Investing in Innovation

A Policy Roadmap for Resilient, Prosperous Fumigant-Free Farming in California

With science highlighting the risks of soil fumigant pesticides, California’s farmers are in need of new tools to control soil pests. The future resilience and continued prosperity of California agriculture depend on a commitment from the Governor and the California Department of Pesticide Regulation to support farmers in a transition to innovative, safe and profitable replacements for hazardous fumigants by 2020.

Fumigants are outdated, hazardous technology

Soil fumigant pesticides are among the most hazardous pesticides on the market, are used at higher application rates than other pesticides and — because they are gases or highly volatile liquids — are more likely to drift away from fields than other pesticides. Exposure to fumigants that drift away from where they are applied is a leading cause of pesticide-related illnesses among workers in nearby fields. Community residents living in rural areas and those living on the ag/urban interface are also at risk of fumigant exposure and illness.

In the field, fumigants are injected into the soil in massive quantities to kill all soil pests before crops are planted — at the same time eradicating beneficial organisms including fungi and bacteria critical to the nutrient cycle and carbon sequestration potential of healthy soil.

California agriculture relies heavily on fumigants: they make up approximately 20% of the pesticides used in the state each year. Many crops use fumigants, including strawberries, almonds, potatoes, sweet potatoes, raspberries, walnuts, carrots, tomatoes and peppers; they are also common in nursery production.

California is the nation’s leading strawberry producer, providing 88% of the country’s total strawberry harvest in 2011. The crop relies heavily on fumigants: it accounted for over 25% of total agricultural fumigant use across California in 2010. Over 9 million pounds of fumigants were used on California’s strawberry fields in 2010, making up 85% of the state’s total pesticide use on strawberries.
**The future of fumigants is limited**

In 1987, the U.S. signed the Montreal Protocol, an international treaty phasing out the use of ozone-depleting chemicals including the fumigant methyl bromide, used widely prior to planting strawberries and other crops. Initially scheduled for phaseout by 2005, the U.S. has received permission to use methyl bromide each year, but these allowances are slated to end by 2015.

With progressively limited amounts of methyl bromide available for use, growers have turned to other fumigants. However, these drop-in substitutes have their own limitations. Because of their toxicity and tendency to drift away from fields, use of all other fumigants are subject to increasingly comprehensive rules. These rules are established by both the state of California and the U.S. Environmental Protection Agency to protect human and environmental health.

In 2012, the cancer-causing fumigant methyl iodide — proposed as a potential substitute for methyl bromide — was pulled from the market, highlighting that California agriculture is at a crossroads: fumigants are not reliable long-term options for pest control. This is a signal to growers and regulators alike that large-scale, safe and innovative farming practices must be developed and broadly implemented without delay as solutions to widespread reliance on fumigants.

**Innovative, safe replacement techniques need support to be market-ready**

Healthy soil is one of the most important legacies we can leave for future generations. Innovative new replacements for fumigant pesticides are under development that contribute to effective soil stewardship and will build a stronger foundation for California agriculture to remain resilient and prosperous for years to come.

Over the past five years, field trials have shown great promise for controlling soil pests and diseases with these new techniques, including steam, anaerobic soil disinfestation (ASD) and biofumigation with mustard seed meal. Though many of these techniques have been tested successfully on smaller plot sizes, a high priority need to support transition to alternatives is to run trials in larger fields to ensure the techniques’ economic viability and efficacy at combatting pests and diseases at commercial scale.

With investment in critical research and field trials, California can ensure that these innovative techniques are ready for widespread adoption; give its farmers a head start in the transition away from fumigants; and provide growers and communities with the safe and effective solutions they need to protect public health and strengthen agriculture.

Fumigant alternatives also offer many additional benefits. Not only do they reduce toxic emissions into the state’s air and water, but they build healthy soil that can sequester carbon, reduce nitrogen oxide emissions and are a key strategy for agriculture to adapt to climate change and mitigate the impacts.

With fumigants currently used across the U.S. and the globe, investing in fumigant alternatives will create a growth industry for California businesses. Developing these cutting-edge,
emerging technologies will create economic opportunities for entrepreneurial California companies to sell equipment and services both across the U.S. and internationally.

