some of California's most heavily used pesticides continues to be disregarded by CARB. More than 60 other environmental justice, labor, environmental, sustainable ag and public health organizations share our concerns[1]. We face a climate and biodiversity crisis that cannot wait. Pesticides allow for farming practices that are the least beneficial for sequestering carbon and at the same time put at risk the health of nearby agricultural communities, their children, and species that are critically important to our food supply.

We urge CARB not to let another opportunity go by to set benchmarks for transitioning away from reliance on hazardous, drift-prone and highly polluting pesticides that contribute significantly to GHG emissions and inhibit the ability of soil to sequester carbon.

I. Address pesticides' contribution to greenhouse gas emissions in 2022 Scoping Plan

[1] July 9, 2021 letter signed by 54 organizations to CARB calls for inclusion of pesticides and organic farming in 2022 Scoping Plan:
https://www.pesticidereform.org/wp-content/uploads/2021/07/Sign-on-comment-letter-to-CARB-re-pesticides-in-scoping-plan-July-2021.pdf
January 5, 2021 letter signed by 59 organizations to Governor Newsom calling for inclusion of pesticides in 2022 Scoping Plan and Climate Lands Strategy:
https://www.pesticidereform.org/wp-content/uploads/2021/07/Sign-on-comment-letter-to-CARB-re-pesticides-in-scoping-plan-July-2021.pdf

Address commonly-used fumigants' contribution to GHG nitrous oxide emissions

In the Natural and Working Lands Update workshop hosted by CARB on July 20, 2021, CARB staff responded to a public comment about inclusion of pesticides in the 2022 Scoping Plan with the statement that there were only two pesticides that contribute to greenhouse gas emissions - namely methyl bromide and sulfuryl fluoride.

We believe this statement severely misrepresents and understates the scale of the problem and have previously shared with CARB staff studies that document significant greenhouse gas emissions from use of three other pesticides as we outline below:

- Soil fumigants, which are injected as a gas or applied via irrigation into soil to control weeds, pests and soil borne diseases, can cause increased emissions of nitrous oxide (N_2O). They represent roughly one-fifth of the pesticides used in California. A recent study shows that the application of the third most commonly used fumigant in California -- chloropicrin -- can increase N_2O production by 700-800%[2]. Researchers concluded that similar classes of fumigants would yield similar increases in emissions.
- A later study found that, in addition to chloropicrin, two other MITC-producing fumigants - metam sodium and dazomet - also increase nitrous oxide production significantly.[3] Altogether nearly 20 million pounds of these three fumigants are used every year on California fields.[4] This study didn't consider the MITC-producing fumigant metam potassium, another commonly-applied fumigant of which approximately 8.5 million pounds are applied in California each year, and which we expect would produce the same impact.
- Compared to fertilizer-induced N_2O emissions, which generally return to background rates within 2 weeks after application, the effect of fumigant-induced N_2O emissions were found to last more than 48 days.[5]

At a minimum, we call on CARB to measure and address the GHG contributions of the fumigant pesticides chloropicrin, metam sodium, metam potassium and dazomet and set benchmarks for their reduction or elimination.

Address pesticides' contribution to formation of GHG tropospheric ozone (O_3)

Eighty to ninety percent of pesticides may volatize within a few days of application.[6,7] Volatile organic compounds (VOCs), including pesticide VOCs, react with sunlight and NO_x to form

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[2] Spokas K., Wang D. 2003. Stimulation of nitrous oxide production resulted from soil fumigation with chloropicrin. *Atmospheric Environment* 37 (2003) 3501–3507. https://doi.org/10.1016/S1352-2310(03)00412-6

[3] Spokas K., Wang D., Venterea. R. 2004. Greenhouse gas production and emission from a forest nursery soil following fumigation with chloropicrin and methyl isothiocyanate. *Soil Biology & Biochemistry* 37 (2005): 475–485. https://doi.org/10.1016/j.soilbio.2004.08.010.

[4] Department of Pesticide Regulation annual Pesticide Use Reports. https://www.cdpr.ca.gov/docs/pur/purmain.htm.

[5] Spokas, K., Wang, D., Venterea, R. & Sadowsky, M. (2006) Mechanisms of N2O production following chloropicrin fumigation. *Applied Soil Ecology* **31**, 101-109.

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

[7] 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.

tropospheric ozone (O_3),[8] a GHG that is harmful to plants and animals. Tropospheric O_3 is **the third most important greenhouse gas** after carbon dioxide (CO_2) and methane (CH_4).[9] Its abundance is controlled primarily by emissions of CH_4, carbon monoxide (CO), nitrogen oxides (NOx), and VOCs. VOC pesticides include the fumigants methyl bromide, 1,3-dichloropropene, chloropicrin, metam sodium, metam potassium and dazomet. In California's San Joaquin Valley, VOC non-attainment areas, 65% of VOC emissions are from high VOC formulations of non-fumigant pesticides including abamectin, chlorpyrifos, gibberellins and oxyfluorfen.[10] The contribution of these pesticides must also be measured.

