

California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

April 9, 2017

Re: The 2017 Climate Change Scoping Plan Update (online comment submitted to:  
[https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=scopingplan2030&comm\\_period=N](https://www.arb.ca.gov/lispub/comm/bcsubform.php?listname=scopingplan2030&comm_period=N))

Dear Air Resources Board Members:

On behalf of the Pesticide Action Network, and the statewide coalition Californians for Pesticide Reform, we thank you for the opportunity to comment on *The 2017 Climate Change Scoping Plan Update*. **We focus our comments on those agricultural land management practices that have the greatest capacity to reduce GHG emissions and sequester carbon (C), while protecting vital soil and water resources and ensuring a vibrant future for California's agricultural economy.** Of the various sectors represented in the Scoping Plan's Figure I-3 (p.14), agriculture is the *only* sector where innovative practices can not only reduce GHG emissions, but also mitigate climate change through sequestration of C into healthy, productive soils.

The regenerative or agroecological practices we support can also function to protect agricultural communities from human health hazards associated with practices they replace as well as help ensure long-term environmental and economic viability of the communities in which they are practiced. The allocation of GHGR funds in support of these regenerative agroecological practices will directly benefit traditionally-underserved, disadvantaged communities in California's heavily agricultural counties, in compliance with SB 535. It is vital that greater resources are invested in socially-disadvantaged communities in rural areas, who often face the highest rates of poverty and environmental exposures.

Pesticide Action Network (PAN) North America is one of five regional centers worldwide representing hundreds of organizations in more than 90 countries. We work collectively around the globe and at the local and state level to push for public policies to better protect workers and the public from exposure to hazardous pesticides. We also work to promote the transition to a more just, environmentally sound and viable food and agriculture system. With offices in Oakland, CA we represent about 22,000 CA members. We are an active member of the 15-member California Caucus of the National Sustainable Agriculture Coalition (NSAC) based in Washington, D.C., and a founding member of the statewide coalition, Californians for Pesticide Reform, with a membership of about 190+ community-based organizations.

We are grateful for the significant improvements over the 2008 Scoping Plan that largely failed to recognize the huge potential of regenerative agricultural practices to contribute to climate change mitigation. We support this direction. California's farmer, ranchers and residents need more; we need a much more aggressive approach that will truly serve to transform California's agricultural lands into highly productive, diverse, climate-mitigating landscapes. This is something other nations are already beginning to do.<sup>1</sup> The growing body of scientific evidence, along with rapidly growing number of demonstrative stories from the field fully supports this approach.

## **Prioritize regenerative farming with the *most* potential for C sequestration**

We are pleased that the Scoping Plan recognizes that storage of C in natural and working lands (p.19) is the “most effective way to remove carbon dioxide from the atmosphere.” We are also encouraged by ARB’s initial steps to better understand the potential carbon outcomes associated with a variety of Natural and Working Lands management and restoration activities.

We especially support ARB’s intention to incorporate U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) management practices into its carbon modeling. Nevertheless, we remain concerned that limited California-derived data may be used as justification for not moving proactively or aggressively to recognize the potential of, and provide support for, the implementation of those agricultural land management practices with the greatest C sequestration potential. Therefore, we strongly advise ARB to look to the U.S. literature and even the international literature to provide details on potential C contributions of different land management practices, and not limit ARB’s consideration of practices receiving support to those for which CA data are plentiful.

## **Diverse, perennial systems sequester the greatest quantities of carbon**

Much research in California and elsewhere support the contention that organic, regenerative, and other sustainable farming practices can contribute significant amounts of C to managed soils.<sup>2</sup> A well-referenced comprehensive analysis by Eric Toensmeier of carbon farming practices around the globe presents additional, solid, scientific evidence of the great potential for highly diverse agriculture to both mitigate and reverse the current trajectory of climate change. The data show that if implemented on a larger scale than currently practiced, regenerative agriculture — from tropical home gardens to temperate permaculture — could draw down more than 100 billion tons of C into the soil.<sup>3</sup> That’s equal to 367 billion tons of carbon dioxide (CO<sub>2</sub>) which would indeed bring us back from our current climate change tipping point. Climate scientists report that to reverse the disastrous course we’re now on, we need to draw down an estimated 200 billion metric tons of CO<sub>2</sub>.

