

Reason for Standard

Fruits and vegetables are the foundation of a healthy diet, but how these foods are produced can raise other health concerns for consumers and the planet. Modern industrial agriculture is a resource-intensive system reliant on synthetic pesticides and fertilizers, genetically engineered crops, and single crop production (known as monocropping).ⁱ The impacts of this approach include water and air pollution, biodiversity loss, soil and land degradation, deforestation, and collapse of pollinator populations.^{ii,iii,iv} Agriculture is also a major contributor to climate change, with an estimated 21-37% of total greenhouse gas emissions attributable to all food system activities—within this figure it's estimated that 9-14% of emissions are from crop and livestock practices and 5-14% from land use changes like deforestation.^v

While agriculture contributes to climate change, it is also vulnerable to the resulting effects of climate change, such as extreme and unpredictable weather events, temperatures, and precipitation, droughts, wildfires, and flooding.^{vi,vii,viii} All of these changes impact our ability to grow food in various ways. Higher temperatures provide an ideal climate for pests to thrive and prolonged periods of rain or drought cause crop failure, soil erosion, and flooding in fields.^{ix,x} Along the west coast, the increased number of wildfires every summer has started impacting crops, such as grapes and apples, as fires and smoke damage processing facilities and crops (either by ruining flavor or burning acreage) or make those areas inaccessible and unsafe for workers to harvest or process crops.^{xi}

Conventional agriculture relies heavily on synthetic pesticides, like dicamba and glyphosate, which can be harmful to workers in the fields, surrounding rural communities exposed through pesticide drift, and consumers who eat foods contaminated with pesticide residues.^{xii,xiii} Many widely used pesticide chemicals have been linked to chronic diseases, neurological disorders, developmental delays, learning disabilities, and cancer.^{xiv,xv,xvi} Studies continue to demonstrate the adverse health impacts from direct exposure to pesticides and even potential health impacts among later generations of those exposed.^{xvii,xviii,xix} Alternatively, some new evidence indicates that eliminating exposure through consuming organic foods decreases pesticide levels in the body and lowers the risk of associated health conditions, most notably being cancer.^{xx,xxi,xxii} Furthermore, since most pesticides target biological or physiological mechanisms shared between plants or animals, pesticides also pose significant harm to beneficial insects or native plants, reducing biodiversity, ecosystem health, and natural pest management.^{xxiii,xxiv,xxv}

Although there are many concerns associated with the industrialized approach to crop production, there are alternative production methods that can greatly reduce or eliminate many associated harms and negative impacts. For example, certified organic crops must meet specific United States Department of Agriculture (USDA) regulations that are backed by a federal law known as the Organic Foods Production Act (OFPA) and were developed with a goal to minimize the environmental and human health impacts of farming. Organic standards promote growing techniques that enhance soil health, foster biodiversity, protect natural resources, and prohibit many harmful substances and practices like genetic engineering, and synthetic pesticides and fertilizers.^{xxvi} Because organic production doesn't rely on resource-intensive

inputs and instead focuses on enhancing the health of the land and ecosystems, it has less of an impact on the climate.^{xxvii}

Often building on the foundational standards of organic but many times lacking verification or a consistent definition, regenerative agriculture takes a more holistic approach to crop cultivation and land management by treating farms as integrated systems that exist as part of the broader ecosystem.^{xxviii, xxix} Through this approach, regenerative farmers grow food by prioritizing biodiversity, soil health, and eliminating the reliance on synthetic inputs, thus nurturing the ecological systems and nutrient cycles necessary for plants to flourish.^{xxx, xxxi}

Especially as climate change continues to worsen, the need for climate-smart agriculture and more resilient regional food systems is becoming increasingly critical. Organic or verified regenerative practices both offer alternative frameworks to conventional agriculture that accomplish these goals.^{xxxii, xxxiii, xxxiv}

As technology has advanced over the decades, in congruence with growing concerns over climate change, food security, and population growth, it has naturally found applications within the agricultural industry to develop more sophisticated and versatile hydroponic and similar soilless growing systems.^{xxxv, xxxvi} Advocates point to many potential benefits they could offer, such as high yields, water efficiency, fewer pesticides, year-round production, the ability to grow food close to or in dense urban centers, and the small physical footprint of operations that employ vertical production to reduce land use (conversion of forests to farmland contributes to climate change).^{xxxvii, xxxviii}

Hydroponic systems also have a number of drawbacks, including increased risk of waterborne diseases, reliance on synthetic or highly concentrated fertilizers, and large energy requirements for lighting, heating, and cooling.^{xxxix, xl} Depending on the crop and the climate of facility's location, the energy needs for lighting and heating/cooling loads could be considerably greater than traditional farming and reliance on electricity to control the growing environment leaves indoor operations vulnerable to power outages.^{xli, xlii} Additionally, the infrastructure, equipment, and technology required to build and maintain indoor farms could have environmental impacts (e.g., materials used in electronics) and if farms rely on electricity generated by coal or natural gas, there are associated climate impacts to consider..^{xliii, xliv} Lastly, there is a strong case that soil is critical to growing healthy, productive plants because of the interplay between root structures, nutrient cycling, and microorganisms in the soil.^{xlv} Some hydroponic operations have obtained USDA organic certification, which has led to significant controversy around the role of soilless growing methods in organic given the emphasis organic has historically placed on fostering healthy, biodiverse, and carbon-sequestering soil.^{xlvi, xlvi}

