REFRAMING FOOD WASTE: TACKLING THE BIG PICTURE WITH ALMONDS

Innovative approaches to almond cultivation can provide a unique view into zero waste and sustainability. By investing in research-based, cutting-edge solutions that contribute to a circular economy, the almond sector is identifying new and valuable uses for everything grown in the orchard— generating upstream solutions, doing more with less resources, giving back to nature and eliminating waste before food even leaves the farm.

The Circularity Of Almond Production

Almonds have a two-year shelf life when stored properly, which means very few almonds go to waste. But beyond the almond itself, California almond farmers are taking action to optimize the uses for almond byproducts, meaning the materials leftover from growing almonds: hulls, shells, and woody biomass.

As the urgency for a circular economy increases, the California almond industry is a leading example of agriculture's ability to channel organic resources (like almond byproducts) back into nature to benefit the greater ecosystem.

From the hulls and shells that protect the almond kernels as they grow to the trees themselves, read on for examples of these circular production practices.

HULLS AND SHELLS

Hulls

A particularly rich source of nutrients when used as animal feed, helping poultry to combat salmonella and improving their egg-laying capacity.

Can also be used as a growing medium for mushroom cultivation as a replacement for traditional peat moss, a non-renewable resource that's often imported from Canada.

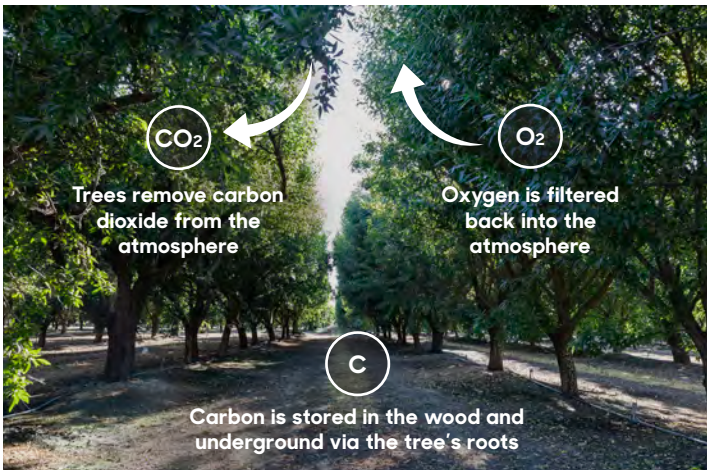
Shells

Can be used as a feedstock to grow black soldier fly larvae, a valuable food source for poultry and aquaculture.

Can be burned and transformed and added to post-consumer recycled plastics, making them stronger and more heat stable. This increases our ability to recycle existing plastic, resulting in less new plastic in the world.

WOODY BIOMASS

Consider the orchard as a carefully managed forest. Almond trees sequester carbon, clean pollutants from the air, produce oxygen, offer a food source for pollinators, and more.



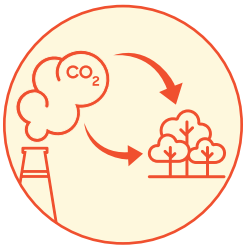
Using the trees' woody biomass, California almond farmers are pioneering a regenerative practice and remarkable form of agricultural recycling called **whole orchard recycling**. At the end of their productive lives, entire orchards are returned to nature by grinding up the trees and plowing them back into the soil.

Whole Orchard Recycling increases:

+19%▲ Orchard Yields	**+58%▲** Soil Carbon	**+32%▲** Water Holding Capacity
+42%▲ Organic Matter	**+19%▲** Aggregation	**+17%▲** Nitrogen

Carbon Sequestration

With further production improvements– like whole orchard recycling– and key policy changes, **the California almond community could eventually be carbon neutral, or even carbon negative**.



Farms that use whole orchard recycling sequester **2.4 tons of carbon per acre, equivalent to living car-free for a year**. For almond farms, the majority of which are between 50-100 acres, the potential benefits are promising.

> "I have young trees on an orchard that was just recycled. The trees are giant, lush and green, and I have had very little input to them this year, which is amazing."

Christine Gemperle
Second-generation almond farmer in Ceres, California

Finding ways to reduce environmental footprint while adding value is at the heart of almond farming, ensuring farmers can grow a better future for their families, communities, and the planet. When the California almond industry says zero waste, we mean using everything we grow to make the world a better place. You can scan the code to read more or go to AlmondSustainability.org for additional sustainability resources.

1 Nowak, D., et al. Tree and forest effects on air quality and human health in the United States. Environmental Pollution. 193: 119-129. May 2014.
2 Ramesh Sagili. Assistant Professor – Apiculture, Department of Horticulture. Oregon State University.
3 USDA 2017 Census of Agriculture.
4 Orchard recycling improves climate change adaptation and mitigation potential of almond production systems Jahanzad E, Holtz BA, Zuber CA, Doll D, Brewer KM, et al. (2020) Orchard recycling improves climate change adaptation and mitigation potential of almond production systems. PLOS ONE 15(3): e0229588. https://doi.org/10.1371/journal.pone.0229588