Because it involves high levels of on-farm biodiversity, regenerative carbon farming produces lucrative combinations of food, fiber, building materials and biofuel. It also protects pollinators and wildlife habitat, and improves soil quality and productivity, and protects water resources. For every 21 tons of C sequestered per hectare (2.5 acres), soil organic matter goes up about one percent, which in turn increases the soil’s ability to hold water by 25,000 gallons.<sup>4</sup>

Carbon farming practices range from well-managed pasture-land (e.g. rotational grazing and incorporation of diverse herbaceous and woody species), to regenerative organic farming, to agroforestry systems. The latter offer the most robust version of carbon farming, sequestering by far the greatest amount of C at 10-40 times the best annual cropping or managed grazing systems. Agroforestry is described in *The Carbon Farming Solution* as “intentional, intensive, integrated and interactive” system of farming. In addition to C sequestration, agroforestry systems can reduce need for fuel, fertilizers and pesticides.

In fact, the elimination or dramatic reduction in the use of synthetic pesticides and fertilizers will protect vital soil biology — the engine of soil C sequestration. In an eight-year study in California, soil organic carbon increased 19 percent in organic and low-input systems, compared

to an increase of only 10 percent in conventional agriculture.<sup>5</sup> A 12-year study in California showed a 36 percent increase in carbon sequestration with the use of organic practices despite increased tillage compared to the conventional system.<sup>6</sup> USDA research shows that organic agriculture, even when using tillage, can sequester more carbon than no-till conventional agricultural systems.<sup>7</sup>

### **Protecting Public Health while mitigating climate change – a win-win scenario**

We strongly support the intent of the Scoping Plan to identify policies that will optimize win-win solutions while also minimizing costs — both to farmers and ranchers as well as to public health costs associated with “business as usual” practices.

Ubiquitous exposure to highly hazardous pesticides, especially among children in California’s agricultural communities in the San Joaquin Valley and Central Coast, are one of the most serious public health costs associated with agricultural production. This need not continue to be the case as the very same climate-friendly agricultural practices, from regenerative organic to agroforestry, that show the greatest promise of sequestering C and reducing GHG emissions also dramatically reduce or entirely avoid the use of synthetic pesticides and fertilizers. Not only does implementation of these practices reduce the direct use of petroleum-derived pesticides and fertilizers, but they provide additional benefits by reducing GHG emissions associated with their production and transport.<sup>8</sup>

We agree fully that “addressing climate change presents a significant opportunity to improve public health for all of California’s residents” and especially those “facing the greatest health inequities” including poor and largely Latino residents of California’s San Joaquin Valley and Central Coast Communities.

### **Long-term sustainability requires supporting smaller-scale, more diversified agriculture in California**

Since 2009 a number of high-level international bodies and studies have confirmed that the current model of intensive industrial agriculture, based on high use of external inputs such as synthetic fertilizers and pesticides, fossil fuels and irrigation, must change if the global community is to feed future generations.<sup>9</sup> The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD) initiated by the World Bank and six UN agencies and authored by more than 400 of the world’s scientists and development experts, assessed evidence from the last 50 years of agriculture and evaluated prospects for the next 50 years. They found that the current energy-intensive industrial model of agriculture is unsustainable and exacerbates social inequality and that productivity per unit of land and per unit of energy use is much higher in small-scale and diversified farms than in large intensive farming systems.<sup>10</sup>

### **Children’s health at risk with many current agricultural practices and policies**

California’s Central Valley’s primary asset is the agriculture industry that claims to feed the nation and world; however, Valley counties are among the counties with the highest food insecurity in the nation, ranging from 33-41% food insecurity. Sixty-seven percent of adults are obese, while children suffer from chronic disease, hunger and poverty. Fresno County, for

example, is the richest agricultural producing county in the nation and the nation's poorest congressional district, with poverty and hunger at about 40% according to the California Health Inventory Survey.<sup>11</sup> An abundance of food leaves the region, local produce distribution systems are broken, rural corner stores sell predominantly cheap junk food and soda, and residents struggle routinely with lack of potable water and transportation access.

In 2014, the California Department of Public Health published a report documenting that over 500,00 students attend schools within a quarter mile of use of highly hazardous pesticides.<sup>12</sup> Central Coast and San Joaquin Valley students are most likely to face exposure to these pesticides and Latino children were 91% more likely than white students to be exposed to the highest levels. The top highly hazardous pesticides used (by quantity) are highly volatile soil fumigants followed by the carcinogenic fungicide captan, neurotoxic organophosphate pesticides, and the herbicide paraquat, a known endocrine disruptor.