Address sulfuryl fluoride's contribution to GHG emissions

Sulfuryl fluoride is a toxic air contaminant and an extremely potent short-lived climate pollutant, reported to have a 20-year Global Warming Potential (GWP) of 6,840. It's also one of the most commonly used fumigants in the state, with almost 3 million pounds applied in California in 2018, mainly for structural fumigation but with 0.5 million pounds used for post-harvest fumigation of nuts and other commodities.[11] Between 50 to 60% of the entire global usage of sulfuryl fluoride takes place in California.[12] It is also an extremely toxic pesticide and a neurotoxin, which causes illness, disabilities and death. Although sulfuryl fluoride has been mentioned in previous Scoping Plans as a short-lived climate pollutant of concern, to our knowledge CARB has taken no action to curb its use. We call on CARB to incorporate strategies to reduce use of this fumigant.

II. Address pesticides' deleterious impact on soil's ability to sequester carbon in 2022 Scoping Plan

Synthetic pesticides inhibit the ability of soil to sequester carbon and can lead to increased use of synthetic fertilizers

Synthetic pesticides, through their deleterious effect on microorganisms, decrease the soil's capacity to sequester carbon, build soil organic matter (SOM) and provide the many associated benefits including cycling and provision of nutrients, suppression of phytopathogens, and building resistance to both biotic and abiotic stressors. Pesticide impacts include inhibition of N-fixing bacteria, decreased populations of mychorrhizal fungi, detrimental shifts in nematode populations, and decimation of earthworm populations.[13] Applications of the common fungicide captan, for example, is associated with decreased populations of N-fixing bacteria and

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

[9] Atmospheric Chemistry and Greenhouse Gases - IPCC https://www.ipcc.ch/site/assets/uploads/2018/03/TAR-04.pdf

[10] https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=11273

[11] Department of Pesticide Regulation annual Pesticide Use Reports. https://www.cdpr.ca.gov/docs/pur/purmain.htm.

[12] Gallagher, G., Zhan, T., Hsu, Y. K., Gupta, P., Pederson, J., Croes, B., ... & Wolf, K. (2014). High-global warming potential F-gas emissions in California: Comparison of ambient-based versus inventory-based emission estimates, and implications of refined estimates. *Environmental science & technology*, 48(2), 1084-1093.

[13] Pesticide Action Network (2020) Pesticides and Soil Health: State of the Science and Viable Alternatives http://www.panna.org/resources/pesticides-and-soil-health-state-science-and-viable-alternatives

increased populations of denitrifiers (and potential generation of NO_2).[14] Reduced N-fixation requires more synthetic N fertilizers, also leading to greater N_2O emissions.

- 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.

III. Add the Department of Pesticide Regulation as a consulting agency/department

We once again urge you to ensure that the Department of Pesticide Regulation (DPR) is consulted, in accordance with § 38561(a) of the California Health and Safety Code, which states that "The state board **shall** consult with all state agencies with jurisdiction over sources of greenhouse gases" (bolding added). Since CARB now acknowledges that, at a minimum, the pesticides methyl bromide and sulfuryl fluoride are greenhouse gases, and since DPR has jurisdiction over them, CARB is compelled to formally include DPR as a consulting agency. CARB currently lists 17 departments and agencies as collaborating partners on the 2022 Scoping Plan. We urge you to add DPR to this list.

IV. Incorporate organic farming as a critical nature-based climate solution

Previous Scoping Plans and the Public Workshop Series have not incorporated the latest science that outlines the climate benefits of organic farming. Achieving carbon neutrality requires building on proven tools for sequestering carbon and reducing emissions. UC California research points to organic farming as an effective method to sequester carbon and reduce emissions, particularly of methane.

- A UC Davis Long-Term Research on Agricultural Systems (LTRAS) study found that after 10 years, organic systems resulted in 14 times the rate of carbon sequestration as

[14] Martınez-Toledo MV, Salmeron V, Rodelas B, Pozo C, Gonzalez-Lopez J. 1998. Effects of the fungicide Captan on some functional groups of soil microflora. *Applied Soil Ecology* 7: 245–255; doi: https://doi.org/10.1016/S0929-1393(97)00026-7.
[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] Gougoulias, 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.

the conventional system[19]. After 20 years, organically managed soils sequestered significantly more soil organic carbon than conventionally managed soils[20].