PCC supports organic and regenerative agriculture due to the reasons outlined above. Our standard places a priority on local, in-season produce, balanced with staples offered year-round from reputable organic and non-GMO producers. Since hydroponically grown produce is already in the market, and can be certified organic, we encourage producers to be transparent about their production methods, so that we can label hydroponics on the shelf to provide customers with knowledge about how their food is grown.

Scope

This standard applies to all fresh produce items sold at PCC, including pre-packaged items, bulk produce, and pre-cut offerings.

Standard

1. General Requirements and Sourcing

- 1.1. PCC must ensure that 95% of the produce offered in the department is certified organic.
- 1.2. PCC gives priority to certified organic, in-season, locally grown produce so long as it is commercially available and not cost prohibitive for consumers.
- 1.3. PCC does not sell fresh produce from countries or regions that are at high risk for fraud, food safety violations, or industrial waste or chemical contamination.
- 1.4. All produce must comply with PCC's [GE Ingredient & Labeling Standard](#).
- 1.5. Produce vendors must comply with PCC's [Packaging Standard](#) and are encouraged to reduce their use of plastic packaging for produce items such as bags, clamshells, and netting.
- 1.6. PCC supports add-on certifications for regenerative farming, as long as USDA organic certification is required as a baseline.

2. Hydroponics and Soilless Growing Systems

- 2.1. PCC strongly encourages producers to clearly identify produce grown using soilless methods, such as hydroponics and aquaponics.
- 2.2. If vendors disclose produce as being hydroponically grown¹ by labeling the shipments, PCC staff must label the items accordingly at the shelf as grown in soilless systems.

Standard-Specific Glossary

Aeroponics is a variation of hydroponics where plant roots are suspended in air and regularly sprayed with a nutrient solution (e.g., water with soluble nutrients). One of the reasons the roots are left exposed in this method, rather than using a root-zone medium, is to allow them access to more atmospheric oxygen, which aids in plant growth.

Aquaponic growing systems are recirculating hydroponic systems in which plants are grown in nutrients originating from aquatic animal wastewater, which may include the use of bacteria to improve availability of these nutrients to the plants. The plants improve the water quality by using the nutrients, and the water is then recirculated back to the aquatic animals. Aquaponic systems use rooting media similar to hydroponic systems but get some or all of the plant nutrients from fish waste. Some common rooting media include coconut materials, coconut/vermiculite mix, clay pellets, expanded shale, and lava rock.

[Biodynamic farming](#) is a form of regenerative farming ([see below](#)) rooted in the work of Dr. Rudolf Steiner, which emphasizes self-sustainability and treating the farm as a whole living organism of interconnected parts. The approach focuses on cultivating natural systems and using the synergy of plants, animals, and soil to reduce the need for external and chemical inputs. Biodynamic farmers use traditional methods like livestock integration, cover cropping, crop rotation, and composting to enhance soil health and improve ecosystem biodiversity, which will result in healthy and resilient crops. Biodynamic farming techniques do not allow synthetic pesticides, fungicides, herbicides, synthetic fertilizers, growth stimulants or GMOs. [Demeter USA](#) is a certification agency that certifies agricultural operations and products as biodynamic; they are most well known for their certification of vineyards.

¹ "Hydroponically grown" includes aquaponics, aeroponics, and any other soilless growing systems.

Bioponics is an umbrella term to describe soilless growing systems where plant roots are suspended in or exposed to nutrient-rich plant-derived water solutions. They can also be grown in combination with fish, where the waste from fish is converted into plant-available nutrients through microbes in the system. Bioponics do not use synthetic fertilizers and rely more upon recirculating nutrient cycles than typical hydroponic operations.

Container-grown refers to a growing system that isolates plants and their root systems from the broader ecosystem and soil using growing vessels like pots, troughs, trays, or plastic bags. Plants are often grown in greenhouses to provide additional control over the growing environment and inputs.

Genetically Engineered (GE)/Genetically Modified Organism (GMO) does not have a standardized definition. (In part, this has created some of the problems for achieving GE transparency and reaching consensus on how best to identify and communicate this with consumers.) Many authorities, however, would define GE food or GMOs as a living organism whose genetic material (otherwise known as DNA) has been artificially manipulated in a laboratory through genetic engineering. Genetic engineering creates combinations of plant, animal, bacteria, and virus genes that do not occur in nature or through traditional crossbreeding methods.

High-Risk Genetically Engineered Crop Ingredients are identified on the [Non-GMO Project](#) list of crops and inputs that are highly likely to be GE. These include, but are not limited to, canola, corn (except popcorn), papaya, soy, and sugar beet.