While children in agricultural communities face the same food-borne exposures to pesticides as their urban counterparts, they face additional exposures when agricultural chemicals contaminate water supplies or drift from nearby fields. Per pound, children's exposure is greater than that of adults. In addition, as their physiological systems undergo rapid changes from the womb through adolescence, interference from pesticides and industrial chemicals—even at very low levels—can derail the process in ways that lead to significant health harms including cancer, neurodevelopmental harms and learning disabilities.<sup>13</sup>

### **We urge greater incorporation of the California Department of Pesticide Regulation and pesticide use into greenhouse gas reduction planning**

Considering how 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 and their children, we are disturbed that the California Department of Pesticide Regulation (DPR) is not more actively engaged in climate discussions (as just one example, DPR is not part of the Climate Action Team's Research Working Group, an entity critical for identifying potential greenhouse gas-reducing practices and systems). DPR and pesticide use should be better incorporated into greenhouse gas reduction plans. Certain pesticides result in greenhouse gas emissions at the production, transportation and use stages.<sup>14</sup> Moreover, pesticides help prop up unsustainable greenhouse gas-emitting farming practices rather than practices that build up the soil, which helps sequester carbon. Reducing pesticides could also bring additional co-benefits, including better air quality, which socially-disadvantaged communities and EJAC have identified as a high priority. And communities have called for pesticides to be addressed at a number of the Scoping Plan workshops only to be told ARB isn't the agency that addresses pesticides. Hundreds of millions of pounds of pesticides are used in California each year, which serve primarily to support agricultural practices that are the least able to sequester carbon. It is critical the DPR and pesticides be more explicitly addressed in order to ensure that California greenhouse gas efforts are helping to promote the farming practices with the greatest C sequestration and regenerative capacity.

### **Opportunities for Climate-friendly agriculture to benefit Environmental Justice Communities**

We strongly believe that policies that support widespread implementation of climate-friendly

agricultural practices, among the greatest number of farmers, especially in California's San Joaquin Valley and Central Coast regions will provide great health and economic benefits to some of the state's most impoverished agricultural communities. Creating and implementing such policies in these communities will help ARB comply with its obligation under SB535 to allocate a minimum of 25% of its GHG reduction funds to benefit disadvantaged communities and 10% of such projects located within disadvantaged communities.

The human health and environmental benefits of organic farming are well known. In addition to reports that consumption of organic food can significantly reduce children's exposure, for example, to neurotoxic organophosphate pesticides<sup>15</sup>, organic and other regenerative agricultural practices provide a host of other benefits to human health and environmental health. The benefits of the elimination of use of all highly hazardous pesticides is obvious to the community health of agricultural communities. The benefits to pollinators, natural enemies of crop pests and diseases, other wildlife have been documented for decades as well. Benefits to soil health of the elimination of highly hazardous pesticides is likely as well but has been less studied.

Organic production brings clear economic benefits to the communities in which it is practiced. Organic farming is profitable. Census data show that organic farms in the United States on average have higher sales, higher production expenses, and higher operating profit than the average for all U.S. farms, creating real opportunity for rural economic livelihood. Organic farms bring community-wide economic benefits by providing expanding employment opportunities. The Organic Farming Research Foundation reported data from a five-state study indicating that organic farms hired an average of 61 year-round employees compared with 28 year-round employees hired on conventional farms. The study also found that organic farms hire more seasonal workers than do conventional farms.<sup>16</sup> The following two examples illustrate this point.

Singing Frogs Farm based in Sebastopol, CA has, in about ten years, quadrupled soil organic matter (with no nutrient leaching), dramatically increased above- and below-ground biodiversity, reduced water use, increased perennial plantings and now produce roughly \$100,000 in vegetable sales per crop acre per year with over half of that revenue paying our year-round employees' salaries.<sup>17</sup>

In the Capay Valley, Full Belly Farm<sup>18</sup> produces 80 different organic crops using a whole farm systems approach including a focus on building soil resources and planting habitat for beneficial insects and wildlife — all toward realizing a goal of integrating farm production with long-term environmental stewardship. Full Belly also provides year-round employment for their hired workers. Both farms provide a variety of on-farm demonstrations and education programs.

