



September 19, 2022

Ms. Michelle Arsenault
National Organic Standards Board
USDA-AMS-NOP
1400 Independence Avenue, SW
Room 2648-So., Ag Stop 0268
Washington, DC 20250-0268

RE: Materials Subcommittee – 2022 Research Priorities

Dear Ms. Arsenault:

Thank you very much for this opportunity to provide comments on the 2022 Research Priorities.

The Organic Center is a non-profit organization with the mission of convening credible, evidence-based science on the environmental and health benefits of organic food and farming and communicating findings to the public. We are a leading voice in the area of scientific research about organic food and farming, and cover up-to-date studies on sustainable agriculture and health while collaborating with academic and governmental institutions to fill knowledge gaps.

The Organic Center thanks the Materials Subcommittee for its recommendation on Research Priorities. We appreciate the creation of the Research Priority Framework and the efforts made by each Subcommittee to bring forth its research priorities for 2022.

Summary:

- The Organic Center supports the subcommittee's proposed 2022 Research Priorities. The proposed priorities are in line with the needs of the organic community, and will serve as an important resource to guide The Organic Center's research priority focus and project development.
- We appreciate the large diversity of priorities currently presented and also **recommend the inclusion of the following additional priorities:**
 - Assessing impacts of inadvertent chemical contamination across the supply chain (runs almost parallel with issue of GMO contamination, but is a separate problem that requires separate exploration)
 - Assessing benefits and risks of livestock integration into crop rotations
 - Quantifying nutritional values of organic animal products (such as dairy, meat, and eggs)
 - Comparisons of pesticide and antibiotic residues in organic and conventional products
 - Measuring impacts of organic crop production on water
 - Cultural and social barriers to organic adoption



We offer the following more detailed comments:

ADDITIONAL RESEARCH NEEDS

The Organic Center is continually collecting information on research needs from multiple sectors of the organic community. We conduct industry roundtables, work with the Organic Trade Association's Farmers Advisory Council, meet with professors on our Science Advisory Board and hold one-on-one meetings with individual companies, farmers, professors, and consumers. We feel that the NOSB Materials Subcommittee's 2022 Research Priorities are in line with the needs of the organic industry, and appreciate the release of this report as an important resource to guide The Center's own research priorities and project development. Based on feedback we've received during our own outreach efforts, **we would also like to suggest that the following research be considered for inclusion in the 2022 Research Priorities:**

Benefits and risks of livestock integration into crop rotations

Livestock grazing of cover crops could be beneficial for organic systems, because it maximizes the strengths of cover cropping, including enhanced soil fertility, structure, water infiltration and storage, and reduced nitrate leaching, while addressing challenges that have limited the expansion of cover crop use such as concerns over cover crop water use and nutrient immobilization, which could increase deficiencies and increase input costs of the crops that follow.

Unfortunately, despite the well-known benefits of animal-crop integration, concerns over microbial food safety are limiting the expansion of animal integration into cropping systems. Recent research has shown that integrated crop-animal systems [perform well in keeping pathogens out of meat](#), but additional research is needed to examine the synergistic impacts of the use of livestock for cover crop grazing on ecosystem health and food safety.

The Organic Center is working on this project in collaboration with the University of California, Davis by examining food pathogen persistence and survival in soil and transfer to vegetable crops, and the relationship between soil health properties, environmental factors and pathogen survival in grazed cover crop-vegetable production in three states. Researchers will measure changes in soil health indicators over two years of grazed cover crop-vegetable production, and assess benefits and potential tradeoffs of vegetable cash crop productivity.

Nutritional value of organic animal products (such as dairy, meat, and eggs)

We were pleased to see the inclusion of "Factors impacting organic crop nutrition, and organic/conventional nutrition comparisons" in the 2022 Research Priorities, as we agree with the committee analyses that a better understanding of how pre- and post-farm gate practices impact crop nutrition is needed. However, the committee discussion focuses around fruit and vegetables. We encourage the committee to include animal products such as meat, dairy, and eggs in their priorities.

The Organic Center recently conducted a review of recently published studies on the impacts of



organic meat production, and while we found research suggests that organic practices result in animal products with higher nutritional value, most of that research has been conducted in Europe and are based on European livestock standards. Additional studies based on U.S. standards will be critical for fully understanding the impacts of production methods on meat nutrition.

