CURRICULUM GUIDE

Mechanization in Agriculture: The Farmer's Dilemma

by Janet Brown

for the Indiana Historical Society Indiana Experience

You Are There 1924:
Tool Guys and Tin Lizzies

INDIANA HISTORICAL SOCIETY

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Cover Image: "George Greenlee Ford Garage" (Indiana Historical Society, Digital Image Collection, Item ID P0114_G_AR12)

This lesson coordinates with the You Are There 1924: *Tool Guys and Tin Lizzies* component of the *Indiana Experience* at the Eugene and Marilyn Glick Indiana History Center. In this experience, visitors are invited to step back in time to 1924 to visit the re-created Liniger brothers' plumbing, tinning, and roofing shop in Hartford City, Indiana. Auto mechanics from the George Greenlee Ford dealership next door worked in this space through an agreement Greenlee had with the Linigers. The Linigers conducted most of their work in homes and businesses around town, leaving the space available for use by Greenlee's mechanics. The curriculum is intended to provide historical context for life in Indiana and, in particular, life in Blackford County and Hartford City, Indiana, in the 1920s. The lesson may be used to prepare students for a visit to You Are There 1924: *Tool Guys and Tin Lizzies* or it may be used as a follow-up to a visit. In addition, the historical context and themes will be relevant to classroom instruction even if a visit is not possible. You Are There 1924: *Tool Guys and Tin Lizzies* opens March 20, 2010, and will remain open until February 27, 2011.

Overview/Description

In this lesson students will read a primary source describing the benefits of switching to the tractor for farming and then debate the merits of making the change.

Grade Level

Elementary (grades 4 and 5) and middle/intermediate school (grades 6, 7 and 8)

Academic Standards

- Indiana Standards
  - Grade 4
    - Social Studies 4.1.11—Identify and describe important events and movements that changed life in Indiana in the early twentieth century.
    - Science 4.1.7—Discuss and give examples of how technology has improved the lives of many people, although benefits are not equally available to all.
  - Grade 5
    - Social Studies 5.4.4—Trace the development of technology and the impact of major inventions on business productivity during the early development of the United States.
    - Science 5.1.6—Explain how the solution to one problem may create other problems.
  - Grade 7
    - Science 7.1.10—Identify ways that technology has strongly influenced the course of history and continues to do so.
  - Grade 8
    - Social Studies 8.4.6—Relate technological change and inventions to changes in labor productivity in the United States in the eighteenth and nineteenth centuries.
- National Standards (National Council for the Social Studies)
  - I Culture
    - Compare similarities and differences in the ways groups, societies, and cultures meet human needs and concerns.
  - VII Production, Distribution, and Consumption
    - Explain and illustrate how values and beliefs influence different economic decisions.

- VIII Science, Technology, and Society
    - Describe examples in which values, beliefs, and attitudes have been influenced by new scientific and technological knowledge.

Social Studies/Historical concepts

Agriculture, mechanization, and early twentieth-century life

Learning/Instructional Objectives

Students will:

- Use primary sources to gain an appreciation for the costs of farming.
- Understand how technology affected farm families in the early twentieth century.

Time Required

One class period

Materials Required

- Paper
- Pencils
- Student Handout: The Rumely Oilpull Tractor
- Images from the Indiana Historical Society collection. See pages 6 through 11 of this lesson. Teacher may either print these images or show them to the class using a document camera or computer.
    - "Rumely Oilpull Tractor," no date (Indiana Historical Society, Digital Image Collection, Item ID P0321_FOLDER2_RUMELY_OIL_PULL)
    - "Woman with Horse and Plow," no date (Indiana Historical Society, Digital Image Collection, Item ID M0820_BOX2_FOLDER3_WOMEN_W_HORSE_AND_PLOW)
    - "1919 Oilpull Tractor and 1923 Oilpull Tractor at the Indiana State Fair," 1952 (Indiana Historical Society, Digital Image Collection, Item ID P0321_FOLDER1_2_TRACTORS_AT_STATE_FAIR
    - "Tractor Pulling Plow," no date (Indiana Historical Society, Digital Image Collection, Item ID M0820_BOX2_FOLDER3_TRACTOR_AND_PLOW)
    - "Horse Drawn Plow/Grader," 1922 (Indiana Historical Society, Digital Image Collection, Item ID P0130_P_BOX27_FOLDER3_82236)
    - "Farm Equipment," 1924 (Indiana Historical Society, Digital Image Collection, Item ID P0130_P_BOX27_FOLDER3_87697)