- 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.[21]
- Organic crop and livestock production practices build long-term soil fertility, creating healthy soils that can store increased levels of nutrients, including carbon[22].
- The Rodale Farming Systems Trial, which is the longest running organic comparison study in the United States, documented that after 22 years, soil organic carbon increased by 15-28% in organically managed soils compared to 9% in the conventionally managed soils[23].
- An extensive 2017 study comparing soils from 659 certified organic farms and 728 conventional farms found that organic farms across 48 states sequester significantly more carbon than conventional farms[24].
- Globally, evidence shows that organically managed soils hold more carbon and have higher rates of carbon sequestration than soil from non-organic systems[25].
- All organic livestock producers must graze ruminant animals on pasture for a minimum of 120 days per year[26] while non-organic ruminants may be raised in confined feeding operations. UC Davis scientists found that dairy cow and heifer manure on pasture emits minimal GHGs compared to lagoon storage, liquid slurry storage, and dry lot manure, which together account for 98% of dairy manure methane emissions in California[27].
- One meta-analysis of 59 studies found total soil organic carbon to be on average 19% higher in organic than conventional systems.[28]

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[19] Kong, A. Y., Six, J., Bryant, D. C., Denison, R. F., & Van Kessel, C. (2005). The relationship between carbon input, aggregation, and soil organic carbon stabilization in sustainable cropping systems. *Soil Sci Soc Am J.*, 69, 1078-1085.

[20] 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.

[21] Horwath, W. R., Deveˆvre, 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.

[22] Suddick, E. C., Scow, K. M., Horwath, W. R., Jackson, L. E., Smart, D. R., Mitchell, J., . . . Six, J. (2010). The potential for California agricultural crop soils to reduce greenhouse gas emissions: a holistic evaluation. *Advances in Agronomy, 107,* 123-162.

[23] Pimentel, D., Hepperly, P., Hanson, J., Douds, D., & Seidel, R. (2005). Environmental, energetic and economic comparisons of organic and conventional farming systems. *Bioscience, 55*(7), 573-583.

[24] 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.

[25] Gattinger, A., Muller, A., Haeni, M., Skinner, C., Fliessbach, A., Buchmann, N., . . . Niggli, U. (2012). Enhanced top soil carbon stocks under organic farming. *Proc. Natl. Acad. Sci. U.S.A., 109,* 18226–18231.

[26] Rinehart, L., & Baier, Ann. (2011). Pasture for organic livestock: understanding and implementing the national organic program (NOP) pasture rule. *U.S. Department of Agriculture, Agricultural Marketing Service.* Retrieved from https://www.ams.usda.gov/sites/default/files/media/NOP_UnderstandingOrganicPastureRule.pdf.

[27] Kaffka, S., Barzhee, T., El-Mashad, H., Williams, R., Zicari, S., & Zhang, R. (2016). Evaluation of dairy manure management practices for greenhouse gas emissions mitigation in California. Final Technical Report to the State of California Air Resources Board

[28] 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.

- 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.[29]

Omitting whole-farm solutions like organic certification ignores the latest science and misses the opportunity to adopt multiple climate-smart practices through one strategy. Furthermore, agricultural practices currently emphasized in the Scoping Plan and the Draft California 2030 Natural and Working Lands Climate Change Implementation Plan, such as no-till, could result in an increase in pesticide use unless pesticide reduction is actively incentivized. For instance, a recent meta-analysis of peer-reviewed articles from 1985–2016 showed a greater concentration of atrazine, cyanazine, dicamba, and simazine in runoff from no-till than conventional till fields.[30]

V. Support research into life cycle analysis of pesticides' contribution to climate change

Pesticides' role in contributing to climate change has been insufficiently studied. The studies that do exist indicate that pesticides increase GHG emissions, but there is much research still to be conducted, and this research must be holistic and include all direct and indirect aspects of the pesticide life cycle: from production to transportation, storage, energy costs of application, emissions arising from applications, and pesticide-derived modifications of environmental processes involved in the GHGs flux exchanges[31].

VI. Pesticides are a critical environmental justice issue that must be addressed in the 2022 Scoping Plan

Make Scoping Plan processes accessible to environmental justice communities
Going forward, we urge CARB to make public workshops fully inclusive by scheduling them in the evening and by providing Spanish language interpretation. While CARB staff in the July 20 workshop noted with regret that the workshop was scheduled at a time that made participation difficult for many stakeholders, we would add that the workshop was offered only in English, despite the apparent effort to include environmental justice considerations in the presentation. Reducing pesticides not only mitigates climate change, but also addresses serious

[29] 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

[30] Elias, D., Wang, L., & Jacinthe, P. A. (2018). A meta-analysis of pesticide loss in runoff under conventional tillage and no-till management. *Environmental monitoring and assessment*, 190(2), 1-17.

