



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.<sup>xxx,xxxii</sup>

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.<sup>xxxii,xxxiii,xxxiv</sup>

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.<sup>xxxv,xxxvi</sup> 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).<sup>xxxvii,xxxviii</sup>

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.<sup>xxxix,xl</sup> Depending on the climate and crop, 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.<sup>xli,xlii</sup> 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.<sup>xliii,xliv</sup> 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.<sup>xlv</sup> 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.<sup>xlvi,xlvii</sup>

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 allow customers 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 grown<sup>1</sup> 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 the roots are 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 of any kind, 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 reviews the practices of [Biodynamic](#) vineyards.

**Bioponics** are soilless systems that sometimes employ a soil-like medium in containers; they rely on plant-derived biomass teas for nutrient infusion, typically into flood and drain, or ebb and flow systems.

**Container-grown** refers to a growing system that isolate 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.

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<sup>1</sup> “Hydroponically grown” includes aquaponics, aeroponics, and any other soilless growing systems.

**Hydroponics** has multiple definitions, but most simply it can be understood as an agricultural production system that involves growing plants 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.”<sup>xlviii</sup> 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 organics certification.

**Non-GMO Project** is a nonprofit organization that certifies products that are free of genetic engineering. Their standards require verifications 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 and require 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 U.S. Department of Agriculture 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 terms use.

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