Background/Historical Context

Until the late 1800s, work on farms was accomplished largely through the energy provided by humans and animals. The invention of the reaper (a machine that cut and harvested grain) by Cyrus McCormick in 1831 and of the thresher (a machine that separated the grain from the chaff and straw) by John A. and Hiram A. Pitts in 1837 began an era of mechanization in agriculture. Steam-powered tractors were developed in 1868 and gasoline tractors became available in 1887, but these machines were large and expensive, not practical or affordable for most farmers.

After 1910 manufacturers began producing smaller tractors. Henry Ford was among the first to introduce a tractor with a smaller design. Ford had begun development of a line of tractors in 1907. Having grown up on a farm, he recognized the possibilities of the application of technology to agriculture. He tried to convince the board of directors of the Ford Motor Company that tractor production would be a boom to the company. The company's directors disagreed, however, so Ford set up a separate company, the Henry Ford

and Son Corporation, to produce his tractors. In 1917 Ford introduced his Fordson tractor. Much like the Model T transformed the automobile industry, this tractor revolutionized the tractor industry. The Fordson was the first tractor to be mass produced and also the first average farmers could afford to buy.

According to one author:

> The smaller design of the Fordson allowed the tractor to be affordable and easy to produce. Especially important to that goal, the new Ford tractors lacked a conventional frame. Instead, the engine, transmission, and axle housings were all bolted together to form the basic structure of the tractor. With the small size and innovative frame of the first Fordson, the tractor was well-suited for the mass production Ford had brought to the Model T. As a result of this, the machine could be sold at a much lower price affordable to average farmers. Just as Ford had brought the car to the middle class through assembly line production, the tractor was now also within reach.[1]

The Fordson quickly captured a large share of the market. By 1920 one-third of all the tractors sold in America were Fordsons.[2] The popularity of the Fordson was also helped by Ford dropping the price of the tractor from $855 in 1917 to $395 in 1922.

World War I increased demand for tractors. The war years were a boom time for American farmers since there was a high demand for food to feed the troops and send to the Allied nations. Furthermore, when America entered the war in 1917, there was a shortage of farm workers. Farm tractors helped to fill the gap, boosting production levels of food despite labor shortages. Fordsons went into mass production in 1918 in order to meet the demand in America and in Great Britain.

Still, in 1920, there were only two hundred and twenty-five tractors in the United States. Most farmers continued to farm with horses.[3] This soon changed. Between 1920 and 1939, the number of tractors on American farms increased sixfold.[4] Much of this increase in tractor ownership occurred in the early years of the 1920s. Still riding the wave of prosperity created by World War I, farmers purchased tractors. Many, however, kept horses for use in hauling and other tasks the tractor could not yet perform.

It was not until the introduction of the McCormick Deering Farmall general purpose tractor in 1924 that it became possible to use tractors for such things as mowing hay, planting and husking corn, threshing, hauling, and raking.[5] The general purpose tractor included something called a power take-off that allowed the tractor to power other farm implements through its engine.

When a farmer was able to purchase a tractor and reduce the number of horses he owned, it not only speeded up farm production it also freed acreage for crops that would otherwise have been used to grow feed for the horses. A tractor might cost two to three times what a horse did, but would yield ten times more product. A mature farm horse could eat the equivalent of three acres of feed per year. Horses also required rest and daily care, while tractors could be operated day and night without worrying about weather. A forty-acre plot would take a team of four horses fifty-five hours to till, while a tractor could do the same in only five-and-a-half hours. Farming was done at greater speed on a scale that had formerly

[1] "History of Ford Farm Tractors." SSB Tractor. http://www.ssbtractor.com/features/Ford_tractors.html (accessed November 25, 2009)

[2] Robert E. Ankli, "Horses vs. Tractors on the Corn Belt," *Agricultural History*, Vol. 54, No. 1, Agricultural History Symposium: Science and Technology in Agriculture (Jan., 1980): 136.

