Environmental Case Study

Regenerative Farming in Iowa:
Regenerative Agriculture in Iowa

Dick and Sharon Thompson operate a diversified crop and livestock farm near Boone, Iowa. Originally, the Thompsons practiced high-intensity, monocrop farming using synthetic pesticides and fertilizers just as all their neighbors did. But they felt that something was wrong. Their hogs and cattle were sick. Fertilizer, pesticide, and petroleum prices were rising faster than crop prices. They began looking for a better way to farm. Through 30 years of careful experimentation and meticulous recordkeeping, they have developed a set of alternative farming techniques they call "regenerative agriculture" because it relies on natural processes to rebuild and protect soil.

Rather than depend on synthetic chemical herbicides and pesticides to keep their fields clean of weeds and pests, the Thompsons use a variety of old and new techniques including crop rotation, cover crops, and mechanical cultivation. Instead of growing corn and beans over and over again in the same fields as most of their neighbors do, the Thompsons change crops every year so that no one weed species can become dominant and all species remain relatively easy to control. In the fall, nitrogen-fixing cover crops are planted to hold soil against wind erosion and to keep down weeds.

Before planting, animal manure is spread on fields to rebuild fertility. During the summer, cattle are pastured on fallow land, using intensive grazing techniques that discourage weed growth and spread of manure over the whole field. The soil organic content—the sentinel indicator of soil health—registers at 6 percent, which is more than twice that of their neighbors. Untouched Midwestern prairie usually has about 7 percent organic content. The capacity to store extra carbon in soil might allow farmers to bid on carbon set-aside contracts.

The high levels of organic matter and available nutrients in the Thompsons' fields, coupled with the absence of pesticides that might harm beneficial microbes and pathogens, help crops compete against weeds and insects. Weed control specialists predict that in the future more farmers will follow the Thompsons' lead and concentrate on microbial biocontrol rather than depend on conventional herbicide-dependent systems, some of which can impair soil quality and lead to carryover injury to crops.

Among the cultivation techniques used by the Thompsons are chisel plowing, ridge-tilling, and rotary hoe cultivation. These techniques leave more crop residue on the surface to protect the soil than does conventional moldboard plowing. Chisel plowing merely scratches the surface rather than turning the soil upside down. The rotary hoe is a tool used just after crops germinate to skim the soil surface and remove recently germinated weeds. In ridge tilling, a small plow scrapes weeds out of shallow valleys and mounds up soil into small ridges where crops grow.

More is known about the Thompson operation-production methods, yields, costs and returns, weed counts, soil quality, and environmental impacts—than any other similar farm in the United States. Through 30 years of on-farm experiments, the Thompsons have collaborated with scientists from a variety of institutions. Dozens of research reports and articles have been written about how the Thompsons' diversified farming system affects land fertility, erosion, and livestock health. Every year a field day is held on the farm to give neighbors and others a chance to see how the diversified system works.

While yields on the Thompsons' land is comparable to those of their neighbors, lower reliance on off-farm inputs—including pesticides, fertilizers, and animal drugs—keeps the Thompsons' production costs significantly lower than those in conventional cropping systems. Growing corn costs the Thompsons $1.50 per bushel compared to $2.11 per bushel on neighboring farms. Similarly, soybeans cost the Thompsons $3.90 per bushel compared to $4.80 per bushel for their neighbors. In addition to favorable financial returns, the Thompsons benefit in other ways from their innovative system. The quality of their
soil is significantly better than that under conventional agriculture and is steadily improving in fertility, tilth, and health.

Through their innovative work, Dick and Sharon Thompson are helping find ways to profitably produce high yields without degrading the land or the environment. In 1996, the Thompsoms were selected by the Des Moines Register as Iowa’s "Farm Leaders of the Year" in recognition of their contributions to the science of sustainable agriculture.