## **Scoping Plan Analysis**

It is appropriate that ARB promises to include, in their Scoping Plan analysis estimates of impacts of land use both from business-as-usual practices as well as proposed policies. We strongly encourage the analysis to include additional practices mentioned and referenced in these comments but not yet identified in proposed approaches. We caution, however, that lack of thorough on-the-ground verification of less-known practices<sup>19</sup>, such as perennial grain crops, that show great C sequestration and/or GHG reduction potential based on published descriptions, should not be grounds for dismissal of those practices for support under the Scoping Plan. This

point supports ARB's stated intent to "to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities" (p.7) that may go beyond the limits of the Scoping Plan.

The allocation of GHG reduction funds in support of farmers and ranchers who both implement climate-friendly regenerative agricultural practices — both innovative and the tried and true — and share their experiences, will go a long way towards building the next generation of ranchers and farmers who will implement those practice because they make economic sense to do so while also protecting the environment and public health for generations to come.

We are encouraged that ARB plans include various co-benefits as described. In addition to those described, we urge ARB to expand the list to include other co-benefits described by CDFA's online ecosystem services database that includes — in addition to soil health and water quality and yield, and nutrient cycling — pollinator services and and pest control.<sup>20</sup> While some of these services may not be quantifiable in relation to the land management practices that generate them, they nevertheless are very important benefits and must be taken into consideration when evaluating practices for which GHGR funds are to be allocated. This idea was discussed at the May 18, 2016 CDFA public hearing on the Healthy Soil Initiative with specific discussion of using co-benefits as components of scoring potential project recipients of GHGR funds generally, and the Healthy Soil Initiative in particular.

We believe, as is stated in the Scoping Plan that not only that economic prosperity and environmental sustainability can be achieved together, but that economic prosperity is California's \$54 billion agricultural industry is *dependent* on the sustainable stewardship of the environment — i.e. the soil, water, pollinators, and natural enemies of pests and diseases.

## **Whole Farm Systems approach**

Demonstration projects and incentives should support a whole farm system approach to C sequestration, GHG reduction, improving soil health and overall long-term environmental stewardship. This entails identifying and evaluating a full suite of GHG reduction and sequestration opportunities on the farm to optimize GHG reduction and sequestration potentials by providing producers with a range of site-specific opportunities and the information needed to select those practices that will best support overall land management objectives while maximizing GHG benefits. A whole farm system approach should allow for economies of scale and economic and environmental synergies not otherwise realized with single practice implementation.

Research indicates that the integration of multiple GHG-reducing practices on farms and ranches may be more effective at mitigating climate change than changing single, individual agricultural practices. For example, UC Davis research showed that reduced tillage combined with growing cover crops has greater ability to sequester C and increase yields than either practice alone.<sup>2</sup> It is the synergistic benefits of combined practices in a whole-farm context that hold the most promise for increased C sequestration in soils and reduced GHG emissions in agriculture.

We encourage CDFA and its agency partners to prioritize projects that combine multiple practices and promote the use of integrated farming systems that work across multiple

management areas including: water use/irrigation; off-farm inputs; energy use; crop choices and cropping patterns; and biodiversity.

A whole farm approach includes creating and maintaining a productive, well-compensated workforce; one ideally supported year-round. Complex, diverse farming systems tend to provide for a greater number of on-farm jobs that last longer as greater crop diversity leads to extended or continuous on-farm production (as previously described in the two CA farm examples).

### **Emphasis should be placed on demonstration projects**

The effective transformation of CA's agriculture will happen not by a small handful of large farmers and ranchers implementing practices on a few large farms. Rather, the greater the numbers of farmers and ranchers engaged, the greater the potential multiplier effect as each individual can, in turn, communicate their challenges, trials, errors and successes to others. Thus, whether financial supports are allocated as simple incentives to farmers/ranchers to implement climate-friendly practices or to develop more comprehensive demonstration projects, both should require substantial components of outreach to other farmers and ranchers. It is well known that the most effective way for farmers and ranchers to learn is by seeing and doing, and there is no better way than local on-farm demonstrations.

The Natural Resources Conservation Service documents this phenomenon quite well. It's report, "California Soil Health Partnership" illustrates the transformative power and effectiveness of on-farm demonstrations. Such outreach efforts build not only knowledge but capacity to similarly share and transfer knowledge from farmer-to-farmer, and helps identify and supporting the development of farmer leaders.<sup>21</sup>

Finally, it is also essential that practice incentives be made available to all scale of farmers and rancher as well as those who do not own the land. In order to ensure that land ownership not be a criterion for receipt of state support for implementation of climate-friendly farming practices.