Comparisons of pesticide, antibiotic, and synthetic growth hormone residues in organic and conventional products

Understanding the benefits of organic when it comes to avoiding synthetic toxins is critical, because it is the basis behind hypotheses for recent research finding health benefits to consuming an organic diet such as a 25% reduction in overall cancer risk.

The Organic Center completed a study in collaboration with Emory University showing that organic is an easy way to avoid pesticides, antibiotics, and synthetic growth hormones in dairy. Specifically, the study found no detectable levels of any antibiotics in organic milk in comparison with 60% of conventional samples having detectable levels of antibiotics. We also found that over 30% of conventional samples had residues of antibiotics that are banned for use in lactating cows. Conventional levels of growth hormones were twenty times higher than the organic levels. For pesticides, we found that organic milk didn't have any residues of currently used pesticides, but pesticides over 60% of conventional milk, including chlorpyrifos, atrazine, and diazinon.

This year, we are expanding this work by partnering again with Emory University to assess organic and non-organic retail milk for glyphosate residues. The results from our studies are just the start of what could provide baseline data about pesticide exposure that can be used to calibrate future diet intervention studies, which would evaluate how replacing various foods with organic options can impact pesticide exposure from diets.

Additional research on the impacts of organic on exposure to residues, and connections between these exposures and health outcomes are critical for understanding emerging research on the long-term health effects of an organic diet.

Effects of organic crop production on water quality

Studies on the impacts of organic production on water are limited, but may have major implications for organic growers who must meet nutrient runoff restrictions (e.g. in California). However, we want to emphasize that research on water quality should not be limited to nutrient losses, but must also take into account the impacts of pesticide pollution on waterways. Almost all water quality discussions that have been circulating recently focus on nutrient loss, but pesticide runoff has an equally, if not larger, impact on environmental and human health. We need to integrate research on pesticide residues into our discussion about water quality by reviewing the research on contaminated watersheds, the impacts of pesticide residues in water, and how organic can keep pesticides out of waterways.

In addition to pesticide impacts on water quality, some areas of research need include: (1) additional research examining the impacts of organic versus conventional systems on nutrient loss. Dr.



Cambardella *et al.* were able to isolate all runoff from a farming system in Iowa, but there needs to be an examination of data from broader regions to better understand the overarching effect that farming system has on nutrient runoff/leaching, (2) Best practices on reducing nutrient runoff/leaching for organic farmers. This is a hot issue with organic farmers right now, because several states have mandated reductions in nutrient loss, but many of the recommended strategies for reduction are not developed with organic systems in mind, so might not be useful to organic farmers and/or would not have the same nutrient loss impact as they would on conventional farms.

Protection of organic farmers from chemical contaminants

Unintentional pesticide contamination in organic crops has been flagged as a major challenge by the organic sector, across the supply chain. For example, the Organic Trade Association's Farmers Advisory Council has highlighted it as a top priority in their 2019 work plan, and the Organic Trade Association is currently assembling a task force to engage the industry in protecting organic integrity from pesticide contamination. Contamination can have a disproportionate impact on organic farmers, because organic stakeholders along the entire supply chain are burdened with the cost of testing and experience losses when tests are positive. While the organic community has identified this as a critical topic for investigation, little data has been collected synthesizing the current experiences and specific research needs of the organic community.

The Organic Center was recently awarded an OREI planning grant to address this issue. We have conducted a national survey that shows farmers across all major regions of the US have experienced contamination, mostly from drift and have experienced exceptional losses including the loss of organic certification, strained relationships with neighbors, and product loss from damage despite using practices to avoid drift contamination (e.g. buffer zones, windbreaks). We have brought together organic stakeholders across the supply chain with scientists who are developing research programs to help quantify social, economic and physical consequences of inadvertent pesticide contamination for organic farmers and communities. There has been an overwhelming interest in this topic by farmers and researchers across the nation and it is clear there is a real need for many types of research related to this topic area with a goal to change policies that better support and protect organic farmers from the impacts of contamination.

