

# OUTSTANDING DAIRY FARM SUSTAINABILITY

## Royal Dairy Royal City, Washington



### Worms help young farmer reduce greenhouse gases and reuse water

Last summer, Washington farmer Austin Allred deployed millions of worms to work on his dairy. He's glad he did. They're busy processing cow manure day and night – and creating results that are good for his community, the planet and his business.

His farm's cow manure is filtered through worm-dense soil, wood shavings and gravel. The result? Reduced odors and greenhouse-gas emissions.

Allred, who owns Royal Dairy in Royal City, Wash., entered a pilot program with BioFiltro, a Chilean firm that builds worm-based filtration systems for wastewater treatment around the world. Last year, his 6,000-cow operation became the largest U.S. dairy to use the technology.

The results were pleasantly surprising. In just four hours, the system removed more than 90 percent of total nitrogen, suspended solids and total phosphorus. Allred can now treat all the excess water his dairy puts out – a whopping 200,000 gallons per day. This has led to several positive outcomes for his farm, including keeping tanker trucks off the roads, better control over nutrients in irrigation water, and reducing overall emissions and odors.

Here's how it works: Wastewater goes through physical filters and is processed by the worms and microbes. Worms eat manure solids, and as they move through the system they create air channels, an important factor for wastewater treatment. They also maintain a stable environment that allows the microbes to form a biofilm.

The biofilm grows throughout the wood shavings and on the rocks. It's formed by colonies of billions of microbes that capture, retain, digest, and remove contaminants from water.

"It is really a huge advantage for us here to be able to track the water we use and to be able to sustain that and turn it into irrigation and have zero loss on our water usage," says Allred.

**Austin Allred, 27, is a first-generation dairy farmer who grew up on a crop farm and worked at the dairy next door as a teenager, where he discovered he enjoyed working with the cows.**

As the system's worms "eat" manure, a film is produced that sticks to the wood shavings and gravel to filter out nitrates and produce cleaner water for re-use on the farm.

Castings from the worms could add another source of revenue. Allred is testing them on his brother's orchard.

