



October 29, 2020

Jason Gray
Chief, Cap-and-Trade Program
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

RE: Compliance Offsets Protocol Task Force Initial Draft Recommendations – October 7, 2020

Dear Mr. Gray:

Indigo Agriculture (Indigo Ag) applauds the significant efforts by the California Air Resources Board (CARB) to reduce the greenhouse gas (GHG) emissions across the State's economy since the passage of the Global Warming Solutions Act (AB32) in 2006. California has demonstrated how offsets can be successfully integrated into a compliance cap-and-trade program, reducing the economic burden to businesses in California while also extending the climate benefits of the program beyond the sectors which fall under the cap. While the program has seen much success through its existing suite of compliance offset protocols (COPs), it has been more than five years since CARB has adopted a new COP. During that time we have seen significant advancements in the development of voluntary offset project protocols, especially around agriculture and land use. Now, following the passage of Assembly Bill (AB) 398,¹ CARB has established the Compliance Offsets Protocol Task Force (Task Force), and this Task Force has issued a comprehensive report summarizing their significant efforts to review options for CARB to expand its suite of COPs. The policy, technology, and business developments necessary to provide scalable agricultural offset projects are now in place and we believe CARB must consider adopting a protocol for agricultural land management activities.

Indigo Ag uses microbiology and digital technology to improve the quality, yields and environmental sustainability of agriculture. We are now expanding our expertise to streamline the ability of farms to tap into environmental markets. Using a combination of rigorous testing, biogeochemical models and remote sensing (including satellite analytics), Indigo Ag can accurately determine the current carbon footprint of a farm and implement changes to decrease that footprint. Working with the 7M+ acres that have contracted to be a part of Indigo Carbon, Indigo Ag is helping these growers to decrease net GHG emissions by more than 1 metric ton per acre of farmland.

The Task Force issued its Initial Draft Recommendations on October 7, 2020. Those recommendations consisted of five chapters, one of which was entitled "Analysis and Recommendations on Livestock, Agriculture and Rangeland" and recommended the development of three protocols: avoided conversion of grasslands, feed additives to reduce enteric emissions of methane from cattle, and diversion of manure storage from anaerobic systems ("alternative manure management"). We strongly support CARB's adoption of a COP for the avoided conversion of grasslands to cropland where grazing lands are suitable for crop cultivation but have not yet been converted. Two voluntary registries, the Climate

¹ Garcia, Chapter 135, Statutes of 2014.

https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB398

Action Reserve and the American Carbon Registry have developed and refined protocols for this activity.^{2,3} In the case of the former, quantification is based on pre-modeled emission factors, significantly reducing the costs of implementation. In the case of the latter, project developers may use biogeochemical models, expanding the applicability of the methodology to crop/region combinations which were unable to be modeled during development of the CAR protocol.

Unfortunately, the avoided conversion of grassland protocols are only relevant to a small fraction of California's 34 million acres of agricultural land.⁴ **To achieve climate benefits on agricultural lands at significant scale, CARB must pursue adoption of new COPs which incentivize broader changes to agricultural land management.**

Actively managed agricultural lands have significant potential to help meet the State's carbon neutrality goals. In fact, it is impossible for the state to become carbon neutral by 2045 without including agricultural lands. Historically the cultivation of crops has left soils severely depleted – croplands soils around the world have lost on average 26 percent of the carbon in the top 30 cm of soil.⁵ Fortunately, the agricultural community recognizes the importance of soil carbon and is working to restore it. According to the National Academy of Sciences, there are many conservation practices that can “increase carbon stocks in soils and are successfully practiced by progressive farmers and ranchers.”⁶ Furthermore, these practices are not limited to their GHG benefits; they provide “additional ecosystem service benefits, including watershed protection, increased biodiversity, and improved soil health and fertility.”⁷

Indigo Ag strongly supports the crediting of practices on agricultural lands through the compliance offset program. Practices such as cover crops, conservation tillage, and crop rotations all show the potential to reduce nitrous oxide (N₂O) emissions and increase soil organic carbon. Unfortunately, these valuable practices are not widely adopted. For example, conservation tillage practices have been implemented on less than 2 percent of cropland acres in California's Central Valley.⁸ Long-term studies in the San Joaquin Valley have demonstrated that no-tillage and cover cropping can increase soil carbon by more

² Climate Action Reserve (February 2020). Grassland Protocol Version 2.1. (<http://www.climateactionreserve.org/how/protocols/grassland/>)

³ American Carbon Registry (2019). Avoided Conversion of Grasslands and Shrublands to Crop Production v2.0. (<https://americancarbonregistry.org/carbon-accounting/standards-methodologies/methodology-for-avoided-conversion-of-grasslands-and-shrublands-to-crop-production>)

⁴ American Farmland Trust, Farmland Information Center. “California Data and Statistics.” (<https://farmlandinfo.org/statistics/california-statistics/>) Accessed October 26, 2020.