While we laud the NOSB for including the focus "Prevention of GMO Crop Contamination: Evaluation of effectiveness," the issue of contamination is not unique to genetically modified material, and **we request that chemical contamination be included in the research priorities as well.**

Barriers to Transitioning to Organic Production

While it is known that production challenges, yields, and other economic barriers to transition are significant, there are lesser defined cultural and social barriers that also prevent some farmers from using organic practices and/or pursuing organic certification, even when they have already adopted organic practices. And because organic hotspots provide many benefits to rural development, it should be of particular interest to determine how to overcome both economic and cultural barriers to organic adoption in general, and particularly in organic cold spots.



Preliminary assessments and literature reviews conducted by The Organic Center have revealed that cultural and social barriers include: a perceived elitism or partisanship of organic either by farmers or by their communities, fear of inadvertent contamination or pressure from non-organic farmers who see organic as a challenge to their own production, various histories of land dispossession and discrimination by USDA and extension agencies that sour the USDA organic brand, and discrimination, both past and present, that prevents access to resources and land and for minority farmers (land access has been tied to sustainability of practices, where longer leases or land tenure result in longer term stewardship of land).

More research is needed to illuminate cultural and socioeconomic barriers so that a path can be laid to address and overcome these barriers. We recommend that priorities be specifically placed on assessing the potential societal benefits and/or drawbacks of organic certification for farmers, their communities, and existing consumers, and assessing current limiting factors to the appeal and adoption of organic by non-certified organic farmers.

CURRENT RESEARCH NEEDS

We have reviewed the list of topics included for 2022 Priorities, and we're particularly pleased to see the inclusion of evaluation of bio-based mulch film, whole farm ecosystem service assessments to determine the economic, social, and environmental impact of farming systems choices, organic no-till practices, plant disease management strategies, relationships between biodiversity and pathogen presence, practices that reduce greenhouse gas emissions, the examination of factors influencing organic food access, and production and yield barriers. The Organic Center is actively involved in conducting and communicating research on these issues, and we expect the prioritization of these topics by NOSB may help us secure further funding. We offer some details about our ongoing work for the following and highlight additional research areas that we suggest be included in 2022 priorities:

Evaluation of Bio-Based Mulch Film

We thank the subcommittee for including the topic of evaluating bio-based mulch films. Organic values are based on improving sustainability and reducing reliance on synthetic materials. However, synthetics such as plastic film and mulch is used in the field as weed control. The use of plastic has increased in the field as organic production has expanded. While the organic community is dedicated to finding alternatives to plastic, there has been a paucity of dedicated discussion and strategy investigating available alternative strategies. Additionally, the complexities surrounding the development of plastic alternatives and organic regulations of plastic use require input and collaboration across the organic sector.

The Organic Center was recently awarded a grant through the USDA Organic Agriculture Research and Extension Initiative (OREI) to hold a conference in 2023 that will bring together farmers, processors, distributors, retailers, researchers and policy makers to discuss challenges of plastic from the perspective of waste, climate change, and environmental/human health, with a goal of exploring ways to reduce plastic along the entire organic supply chain. The workshops will include



presentations of innovative solutions to plastic use and waste, and policy discussions to set the stage for the current global perspective on plastic alternatives and USDA National Organic Program allowances. Bio-based mulch films will most certainly be a topic of discussion at this event. And future research conducted under this NOSB priority would help the industry move beyond discussions about reducing plastic use to actions that lead to the replacement of plastic mulch films.

Economic, Social, and Environmental Impact of Farming Systems Choices

The Organic Center has been interested in the economic and social impacts of organic farming for a number of years, as there is extremely limited research on these issues. Understanding the economic impact of best practices is especially important because it can dictate adoption rates of new techniques. One of our current research projects addresses this by quantifying yield impacts of soil health practices, because different soil building practices do not necessarily have an equitable effect on yields. When considering the adoption of new practices, it is important for farmers to be able to evaluate which practices are most likely to promote environmental sustainability while simultaneously maintaining (or increasing) their bottom line. One goal of this project is to act as an immediate incentive for encouraging the adoption of best soil building practices in organic, because it will connect all the dots between the most important organic strategies for building soil health and sequestering carbon that also translate into higher, more consistent yields.

Unfortunately, while yield data is available to conduct this analysis, most studies do not track the full suite of variables that would be needed for a full profitability comparison, such as input costs. We are pleased to see the NOSB highlight the need for additional economic analyses of organic systems, as it will allow for a more holistic understanding of the economic opportunities and pitfalls for organic growers, and more accurately pair environmental practices with economic incentives for organic growers.