Hydroponics has multiple definitions, but most simply it can be understood as an agricultural production system that involves growing plants not in the ground but rather in a nutrient solution (or liquid feed) either with or without the use of a growing medium, like coco coir. The 2010 recommendation from the National Organic Standards Board has defined hydroponics in the following manner: “The production of normally terrestrial, vascular plants in nutrient rich solutions or in an inert, porous, solid matrix bathed in nutrient rich solutions.”^{xlviii} Hydroponic operations can range from small, in-home systems for herbs and leafy greens to large-scale commercial growing operations housed in large buildings or greenhouses. Hydroponics can also be built upwards for vertical farming.

[National Organic Program](#) (NOP) was established in 2000 under the Organic Foods Production Act of 1990 to regulate the production, processing, and sale of certified organic foods in the United States. The NOP resides within the USDA and manages organic certification standards, enforcement, and accreditation of independent certifying bodies. The National Organic Standards Board (NOSB), a federal advisory committee, provides recommendations and guidance to the NOP on developing new rules and regulations related to organic certification.

[Non-GMO Project](#) is a nonprofit organization that certifies products that are free of genetic engineering. Their standards require verification that no genetically modified materials were used in production of a product, rather than relying on testing the final product for traces of GE material. They also engage in education and advocacy efforts to engage consumers and protect the integrity of the non-GMO food supply chain.

Organic refers to the practices associated with organic food production and processing that prohibit the use of most synthetic inputs and pesticides, along with requiring other environmental and animal-friendly agricultural and food handling practices. Established by the Organic Foods Production Act (a federal law), the [National Organic Program](#) (NOP) within the US Department of Agriculture (USDA) manages the organic certification standards, enforcement, and accreditation of independent certifying bodies. Many other countries also have organic certification programs.

Pesticides are chemical substances used to kill, repel, or control pests, including insects, rodents, fungi, and unwanted plants, which interfere with cultivation of a crop or food product. The term includes herbicides that target plants, insecticides that target insects, rodenticides that target rodents, and fungicides for controlling mold or mildew growth.

Regenerative agriculture is a holistic land management and farming methodology that focuses on increasing and enhancing soil organic matter to improve nutrient content, water retention, and carbon sequestration. Unless certified by a third party with established regenerative standards, regenerative does not have an agreed upon definition or guarantee associated with the term's use.

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ⁱⁱ "Industrial Agriculture 101," NRDC, January 31, 2020, <https://www.nrdc.org/stories/industrial-agriculture-101>.

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^{iv} "Polluting Our Soils Is Polluting Our Future," Food and Agriculture Organization of the United Nations, February 5, 2018, <http://www.fao.org/fao-stories/article/en/c/1126974/>.

^v "Technical Summary: IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems" (Intergovernmental Panel on Climate Change, 2019), https://www.ipcc.ch/site/assets/uploads/sites/4/2020/07/03_Technical-Summary-TS_V2.pdf.

^{vi} Jonas Jägermeyr et al., "Climate Impacts on Global Agriculture Emerge Earlier in New Generation of Climate and Crop Models," *Nature Food* 2, no. 11 (November 2021): 873–85, <https://doi.org/10.1038/s43016-021-00400-y>.

^{vii} "Climate Change and Agriculture: A Perfect Storm in Farm Country," Union of Concerned Scientists, March 20, 2019, <https://www.ucsusa.org/resources/climate-change-and-agriculture>.

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^x "Food Security: IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems" (Intergovernmental Panel on Climate Change, 2019), https://www.ipcc.ch/site/assets/uploads/sites/4/2021/02/08_Chapter-5_3.pdf.

^{xi} Andrew R. Chow, "West Coast Farmers Reel From COVID, Fires, Climate Change," *Time*, October 21, 2020, <https://time.com/5900804/farmers-climate-change-covid-19/>.

^{xii} Catherine Roberts, "Stop Eating Pesticides," *Consumer Reports*, accessed February 2, 2022, <https://www.consumerreports.org/pesticides-in-food/stop-eating-pesticides-a1094738355/>.

^{xiii} Kendra Klein and Anna Lappé, "America's Agriculture Is 48 Times More Toxic than 25 Years Ago. Blame Neonics," *The Guardian*, August 7, 2019, sec. Opinion, <https://www.theguardian.com/commentisfree/2019/aug/07/americas-dependence-on-pesticides-especially-neonics-is-a-war-on-nature>.

^{xiv} Polyxeni Nicolopoulou-Stamati et al., "Chemical Pesticides and Human Health: The Urgent Need for a New Concept in Agriculture," *Frontiers in Public Health* 4 (July 18, 2016): 148, <https://doi.org/10.3389/fpubh.2016.00148>.

^{xv} Mariana Portela de-Assis et al., "Health Problems in Agricultural Workers Occupationally Exposed to Pesticides," *Revista Brasileira de Medicina Do Trabalho* 18, no. 3 (2020): 352–63, <https://doi.org/10.47626/1679-4435-2020-532>.

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