⁵ Sanderman, J., Hengl, T., Fiske, G.J. (2017) Soil carbon debt of 12,000 years of human land use. *Proceedings of the National Academy of Sciences of the United States of America* 114 (36) 9575-9580. <https://doi.org/10.1073/pnas.1706103114>

⁶ National Academies of Sciences, Engineering, and Medicine (2019) *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/25259>

⁷ *ibid.*

⁸ Mitchell, J.P., Klonsky, K., Shrestha, A., Fry, R., DuSault, A., Beyer, J., Harben, R. (2007) Adoption of conservation tillage in California: current status and future perspectives. *Aust. J. Exp. Agric.* 47 (12), 1383–1388.

than 11 tons per acre.⁹ Comparable long-term studies have been conducted in other regions of North America with similar results.^{10, 11}

In fact, the Task Force identified four practices that could be developed into COPs related to agricultural land management:

- Addition of compost to grazed grasslands;
- Subsurface drip irrigation with delivery of nutrients;
- Limited or no-till agriculture; and the
- Use of cover crops.

The Task Force concluded that there were barriers to COP development for all four of these practices, including implementation costs, existing scientific evidence, and available quantification methods, and did not support adoption of a COP at this time. However, all of these practices, and many more, could be incentivized through a single COP.

Indigo Ag strongly advises that CARB reconsider these conclusions by viewing the development and implementation of voluntary offset protocols through a completely different lens. The Task Force's assessment of these practices followed the common mindset among many carbon offset policy practitioners: starting with a narrow practice definition and then building to an end result from that starting point. The history of agricultural carbon offset methodologies and projects over the last two decades has demonstrated that the typical narrow, reductionist approach to offset protocols does not result in practical, scalable offset protocols. One need only to consider examples of protocols with low or no demonstrated success after years of availability in the marketplace (e.g., the Compliance Offset Protocol for Rice Cultivation Projects¹² was adopted in June of 2015 and has generated zero ARBOCs over 5 years¹³).

The key to practical, scalable, and adaptable COPs for agricultural land management is to shift the focus away from proven **practice types** and towards proven **methods to assess performance**. In layman's terms, the protocols should focus on results rather than practices (while maintaining strong requirements for additionality). This is a significant conceptual shift, but it allows CARB's offset program to break free from the tyranny of methodological precedent and put the onus on project developers to not only design projects which will generate real climate benefits, but also to prove the benefits according to the requirements of the protocol. The Climate Action Reserve¹⁴ and Verra (through the

⁹ Mitchell, J.P., et. al. (2017) Cover cropping and no-tillage improve soil health in an arid irrigated cropping system in California's San Joaquin Valley, USA. *Soil & Tillage Research*. 165. 325–335. <http://dx.doi.org/10.1016/j.still.2016.09.001>

¹⁰ Chahal, I., Vyn, R. J., Mayers, D., Van Eerd, L. L. (2020) Cumulative impact of cover crops on soil carbon sequestration and profitability in a temperate humid climate. *Scientific Reports*. 10 (13381). <https://doi.org/10.1038/s41598-020-70224-6>

¹¹ Olson, K., Ebelhar, S. A., Lang, J. M. (2014) Long-Term Effects of Cover Crops on Crop Yields, Soil Organic Carbon Stocks and Sequestration. *Open Journal of Soil Science*. 4, 284-292. <http://dx.doi.org/10.4236/ojss.2014.48030>

¹² Compliance Offset Protocol for Rice Cultivation Projects (June 25, 2015). California Air Resources Board.

<https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/compliance-offset-protocols/rice-cultivation-projects>

¹³ ARB Offset Credit Issuance Table. Accessed October 26, 2020.

https://ww3.arb.ca.gov/cc/capandtrade/offsets/issuance/arboc_issuance.xlsx

¹⁴ Climate Action Reserve (September 30, 2020) Soil Enrichment Protocol. Version 1.0

<https://www.climateactionreserve.org/how/protocols/soil-enrichment/>

Verified Carbon Standard program)¹⁵ recently adopted carbon offset protocols to incentivize agricultural management activities through a results-focused framework.

The key to a results-focused offset protocol is to develop layers of rigorous guidance around the project definition and the assessment of performance. Of course the applicable practices cannot be completely undefined, but it is also possible for the project definition to be flexible enough to allow for a suite of practices to be eligible, either alone or in concert, as decided by the farmer and the project developer. After screening for regulatory surplus and requiring that practice change must be new (i.e., implemented in reaction to the project), assessment of additionality should be based on the specific social and cultural barriers that exist in the agricultural community and which prohibit one farmer from adopting new practices, even if some of their neighbors have already adopted them.¹⁶ It is also possible to pair this barriers analysis with a standardized common practice assessment, as has been done by both the Reserve and Verra.