Relationships between Biodiversity and Pathogen Presence

We thank the subcommittee for including the priority of pathogen prevention as organic farmers face many challenges when it comes to food safety management. One of the most commonly cited issues is incongruities between third party food safety requirements and the National Organic Program requirements. Unfortunately, food safety regulations and requirements originate from various sources, from federal standards (such as the National Organic Standards and the Food Safety Modernization Act) to third party standards required by commodity groups (such as the Leafy Greens Marketing Association) and private retailers, with varying degrees of stringency in what food producers must do to reduce risk. Third party auditors, consultants, and farm advisors may also have their own interpretations of how certain farming practices affect risk of foodborne illness contamination. While all food producers are subject to food safety rules, organic farmers can face unique challenges in trying to meet both NOP and food safety standards, especially the tensions between supporting biodiversity while some food safety concerns pressure them to limit wildlife on or near the farm. Unfortunately, there are often disparities between third-party food safety regulations and biodiversity-maintenance strategies employed by organic farmers due to the fallacy that increased on-field faunal biodiversity may increase the risk for introduction of human pathogens on the field.



While some research has been conducted disproving this myth, more research, extension, and education are needed to fully understand the impact these discrepancies are having on organic farmers, and the true relationship between on-farm biodiversity and food safety. Additionally, extension must take place to both organic growers third-party food safety auditors alike so that evidence-based strategies can be incorporated into their audits. Therefore, we thank the committee for including priority focusing on the relationships between biodiversity and pathogen presence.

The Organic Center was recently awarded an OREI grant proposal to bring together organic growers, third party food standards association, researchers, and policy makers to determine which producers are most impacted (product sectors and regions) by disparities between third-party food safety standards and organic biodiversity requirements, which third-party certification requirements are the most difficult to synchronize with the National Organic Program requirements, and research needs for addressing these specific conflicts. The long-term goal of this proposal is to provide organic growers and industry members with organic-appropriate tools and strategies for mitigating food safety risk while retaining third-party certification viability.

We have been involved in research examining pathogen presence in organic soil amendments for several years, and the proposed work will build on our current and past research on pathogen suppression. For example, we are collaborating with the University of California, Davis, among other organizations, to address the need for additional information on raw manure intervals to provide critical information for guidelines on risk mitigation of foodborne pathogens for organic and sustainable agriculture. We have [published multiple articles and abstracts on the subject](#), and are currently developing an education module in collaboration with Cornell University to communicate our findings to a broad audience.

Reducing Greenhouse Gas Emissions

Climate change is having serious consequences on our environment and public health, and we appreciate the inclusion of the “Climate Change” focus in the 2022 priorities. The Organic Center has been engaged with climate change issues for several years now on multiple levels. For example, last year co-hosted our annual Organic Confluences Conference with USDA, FiBL, The Climate Collaborative, and ISO FAR to focus on mitigating and adapting to climate change. The conference brought together scientific experts, farmers, policymakers, and organic stakeholders to address the current impacts of climate change and best practices within the organic sector to mitigate and adapt, while examining methods to encourage the adoption of strategies to fight climate change.

We have active research projects on the subject of climate change mitigation, and are specifically conducting analyses to “pinpoint specific strategies that organic farmers can take to reduce greenhouse gas emissions and respond to current climate challenges threatening the future of our food security.” For example, we recently published a project in collaboration with researchers at the University of Maryland pinpointing specific strategies organic farmers can take to increase carbon sequestration in the soil. We are also working with Harvard University’s Department of Public Health examining the specific aspects of organic agriculture that can contribute the greatest benefits



to climate stability. These net benefits include carbon sequestration in the soil and reduced energy usage by avoiding synthetic nitrogen fertilizer.

We thank the subcommittee again for all their efforts and for their consideration of our recommendations of amendments to the current list of research priorities for 2022. Please do not hesitate to contact us for information on the data that we have been collecting or with questions you would like us to pose the research community.

Again, on behalf of The Organic Center, I would like to extend my thanks to the Materials Subcommittee for your commitment to furthering organic agriculture.

Respectfully submitted,

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Director of Science Programs
The Organic Center