### **Comments on the Scoping Plan Proposed Concepts**

Rather than support one Concept or another, we generally support those policies that ensure long-term solutions to climate change challenges while providing the greatest benefits to California residents, especially those most at risk and who serve the most to gain from implementation of climate-mitigating practices that improve environmental quality and provide increased economic opportunities.

All concepts include Natural and Working Lands goals, all of which we fully support: forest land restoration; in-fill and revitalization of the urban core; land preservation; and increase habitat protection.

While we do not address methane production (and mitigation) in any detail, we do have the following comment in response to the Concept element "enhancement of short-lived climate pollutant strategy" and the related goal of > 40% reduction in methane emissions. In relation to this goal, we strongly encourage ARB to look at *land management* as a key component of agriculture-related methane production and not just focus on costly, high-tech methane digesters. In appropriately managed rotationally grazed perennial grasslands and shrublands, green plants

and the soil ecosystem work together to ensure that more C is sequestered than emitted, easily compensating for the methane produced by livestock.<sup>22</sup>

While we recognize that California's GHG reduction strategy is based on a cap and trade system we were very encouraged to see, and fully support, the idea of a carbon tax. We recognize that the concept is only slowly gaining support, but it does remain a viable concept around the globe.<sup>23</sup>

## Conclusion

Both PAN and CPR see great potential for allocation of California's GHGR funds to bring great public health and economic benefits to CA rural communities, including largely disadvantaged Latino populations, through the widespread promotion of climate-friendly agricultural practices based primarily on principles of carbon farming.

To effectively use GHGR funds to help transform California agriculture, ARB, CDFA and all partnering agencies must direct resources to the greatest number of farm and ranch operations, rather than just a few large-scale operations that involve relatively few individuals or organizations. Specifically, we urge policies to be explicitly scale-neutral so small- and medium-sized farms can participate. To effectively do this would likely require that smaller-budgeted operations be awarded additional support for technical assistance much along the lines of what NRCS offers for the development of conservation plans.

Furthermore, since a growing number of farmers, especially new and beginning farmers, often lease the land on which they farm, policy instruments must be designed to assist those farmers and ranchers as well.

We thank you for your attention.

Sincerely,

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Sarah Aird and Mark Weller, Co-Directors  
Californians for Pesticide Reform

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<sup>1</sup> In 2012, France launched the Agroecology Project, an ambitious plan to move the entire nation toward a system of agroecological agriculture. The Agroecology Project prioritizes positive biological interactions rather than chemical inputs, and supports self-reliant farms that minimize the loss of water, energy and nutrients; that support on-farm self-generating nutrient and water cycles; and that maximize the use of farmers' knowledge and skills. France is investing significant amounts of state resources in support of this transformation, with the following goals: having 200,000 French farms voluntarily adopt agroecological practices by 2025, adding agroecology to the curriculum of all agricultural colleges across the country, having 20% of food served in the public sector be organic by 2012, having organic production occupy 20% of French farmland by 2020, and having an agroecology diagnostic tool available for free for French farmers to assess their own farming practices. <http://agriculture.gouv.fr/sites/minagri/files/1604-aec-aenfrance-dep-gb-bd1.pdf>.

2. a. Kroodsma, D.A. and C.B. Field. 2006. Carbon Sequestration in California Agriculture, 1980–2000. *Ecological Applications*, 16(5):1975–1985.