[3] Claudia Reinhardt, "Farming in the 1920s: Introduction," Wessels Living History Farm, http://www.livinghistoryfarm.org/farminginthe20s/machines_01.htm (accessed November 25, 2009).

[4] Robert Charles Graham, "Diffusion During Depression: The Adoption of the Tractor by Illinois Farmers," *Business and Economic History*, Second Series, Vol. 14, 1985: 215.

[5] Ankli, p. 136.

been thought impossible.[6] Still, tractors had their drawbacks. They might require the purchase of new plows or other equipment; they required maintenance, gasoline, and oil; and heavy tractors could tear up a field after rains.

As farm prices fell in the second half of the 1920s, and the agricultural market entered a depression, farmers had a difficult choice to make. Did the benefits offered by the tractor justify its high up-front cost? Should the farmer go into debt to purchase a tractor during tough economic times? These difficult choices meant that tractors were more likely to be purchased by farmers with large farms (at least 47.6 acres).[7] The Great Depression of the 1930s only increased the difficulties faced by farmers and it became apparent that in order to afford a tractor a farmer would have to produce much more, often necessitating an increase in acreage. If a farmer was unable to acquire more acreage for his farm, he would likely lose it.

Teachers Instructional Plan

Introduction

Introduce the lesson by helping students to recall farming methods used during the 1800s in America (for example, the plow, scythe, horses, and oxen). On a chalkboard or dry-erase board, list the old methods in a chart. (See Student Handout: Farm Methods) Show students the 1922 image of the horse-drawn plow. (See "Horse Drawn Plow/ Grader," 1922, Indiana Historical Society, Digital Image Collection, Item ID P0130_P_BOX27_ FOLDER3_82236 provided on page ten of this lesson.

Procedure

- Distribute a copy of the Student Handout: Farm Methods to each student.
- Show students the Indiana Historical Society's images of farms and farm machines of the 1920s. Students should examine the images for methods of farming popular in the 1920s. They will list these methods under the "new" column of their student handout.
- Distribute copies of the Student Handout: The Rumely Oilpull Tractor. This handout includes an excerpt taken from *Toiling and Tilling the Soil: Rumely.* (Promotional literature for the Rumely Oil Pull Tractor, 1912, from the Indiana Historical Society collection, S713. M11 T6 1979, pages 11 and 26.) See pages 13 through 14 of this lesson.
- Direct students to read the passage to determine how the use of new technology (the tractor) would affect the farmer's life. Students should consider crop output, the cost of a tractor, skills, use of time, the need for animals, etc. They will record these effects on the Student Handout: Farm Methods.
- Instruct students to assume the role of a farmer in the 1920s and decide whether they would have chosen to purchase an expensive tractor for their farm or not. Students should consider that this purchase might put them deeply in debt for many years. Have those students who would have purchased the tractor stand on one side of the classroom and those who would not have purchased it stand on the other side of the room. The side with the fewest students will select a representative to state why they made this decision. Allow a student on the other side to respond and give reasons for their decision. Continue the debate, allowing students to change sides if they are convinced by the other side's arguments. The teacher may need to guide the debate to keep the important criteria under discussion.

Assessment

The teacher may use a pretest to gauge prior knowledge of developments and issues in agricultural technology and mechanization.

[6] Reinhardt, "Farming in the 1920s: Introduction," p. 2.
[7] Ankli, p. 144.

A post-test can be used after the activity is completed in order to determine learning on this subject.