California must create a roadmap for fumigant-free farming by 2020

Twenty-five years ago, the U.S. agreed to phase out the fumigant methyl bromide. Yet we still do not have safe, sustainable fumigant alternatives documented as economically feasible and effective at scale. California’s farmers, workers and rural communities cannot wait another 25 years. We need a clear, decisive roadmap with timelines and benchmarks to ensure widespread adoption of innovative and safe fumigant alternatives.

Progress has already begun under the Brown Administration. In April 2012, the California Department of Pesticide Regulation (DPR) convened a work group to identify ways to grow strawberries without fumigants. To ensure the kind of successful and timely transition to fumigant alternatives that California agriculture needs to remain resilient and competitive, the Governor and the California Department of Pesticide Regulation must commit to a plan to transition the state away from use of fumigant pesticides on all crops by 2020.

Spotlight: The Expanding Success of ASD as a Fumigant Replacement

Anaerobic soil disinfestation (ASD) is a very promising method of soil treatment emerging as a replacement for methyl bromide and other soil fumigants. By creating anaerobic (oxygen-free) conditions, ASD controls pathogens and restores healthy microbial balance to the soil. After a source of carbon (such as molasses or rice bran) is incorporated into the soil, the soil is covered with a tarp and irrigated to saturation. This creates an anaerobic environment that kills nematodes and other soil pathogens harmful to plants, including the fungus *Verticillium dahlia* — a major problem in strawberry fields. After three weeks, the tarp is removed and while pathogens have been killed, beneficial soil microorganisms return quickly.

In small-scale trials on strawberry fields, ASD has been demonstrated to be less expensive than certain fumigant applications and successful in controlling pests and pathogens. In California, most ASD trials have been on strawberries, but trials are expanding to other crops including raspberries, blueberries, culinary herbs, and nursery stock.

In partnership with farmers, both public universities (such as UC Santa Cruz) and private companies have been on the forefront of this emerging technology. Increased funding is needed for additional field trials to demonstrate the success of ASD on larger plot sizes and for more crops that currently rely on use of soil fumigants.

In an anaerobic soil disinfestation trial for growing eggplant, USDA soil scientist David Butler collects a soil sample for nutrient analysis and disease assessment. USDA ARS

UC Santa Cruz researcher Joji Muramoto works with strawberry growers to develop sustainable farming methods. UC Santa Cruz
Fumigant-free farming in California

Policy recommendations

To implement a successful transition in California to safe, innovative and sustainable fumigant alternatives, we urge Governor Brown to direct the California Department of Pesticide Regulation to take clear and decisive action to:

• Set a clear goal to transition California agriculture to use only safe and sustainable fumigant alternatives by 2020. To ensure success in reaching this goal, DPR must set clear annual benchmarks for fumigant use reduction.

• Provide new funding to support transition to safe fumigant alternatives by establishing a series of competitive grant programs funded by an increase in the Mill Fee (a fee levied at the first point of sale of pesticides in California) just on fumigants. These competitive grant programs should be directed towards:
  - Direct support for growers who voluntarily want to adopt safe low-toxicity fumigant alternative practices in the form of covering input and equipment costs, low-interest loans, crop insurance or other support identified by growers as necessary.
  - On-farm field trials of safe alternative technologies and practices.

• Channel existing state and federal resources into safe fumigant alternatives, specifically:
  - Governor Brown should direct the California Department of Food and Agriculture to prioritize safe fumigant alternatives and direct funding through the existing Specialty Crop Block Grant program to support farmer innovation with fumigant alternatives.
  - The federal Natural Resources Conservation Service should support a transition to safe fumigant alternatives through their Environmental Quality Incentives Program (EQIP) grants.

Agricultural extension support to provide interested growers with information and technical support for how to implement safe alternatives to fumigants.

Plant breeding programs to develop disease-resistant varietals of fumigant-dependent crops. This is a critical and neglected part of reducing reliance on fumigants. This research should remain in the public realm and not be privately patented.

For more information about transitioning California agriculture to a resilient, fumigant-free future, please contact:

California State Grange
Ph: 916-454-5805
info@californiagrange.org
www.californiagrange.org

CPR Steering Committee
California Rural Legal Assistance Foundation
Center for Environmental Health
Center on Race, Poverty & the Environment
Communities for a New California Education Fund
El Quinto Sol de América
Fresno Metro Ministry
Organización en California de Líderes Campesinas
Pesticide Action Network
Pesticide Watch Education Fund
 Physicians for Social Responsibility – Los Angeles

February 2013