Big or Small—All Farmers Gain From Research

In the 1770s, when George Washington urged Congress to establish a National Board of Agriculture, such an idea would have been of great interest to the American worker.

That's because in those days, 9 out of 10 American laborers considered themselves farmers. Power for tillage came from humans, horses, and oxen; grain was sown by hand and harvested the same way.

By 1862, the year that President Abraham Lincoln followed up on his predecessor's suggestion and established the U.S. Department of Agriculture, a large-scale American agricultural revolution was in full swing. The 1860s saw the appearance of steam tractors—one of numerous 19th-century technological innovations that enabled the number of people actively involved in farming to soon decline to 58 percent of the U.S. workforce.

Today's farmers rely on information delivered by fax, computer, and even satellite to help them decide when to plant and when to water, when to harvest and when to market. And those farmers now make up just 2.6 percent of the U.S. labor force.

Yet consider these numbers: In 1860, the era in which USDA was created, this country had 2,044,000 farms, with an average farm size of 199 acres. In 1990, the United States had 2,143,150 farms, with an average size of 461 acres. The steam tractor may be nothing more than a museum piece now, but the American small farm is still with us.

As the chief research agency of the U.S. Department of Agriculture, the Agricultural Research Service has delivered much of value to small farmers over the years—and continues to do so. A few examples:

- A sweet success for small farmers has been ARS-developed thornless blackberries, starting with Thornfree and Smoothstem in 1966. These have enabled growers from mid-Atlantic to Midwestern states to establish thriving pick-your-own operations and roadside berry markets. And USDA plant breeding programs have been credited by some growers with saving the strawberry industry in Illinois, Michigan, Indiana, and Ohio through the release of Surecrop, Stelemaster, and Sunrise, the first strawberry varieties resistant to several races of a root-rotting fungus called red stele.
- In Beltsville, Maryland, ARS scientists developed a new time- and labor-saving way to grow shiitake mushrooms as an added source of income for small farmers: smearing oak log ends with a mixture of grain and starter culture of the fungus *Lentinus edodes*. Left outside and uncovered, these logs can produce mushrooms within 2 months and keep producing for up to 6 years.
- In Phoenix, Arizona, ARS scientists discovered a simple tip for boosting yields and profits of lesquerella, a promising industrial crop for farmers in arid southwestern states. Lesquerella seed oil has potential for many uses in cosmetics and as high-quality lubricants that could replace those made exclusively with imported castor oil. The scientists showed that applying nitrogen fertilizer to the soil at 55 to 110 pounds per acre gave maximum lesquerella seed yields.
- In Booneville, Arkansas, ARS scientists demonstrated that money can grow on trees—in a sense—for small farmers with pine tree plantings. The scientists say fallen pine needles can be harvested and sold in 30- to 40-pound bales for as much as $8 apiece. Yields in Arkansas go as high as 150 bales per acre. The "pine straw" is a hit with landscapers who prefer it to bark nuggets or wood chips. And builders like to spread the straw at construction sites to prevent the soil from being too disturbed.

Many ARS research developments aren't about size. Whether a farmer has 15 piglets or 150, that farmer can benefit from research at ARS' National Animal Disease Center in Ames, Iowa, showing that if piglets are weaned between 10 and 18 days of age, they can be taken from a salmonella-contaminated environment, placed in a rigorously clean environment with good ventilation and limited human access, and raised without detectable levels of this most prevalent foodborne pathogen.

Similarly, growers of virtually any scale can use the news that scattering straw to form mini-dams in crop furrows can save water and soil—and increase yields—when farmers irrigate. Just 1 to 3 pounds of straw scattered along 100 feet of furrow slows the waterflow and cuts runoff down the furrow by nearly half, ARS scientists say. The straw mini-dams make the water rise higher in the trench, soaking through furrow sides and directly toward plant roots. In tests, the extra water for roots raised dry bean yields by as much as 62 percent, with similar results for irrigated sugarbeets, corn, and potatoes.

In this issue of *Agricultural Research* magazine, you'll read about other ARS projects that help farmers of all magnitudes. Big or small, pick-your-own berry grower in Maryland or wheat farmer in Kansas, ARS scientists across the country are finding answers to help them all—answers that will help ensure that America's small farmer doesn't go the way of the steam tractor in the 21st century.

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