Suggested Modifications

- The teacher may read aloud sections of Laura Ingalls Wilder's books to help students recall or understand old-fashioned farming methods. Suggested excerpts:
    - Wilder, Laura Ingalls. *Little House in the Big Woods*, New York: Harper Trophy Publishers, 1932, chapter 11.
    - Wilder, Laura Ingalls. *Farmer Boy*. New York: Harper Trophy Publishers, 1933, chapter 11.
- Explain the threshing machine, cultivator, combine, and other agricultural machines to students. On its Web site, Wessel's Living History Farm in York, Nebraska, offers pictures and good explanations of farming equipment and terms. (http://www.livinghistoryfarm.org)
- Students may research modern-day innovations in agriculture. For example, they might study the use of airplanes, satellite imagery, GPS, and computers in farming. The Farm Industry News Web site has explanations of new techniques in farming. (http://farmindustrynews.com/shop-office/business/technology-changing-agriculture/)
- Students may use artwork to show the feelings of farmers as technology becomes a larger part of their lives.

Additional Resources

Publications

Halley, Ned. *Farm*. New York: Dorling Kindersley, 2000.
Outlines the history of farming including many detailed illustrations and photographs of reproductions and artifacts.

Kitchel, Thomas W. *Growing Up in Indiana: Memories of a Hoosier Farmboy*. Spring Lake, MI: River Road Publications. 1992.
Explains farming techniques and the farmers' way of life during the 1920s.

Web Sites

Reinhardt, Claudia. "Farming in the Twenties." Wessels Living History Farm and Nebraska Educational Telecommunications, Interactive Media Unit. http://www.livinghistoryfarm.org/farminginthe1920s.html (accessed September 2, 2009).
History of farming in the twentieth century with many primary sources and interactive features.

USDA-CSREES. "Agriculture in the Classroom." USDA_CRESS and Utah State University. http://www.agclassroom.org (accessed September 2, 2009).
Agricultural time line, virtual field trips, activities, and links to state agriculture resources.

National Agricultural Library. "History of Agriculture." USDA: National Agricultural Library. http://riley.nal.usda.gov/nal_display/index.php?info_center=8&tax_level=2&tax_subject=3&level3_id=0&level4_id=0&level5_id=0&topic_id=1032&&placement_default=0 (accessed September 2, 2009).
A list of agricultural history resources.

Landis, Leo E. "Indiana Farming: Yesterday and Today." Connor Prairie Interactive History Park. http://www.connerprairie.org/Learn-And-Do/Indiana-History/America-1800-1860/Indiana-Agriculture.aspx (accessed September 2, 2009).
An article on farming in Indiana, past and present.

"Rural History Project." Connor Prairie Interactive History Park. http://www.ruralhistoryproject.org/ (accessed August 3, 2009).
Conner Prairie's collection of oral histories and photos related to Indiana's rural history.

"Rumely Oilpull Tractor," no date (Indiana Historical Society, Digital Image Collection, Item ID P0321_FOLDER2_RUMELY_OIL_PULL)

"Woman with Horse and Plow," no date (Indiana Historical Society, Digital Image Collection, Item ID M0820_BOX2_FOLDER3_WOMEN_W_HORSE_AND_PLOW)

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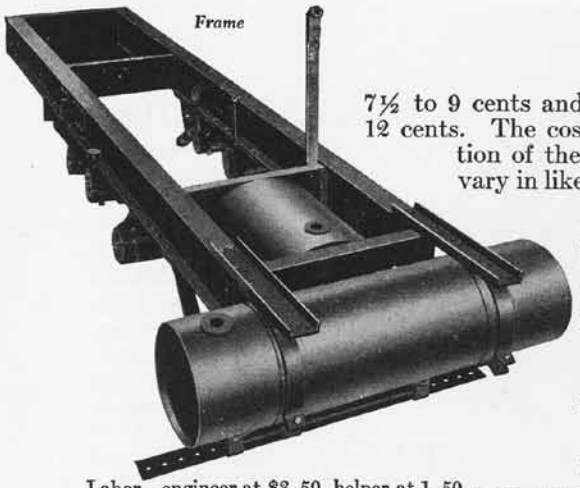
Student Handout: Farm Methods

OLD FARM METHODS	NEW FARM METHODS

How did the use of the tractor affect farmers and farming?