The Reserve and Verra protocols use a two-pronged approach to determine the benefits of agricultural land practices. The approach uses a biogeochemical model supported by field sampling to quantify the net changes in GHG emissions from implementing practices on croplands. Biogeochemical models are increasingly being used to calculate the methane, N₂O, and carbon sequestration from agronomic practices. A recent paper demonstrated that these models are capable of calculating seasonal and annual N₂O emissions from a diverse array of crops and these calculations are more accurate “than the Intergovernmental Panel on Climate Change emission factor approach.”¹⁷ The State already uses biogeochemical models to calculate N₂O emissions from agricultural soil management in croplands.¹⁸ These same models will be used in future versions of the State’s Natural and Working Land Inventory for the calculation of soil carbon fluxes.¹⁹ By applying these approaches with a statistical, sample-based approach to quantification, the protocols become far more scalable and the transaction costs far more manageable than past agricultural protocols.

We recognize there is uncertainty in the use of any models or calculation methodologies. The protocols address this uncertainty through routine soil sampling to confirm the results from the biogeochemical model. This is possible because the cost of measuring soil carbon has decreased to the point where it can be broadly scaled up. Therefore, the practices farmers implement that generate offsets can be supported by the sampling and analysis of the fields at least every five years. This measurement approach provides a reconciliation between the modeled and directly measured approaches and ensures that the practices farmers implement generate real emission reductions and removal

¹⁵ Verified Carbon Standard (October 19, 2020) Methodology for Improved Agricultural Land Management. Version 1.0.

https://verra.org/wp-content/uploads/2020/10/VM0042_Methodology-for-Improved-Agricultural-Land-Management_v1.0.pdf

¹⁶ For a very detailed discussion of these barriers, please see Appendix A of the Climate Action Reserve Soil Enrichment Protocol v1.0 (September 30, 2020).

<http://www.climateactionreserve.org/wp-content/uploads/2020/10/Soil-Enrichment-Protocol-V1.0.pdf>

¹⁷ Deng, J., Li, C., Burger, M., Horwath, W. R., Smart, D., Six, J., et al. (2018). Assessing short-term impacts of management practices on N₂O emissions from diverse Mediterranean agricultural ecosystems using a biogeochemical model. *Journal of Geophysical Research: Biogeosciences*, 123, 1557–1571. <https://doi.org/10.1029/2017JG004260>

¹⁸ CARB (2018) CARB GHG Inventory Updates Documentation. p.8.

https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_00-16_method_update_document.pdf

¹⁹ CARB (December 2018) Technical Support Document for the Natural & Working Lands Inventory. p.87.

https://ww3.arb.ca.gov/cc/inventory/pubs/nwl_inventory_technical.pdf

enhancements. In addition, these samples can be used to further develop and improve the accuracy of these models.

We applaud the work of the Task Force. The current suite of COPs are insufficient to drive GHG reductions and enhance soil carbon sequestration on agricultural lands. More than a third of the land area in the State of California, approximately 34 million acres, is used for some form of agricultural production, including cropland and grazing land.²⁰ Through a mix of avoided conversion, direct GHG reductions, and enhanced soil organic carbon sequestration and conservatively assuming benefits of 1 tCO₂e acre⁻¹ year⁻¹, California's agricultural sector could add 34 million tCO₂e in emission reductions to the compliance offset market every year. On top of that, this approach would open opportunities for commensurate benefits on agricultural lands outside of the State. Such "offset diplomacy," generating benefits to farming communities across the US, would greatly enhance the impact and image of the California Cap-and-Trade Program.

We encourage the Air Resources Board to include the crediting of agricultural land management activities through a protocol that focuses on project performance, rather than a reductive view of a narrow project definition. We believe these practices can generate valuable GHG reductions as well as protect watersheds, increase biodiversity, and improve soil health and fertility. The Climate Action Reserve Soil Enrichment Protocol v1.0 and the VCS VM0042 Methodology for Improved Agricultural Land Management v1.0 both take innovative approaches that are readily adaptable as COPs. Both protocols can be applied to either cropland or rangeland, even mixing the two within a single project. As more data become available and models are calibrated and validated for more crops and geographies, these protocols can accommodate more and more cropland in California without requiring updates to the protocols themselves. In this way, with a single protocol adoption, CARB can create a dynamic framework for crediting emission reductions and removal enhancements across the State, and the nation, without the heavy burden of continuous rulemaking to adapt over time.

CARB has done a tremendous job developing programs to reduce GHG emissions across the California economy and the inclusion of agricultural land practices will continue the State's leadership. We thank CARB for this opportunity to offer these comments and look forward to continued collaboration to implement policies and strategies that further reduce emissions from the transportation sector.

Sincerely,



Max DuBuisson
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Indigo

²⁰ "California Data and Statistics." American Farmland Trust, Farmland Information Center.
(<https://farmlandinfo.org/statistics/california-statistics/>) Accessed October 26, 2020.