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- b. Six, J., S.D. Frey, R.K. Thiet, and K.M. Batten. 2006. Bacterial and Fungal Contributions to Carbon Sequestration in Agroecosystems. *Soil Sci. Soc. Am. J.* 70:555-569.
  - c. Kane, D. 2015. Carbon Sequestration Potential on Agricultural Lands: A Review of Current Science and Available Practices. National Sustainable Agriculture Coalition & Breakthrough Strategies and Solutions, LLC
  - d. Mitchell, J.P., A. Shrestha, W.R. Horwath, R.J. Southard, N. Madden, J. Veenstra, and D.S. Munk. 2015. Tillage and Cover Cropping Affect Crop Yields and Soil Carbon in the San Joaquin Valley, California. *Agron. J.* 107:588-596.
3. Toensmeier, E. 2016. *The Carbon Farming Solution*. Chelsea Green Publishing, White River Junction, NY.
  4. USDA NRCS California. Healthy Soil Offers Sustainable Solutions in a Changing World. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ca/newsroom/?cid=nrcseprd404721>
  - <sup>5</sup> California Climate and Agriculture Network, *Blueprint for a California Program on Climate and Agriculture*, Appendix D, pages A3-A4, March 2015, <http://calclimateag.org/wp-content/uploads/2015/03/Blueprint-2015-Full-FINAL.pdf>.
  - <sup>6</sup> Ibid.
  - <sup>7</sup> Ibid.
  8. Note: It has been estimated that fertilizer production accounts for approximately 1.2% of the world's energy (a), of which about 93% is consumed by nitrogen-based fertilizers. (b)
    - a. Wood, S and A. Cowie. 2004. A Review of Greenhouse Gas Emission Factors for Fertiliser Production. IEA Bioenergy.
    - b International Fertilizer Industry Association. 1998. *The Fertilizer Industry, World Food Supplies and the Environment*.
  - <sup>9</sup> Report of the Special Rapporteur on the right to food. Human Rights Council, 34<sup>th</sup> Session. January 24, 2017. Agenda Item 3. A/HRC/34/48. <http://reliefweb.int/sites/reliefweb.int/files/resources/1701059.pdf>. The report debunks the claim that pesticides are essential for growing sufficient food for the planet, recommends development of a global treaty to govern the use of pesticides, and urges a move to sustainable practices including natural methods of suppressing pests and crop rotation, as well as incentivizing organically-produced food.
  - <sup>10</sup> McIntyre BD, Herren HR, Wakhungu J, Watson RT (eds). 2009. *Agriculture at a Crossroads*. IAASTD International Assessment of Agricultural Knowledge, Science and Technology for Development Global Report. UNDP, FAO, UNEP, UNESCO, The World Bank, WHO, GEF. Island Press, Washington, D.C. [http://www.fao.org/fileadmin/templates/est/Investment/Agriculture\\_at\\_a\\_Crossroads\\_Global\\_Report\\_IAASTD.pdf](http://www.fao.org/fileadmin/templates/est/Investment/Agriculture_at_a_Crossroads_Global_Report_IAASTD.pdf).
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  12. California Department of Public Health. 2014. *Agricultural Pesticide Use Near Public Schools in California*. California Environmental Health Tracking Program.
  13. Pesticide Action Network. 2016. *Kids on the Frontline: How pesticides are undermining the health of rural children*. Pesticide Action Network North America, Oakland, CA.
  - <sup>14</sup> Recent research demonstrates that fumigant applications, particularly of chloropicrin and methyl isothiocyanate can significantly increase nitrous oxide emissions. Spokas, K, Wang D, Veneterea, R. 2005. Impact of soil fumigation with chloropicrin and methyl isothiocyanate on greenhouse gases. *Soil. Biol. Biochem.* 37, 475-483. In one study, Spokas and his colleagues observed a 7-fold increase in nitrous oxide emissions over 20 days following chloropicrin fumigation of a northern U.S. nursery. The failure to adopt organic soil management practices such as cover cropping, use of compost and crop rotation represent missed opportunities to reduce carbon levels.
  15. Curl C.L., Beresford S.A., Fenske R.A., Fitzpatrick A.L. Lu C., Nettleton J.A. and J.D. Kaufman. 2015. Estimating pesticide exposure from dietary intake and organic food choices: the Multi-Ethnic Study of Atherosclerosis (MESA). *Environ Health Perspect* 123:475–483; <http://dx.doi.org/10.1289/ehp.1408197>
  16. Organic Farming Research Foundation. 2011. *Organic Farming for Health and Prosperity*.
  17. Singing Frogs Farm. <http://www.singingfrogsfarm.com/our-farming-model.html>
  18. Full Belly Farm. <http://fullbellyfarm.com/>
  19. Toensmeier, E. 2016. *The Carbon Farming Solution*. Chelsea Green Publishing, White River Junction, NY.
  20. California Department of Food and Agriculture. Ecosystem Services Database <https://www.cdfa.ca.gov/oefi/ecosystemservices/>
  21. USDA NRCS California. California Soil Health Partnership. [https://www.youtube.com/watch?v=uDzuEo\\_WBAQ&feature=youtu.be](https://www.youtube.com/watch?v=uDzuEo_WBAQ&feature=youtu.be)

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23. a. WorldWatch Institute. 2013. Hansen to Obama: Support a Carbon Tax  
<http://www.worldwatch.org/node/5962>  
b. Carbon Tax Center. Where Carbon Is Taxed <http://www.carbontax.org/where-carbon-is-taxed/>