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Office of the Chief Scientist
U.S. Department of Agriculture
1400 Independence Ave., S.W.
Washington, DC 20250

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RE: Visioning of U.S. Agricultural Systems for Sustainable Production

To the Office of the Chief Scientist:

We would like to thank the Office of the Chief Scientist for the opportunity to comment on the long-term health and viability of U.S. agriculture, and to provide suggestions for effective strategies to concurrently improve the economic, environmental, security, and health benefits to the U.S. through agriculture over the next 50 years. Specifically, we would like to provide input on how organic is an integral part of the solution for agricultural sustainability by supporting soil health, mitigating climate change, upholding pollinator health, and contributing to a successful economy.

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 the 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.

Soil Health

Soil health is critical for maintaining agricultural yields over time, and is the backbone of our food security. Organic can act as a model for agriculture on how to build soil fertility and biotic community over time. For example, a study published in *Science* found that over a 21-year time period, organic soils have greater biological activity, greater soil stability, more biomass and higher diversity than conventionally managed soils [1]. Another study found that organic management results in better soil nutritional and microbiological conditions, higher levels of total nitrogen, nitrate, and available phosphorus, more microbial biomass, and more enzymatic activity (acid phosphatase, protease, and dehydrogenase) [2].

Climate Change

Soil health is tied to climate change, which is something that will certainly affect agriculture over the next 50 years. Organic can also be a part of the solution to mitigating climate change through its increase efficiency. Research investigating the efficiency of organic has found that organic farms are more energy efficient than their conventional counterparts [3]. One of the reasons for this is that the production of synthetic fertilizer used in conventional practices is extremely energy intensive. One study showed that organic farming is more energy efficient than conventional farming for almost all crops when comparing the same amount of farmed area [4]. Even when yields are lower in organic vegetable production, the absence of fertilizer input makes up for energy costs so that energy used for the same crop output is still lower or similar to conventional farming.



This energy efficiency is important when it comes to mitigating climate change, which contributes to extreme weather events like droughts. In addition to the energy efficiency of organic production, organic farms also help sequester carbon and release lower levels of greenhouse gases. For example, a recent analysis of data from around the world found that, on average, organically managed soils release 492 kg less carbon dioxide per hectare per year than conventionally managed soils [5].

Organic farming is not only important for climate change mitigation; organically managed crops also allow for better adaptation to climate change. Anderson and Miller claim that genetically modified crops can be crafted to withstand droughts, but the page they link to shows that only one drought-tolerant biotechnology trait has been able to be developed for corn. Rather than relying on experimental biotechnology, organic farming allows greater resilience to drought by conserving soil moisture. Organic management of soils can improve their water-holding capacity by up to 100 percent [6]. This was demonstrated in a research trial that compared the performance of organic and conventional cropping systems in drought years. Researchers found that organic management of crops in drought years yielded up to 196% in relation to conventional crops [7].

Pollinator health

Bee populations have been declining at alarming rates, affecting seventy-five percent of all crops, valued at more than \$16 billion. The decline in pollinator numbers has the potential to not only adversely affect the world's biodiversity, but also threaten our economy and food security. Fortunately, organic farming practices can provide critical solutions that not only decrease risks to pollinators but actively support the growth and health of our pollinator populations.

The Organic Center recently released a report using organic as a model for supporting pollinator populations and providing steps that growers can take to foster healthy pollinators [8]. Organic farming requirements prohibit the use of harmful synthetic pesticides and toxic seed treatments while promoting abundant pollinator habitat and plentiful diverse pollinator food sources. These actions have resulted in higher pollinator abundance and diversity on organic farms. Many techniques used by organic growers--such as crop rotations, hedgerow planting, and the use of integrated pest management techniques—can be adopted by all growers to support pollinator health.,.

Economy

Organic agriculture can also be part of the solution for economic sustainability in agriculture. Organic farms are 35 percent more profitable than the average farm and have higher gross receipts. Premiums paid to organic farmers can range from 29 to 32 percent above non-organic prices, allowing farmers to make a living wage.

Organic is also a major contributor to jobs in the U.S. Sixty percent of organic businesses reported their operations had increased full-time employment during 2015. Additionally, over 65 percent of organic farms sell in wholesale markets, creating a distinct value chain in the greater food economy [9].

These benefits are especially true for rural communities. Organic hotspots, defined as counties with high levels of organic agricultural activity whose neighboring counties also have high organic activity, boost median household incomes by an average of \$2,000 and reduce poverty levels by an average of 1.3 percentage points. There are 225 counties across the United States identified as organic hotspots. These are as diversified as the organic industry, and represent the various kinds of organic agricultural activity and accompanying businesses: crop production, livestock production, and organic processors [10].



Again, on behalf of The Organic Center, I would like to extend my thanks to the Office of the Chief Scientist for its commitment to the long-term success of agriculture in the United States, and for the opportunity to provide input on the Visioning of U.S. Agricultural Systems for Sustainable Production.

Respectfully submitted,

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