KEN HALE IS no stranger to tough times. He faced two consecutive drought years and a year of flooding after taking over the family farm in 1976, but about the turn of the century, he was facing a different kind of threat that forced him to take a hard look at operating costs.

"To be honest, I knew the writing was on the wall for me, that I could not continue to exist in farming with the farming practices I have used in the past," he recalls.

It was his tough Merced clay soils and the many passes required to prepare ground for planting cotton that inspired Hale to focus on tillage practices as a way to cut back on land preparation costs.

"We've got adobe clay here," he explains. "We get cracks in our fields four inches wide and we can stick a tape in the ground 20 inches deep."

Three years ago, Hale decided to change his operation to GPS and minimum tillage to bring down tillage costs. He became convinced he could cut back on the number of passes and the associated costs with a heavy-duty tiller – even though his neighbors were skeptical.

Because the San Joaquin Valley is flat, erosion from runoff is not a concern because most farmers do not drain water from fields into public waterways, according to Dan Munk, cotton, water and soils farm advisor for the University of California Cooperative Extension Service in Fresno. Air quality problems, however, have been an issue, since they can be exacerbated by tillage operations.

"Wind, of course, can take soil from the site, but it's basically the tillage practice itself that creates concern for the air quality regulators," Munk explains.

It is absolutely necessary for Hale to break up heavy clay soils to prepare beds for planting cotton. That's why he decided to adopt what an Australian farmer who visited the valley called "maximum till, minimum passes."

Full tillage is also desirable for cotton in the valley to achieve "plow-down compliance," an integrated pest management program to control pink bollworm and the damage it causes to cotton crops, according to Munk. "The plow-down compliance basically requires growers to shred cotton stalks, detach and incorporate them into the soil before the plow-down date. That sets up a host-free period for the pink bollworm."

One of the reasons Hale chose a heavy-duty tiller from Northwest Tillers, Inc. was to meet pink bollworm plow-down requirements, but he also decided on his "maximum till, minimum passes" program, because it reduces operating costs and dramatically speeds up land preparation.

Considering tillage practices commonly used by growers in his area for cotton seedbed preparation – requiring about 12 passes across the field – he arrived at a cost per acre of $130 to $140 for "conventional" tillage.

Then, using identical figures for tractor time, labor, fuel consumption and other expenses, he also added in items like blade wear on the tiller to determine his "minimum till" costs. In the end, he calculated full tillage with minimum passes, scaled back his field work, and cut out labor, fuel, tractor time and other costs enough to save him approximately $75 per acre on the 1400 acres he prepared for cotton after harvest in 2004.

Because he reduced tillage operations substantially, yet still achieved excellent seedbed preparation, Hale says his payroll savings alone were more than 20 percent the first year.

This year, he is installing sprayers and other applicators on the tiller in pursuit of his ultimate goal: to reduce the total number of passes he makes across the field to only eight per season, saving about 14 field passes compared to the 22 commonly used to prepare and farm a cotton field in his area.