In east-central Washington and north-central Oregon, annual precipitation ranges from 6 to 12 inches. Conservation tillage is not widely practiced by farmers in this dry region prone to wind erosion, but Bill Schillinger, a professor at Washington State University (WSU), and technical staff at the WSU Dryland Research Station at Lind are working to change that. They are developing new deep-furrow drills that will plant winter wheat deep into soil moisture in tilled fallow fields with large quantities of residue. Existing deep-furrow drills cannot pass through much residue without plugging, which is the main reason why conservation tillage is not widely practiced.

Essentially all farmers in this area follow a two-year winter wheat–summer fallow rotation. Farmers till the soil in the spring of the fallow year to help store a portion of the winter precipitation and enable planting of winter wheat deep into stored moisture in late summer. Tillage severs soil pores and channels that, when left intact, act as conduits through which water can escape during the hot, dry summer months.

But excessive tillage during fallow buries residue, pulverizes soil clods, and can lead to dust storms. Some of those storms have exceeded federal air quality standards. “This region experiences severe blowing dust storms that are due to too much tillage of summer-fallowed soils,” Schillinger says.

To address the problem of blowing dust from fallow fields, some growers are turning to “undercutter” tillage—slicing below the surface of the soil with wide, smooth “V” blades of an undercutter implement. Researchers and farmers have conclusively shown that this method will effectively break up soil pores and channels with minimal mixing and stirring of the soil surface. With undercutter tillage in the spring, residue from the previous wheat crop and soil clods can be retained to prevent blowing dust. The undercutter tillage method for summer-fallowed soils is great for soil conservation, but there’s a problem—existing deep-furrow seed drills cannot pass through heavy surface residue without plugging.

The deep-furrow drills that all farmers use in the winter wheat–summer fallow region were developed in the 1960s. They have served farmers well, allowing them to place seed as deep as 8 inches below the soil surface.

“These drills were designed to place seed deep into moisture and stack some of the dry surface soil in furrow ridges,” Schillinger explains. “Hence the name ‘deep furrow.’ The seeds didn’t have to emerge through as much soil. That was a big revolution.”

Within a couple of years of these drills being developed, every farmer in the area had a set. But now the drills are old...