[31] One nearly holistic study of pesticides' contribution to GHG emissions looked at a typical drip irrigated tomato system in South Florida. It showed agrochemicals as the largest contributor of GHG emissions. Pesticides (12.8% of agrochemicals applied) accounted for 61% of agrochemical-GHG emissions. Of those emissions, soil fumigants, fungicides and herbicides accounted for 34%, 17% and 10% respectively. Only energy used for production, transportation and storage were included; energy costs of application were not. Jones, C. D., Fraisse, C. W. & Ozores-Hampton, M. (2012) Quantification of greenhouse gas emissions from open field-grown Florida tomato production. *Agricultural Systems* **113**, 64-72, doi:https://doi.org/10.1016/j.agsy. 2012.07.007. Other studies have documented how organic farming uses consistently less energy per acre than conventional farming. 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. 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.

environmental justice concerns affecting predominantly Latinx rural and farm-working communities throughout California. Every effort should be made to ensure the inclusion of most impacted communities in plans that address their concerns.

Pesticides are an environmental justice issue that can't continue to be ignored

In addition to the climate benefits of reducing agricultural pesticide use, such reductions would also benefit rural communities that are currently impacted by the overuse of pesticides in industrial agricultural systems:

- Pesticides pollute air and water and impact community health, putting the health of Latinx and farmworker communities 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.[32]
- 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."[33] 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.[34] Farmworkers and their families experience high rates of exposure to pesticides because of weak enforcement of pesticide protections, their homes' proximity to pesticide application, crowded and low quality housing which can limit access to bathing facilities, and lack of adequate access to laundry facilities needed to clean work clothes.[35]
- 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.[36]
- 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.[37]
- Pesticides also put Latinx children in particular at higher risk.
    - Pesticide exposure in children has been linked to severe illnesses including cancer, neurodevelopmental harms and learning disabilities.[38]

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[32] Department of Pesticide Regulation annual Pesticide Use Reports. https://www.cdpr.ca.gov/docs/pur/purmain.htm.
[33] 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.
[34] https://www.alrb.ca.gov/wp-content/uploads/sites/196/2018/05/CalifFarmLaborForceNAWS.pdf
[35] 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.
[36] US Census Bureau. https://www.census.gov/quickfacts/fact/table/tularecountycalifornia,kerncountycalifornia,fresnocountycalifornia/PST045219.
[37] Donnaly, N. (2015). Lost in the Mist. *The Center for Biological Diversity.* https://www.biologicaldiversity.org/campaigns/pesticides_reduction/pdfs/LostInTheMist.pdf.
[38] Pesticide Action Network. (2016). Kids on the Frontline: How pesticides are undermining the health of rural children. *Pesticide Action Network North America.*

- 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.[39]
- Research shows pesticide exposure to be a contributing factor to childhood asthma in the San Joaquin Valley.[40] The population of the San Joaquin Valley is 52% Latinx.[41]
- CDC data show the childhood asthma rate in California is higher than the national average for children (15.4 vs 8.6 percent) and out of the 11 counties in California that have asthma rates over 20 percent, 10 are in rural, agricultural counties.[42]

VII. Recommendations

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

- Add pesticide use 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
- 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 of the full life cycle of synthetic pesticides (from production to end use)
- 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
- Adopt a holistic approach towards climate change mitigation in agricultural systems that incorporates outcomes to community health rather than just to agriculture and climate change alone
- 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 incentives to favor the reduction of pesticide use in agriculture
    - Identify a sustainable funding source to support agroecological and regenerative organic farming. All public funding, research and implementation support should

[39] 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/.
[40] von Glascoe, C. A., & Schwartz, N. A. (2019). Bad lungs/bad air: childhood asthma and ecosyndemics among Mexican immigrant farmworkers of California's San Joaquin Valley. *Human Organization*, 78(2), 110-121.
[41] https://cviic.org/wp-content/uploads/2019/01/SJVCRP_Survey_Findings_Report_011819-small.pdf
[42] Pesticide Action Network. (2016). Kids on the Frontline: How pesticides are undermining the health of rural children. *Pesticide Action Network North America.*

be shifted away from chemical reliance to support agroecological and regenerative organic farming
- Provide funding, technical assistance and other support to help California farmers transition off of agricultural pesticides to more ecological farming that focuses on prevention of pest and disease problems by building resilience through support of plant vigor and soil health
- Support the transition to organic farming by subsidizing expenses, including the development of organic plans and certification, particularly for farmers of color and small to midsize farms
- Establish scheduled public procurement goals, requiring government institutions such as public schools, hospitals, prisons, 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

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,

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Pesticide Action Network *(PAN) North America is one of five regional centers worldwide representing hundreds of organizations in more than 90 countries. We work to promote the transition to a more just and sustainable food and agriculture system that is free from hazardous pesticides. We represent more than 5,000 California members.*

The statewide coalition ***Californians for Pesticide Reform*** *(CPR) is a statewide coalition of 200+ organizations working together to protect public health, improve environmental quality and support a sustainable and just agricultural system by building a diverse movement across California to change statewide and local pesticide policies and practices.*