

WHOLE ORCHARD RECYCLING

An almond orchard removal method that can boost yields and lower water use in the replanted orchard.

Burning restrictions and power plant closures are leaving growers in need of solutions for disposing of old trees in an economical and environmentally friendly way.

Whole orchard recycling (WOR) is one solution to this challenge. It involves:

- on-site grinding or chipping of whole trees during orchard removal;
- incorporation of the chips or grindings into the topsoil before replanting.

On-farm benefits of WOR*

Improves soil structure & health

WOR increases water holding capacity, soil aggregation and compaction, soil biological activity, and soil carbon, nitrogen, and organic matter.

Improves tree growth

WOR increases tree nitrogen content and tree water status, and increases trunk diameter after several years of growth.

Boosts yields

WOR boosts yields after several years of growth, increases water use efficiency, and improves orchard resilience to water stress.

Provides environmental benefits

WOR increases carbon sequestration in the soil compared to alternative orchard disposal methods, such as burning or surface mulching.

*see orchardrecycling.ucdavis.edu for research details



Whole orchard recycling field day participants stand near a freshly ripped field. Denair, CA, October 2018.

Nutrient Use with WOR

Growers who do whole orchard recycling may need to apply fertilizer nitrogen at greater rates than what is normally recommended for trees in their first leaf.

Brent Holtz, UCCE County Director and Farm Advisor recommends:

- **apply 6-8 ounces of actual nitrogen per tree** (50-70 lbs N/acre) in the first year of growth. **After the first year you can use typical nitrogen rates;**
- **apply nitrogen early in the season;**
- **spread out nitrogen applications so no more than 1 ounce of actual nitrogen is applied per tree per application.**

Costs of WOR*

WOR requires some upfront costs and different practices than other orchard disposal methods.

But with burning restrictions and biomass power plants paying less for wood chips, costs of doing WOR are comparing increasingly favorably with hauling chips to a power plant.

WOR may also have long-term yield benefits and water savings compared to other disposal methods.

In one research trial*, trees planted where the previous orchard was recycled showed a 1,000-pound kernel increase per acre. Water savings of 10% or more are also possible in such orchards.

	Burning old orchard	Grinding & hauling old orchard	Grinding & recycling old orchard
Pulling trees	\$200-\$300/acre	\$200-\$300/acre	\$200-\$300/acre
Grinding trees	<i>Not done</i>	\$500-\$700/acre	\$500-\$700/acre
Burning with permit	\$400-\$500/acre	<i>Not done</i>	<i>Not done</i>
Spreading chips	<i>Not done</i>	<i>Not done</i>	\$125-\$400/acre
Deep ripping	\$300-\$700/acre	\$300-\$700/acre	\$300-\$700/acre
Discing	\$50-80 (for 2x)	\$50-80 (for 2x)	\$50-160 (for 2-4x)
Plowing (optional)	<i>Not standard</i>	<i>Not standard</i>	\$0-\$50/acre
Cost difference	<i>Baseline</i>	+ \$0-\$200/acre	+ \$125-\$810/acre

*see orchardrecycling.ucdavis.edu for more information

GET PAID TO DO WOR

The San Joaquin Valley Air Pollution Control District's (SJVAD) incentive program will reward growers with funding from \$300-600 per acre up to \$60,000 per year to implement whole orchard recycling. *For more information contact Jacob Whitson (559-230-5800 or Jacob.Whitson@ValleyAir.org)*

Other Considerations

- ◆ **There is good reason to believe that most almond diseases will not be transmitted by recycled wood.** But WOR is currently not recommended for orchards infested with Armillaria, Ganoderma, crown gall, or band canker.
- ◆ **Few growers have reported problems with wood chips contaminating the first harvest.** How quickly chips break down after WOR depends on chip size, the total amount of chips, whether they were pre-treated to speed decomposition, and their incorporation depth.

“ After all the time that we fertilized those trees, rather than shifting those nutrients off the ranch, we can put them back in the soil. ”

Norma Stretch, almond grower, on the benefits of recycling her old orchard



Two-year-old Independence trees on a recycled orchard block, planted 3/2017 (photo 3/2019).

RESOURCES & MORE INFORMATION

Learn more about WOR at orchardrecycling.ucdavis.edu

- ◆ Grower perspectives on WOR
- ◆ Research summaries about WOR
- ◆ FAQs about WOR
- ◆ California orchard recycling providers list

Produced by the Agricultural Sustainability Institute and Department of Plant Sciences at UC Davis, with input from UC Cooperative Extension, UC Sustainable Agriculture Research & Education Program, and USDA Agricultural Research Service. **Funding provided by** the Almond Board of California and the U.S. Department of Agriculture's (USDA) Agricultural Marketing Service through grant 16-SCBGP-CA-0035. Contents of this publication are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.