Student Handout: The Rumely Oilpull Tractor

Read the following passage from *Toiling and Tilling the Soil: Rumely* and determine how the use of technology would affect the farmer's life. Consider crop output, the cost of a tractor, skills, use of time, the need for animals, etc. Record your ideas on the Student Handout: Farm Methods.



7½ to 9 cents and in the Dakotas from 9 to 12 cents. The cost of labor and the condition of the soil will also be found to vary in like manner. All these factors will make the cost per acre higher or lower than shown below—this is merely a fair example.

Engine, cost per day, figuring 1,000 working days	$2.80
Freight and incidentals	.50
Interest	.40
Sixty gallons kerosene at six and two-thirds cents per gallon	4.00
Lubrication	.30
Labor—engineer at $3.50, helper at 1.50	5.00
Repairs and replacements	.20
Total cost of plowing (one day) twenty acres	$13.20
Total cost of plowing one acre	.66

COMPARATIVE COST OF PRODUCTION PER ACRE

On the bonanza farms of North Dakota it costs $8.65 per acre to market a twenty-bushel crop of wheat with animal power. The Oil Pull cuts this cost practically ten cents per bushel and adds that much to the owner's profit. The figures vary in individual cases, but the following summary of all items affords fair comparison:

	WITH HORSES	WITH Oil Pull
Land rental	$3.00	$3.00
Plowing	1.35	.76
Seed	1.76	1.76
Pulverizing and seeding	.63	.17
Twine and cutting	.75	.39
Shocking	.22	.22
Threshing	.65	.65
Machinery costs	.62	.67
Hauling	1.00	.26
Incidentals	.30	.30
	$10.28	$8.18

In this table, as well as that which is shown above, it must be remembered that this is merely a fair, typical standard of costs. Prices will vary both above and below this in different localities and at different seasons of the year.

Oil Pull The Dawn of Successful Mechanical Plowing

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Toiling and Tilling the Soil: Rumely. Chicago, IL: The Franklin Co., 1979. Facsimile reprint. Originally publishedin La Porte, Ind.: M. Rumely Co., 1912, p. 11.
(Indiana Historical Society, Pamphlet Collection, S713.M11 T6 1979, p. 11)

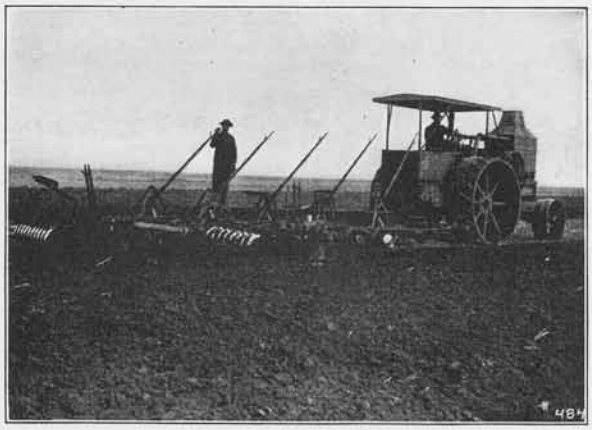
THE 30-60 OilPull — 30 TRACTIVE — 60 BRAKE H. P.

The Giant "Heavy Duty" Tractor

The present time is an age of big things. The many economies brought about by doing things on a large scale have resulted in big business in the commercial world—big farms in the agricultural world. And with the coming and rapid growth of bigger farms has come an increasing demand for bigger power. To meet this demand, we developed this powerful 30-60 Tractor, which produces 60 horsepower with the belt or 30 horsepower at the drawbar.

At plowing time the big-scale farmer encounters the problem of getting all his ground turned in a short time. At threshing time, too, the work must be done in a hurry. In many such cases the Rumely 30-60 OilPull has saved the day. It will pull 8 to 10 plows through ordinary sod; 8 to 12 through ordinary stubble—pull them all the time—day and night, if necessary, by working a double crew. Reliability is one of the foremost features of the OilPull Tractor.

For threshing, the 30-60 OilPull will provide power to run the largest separators. Its operation is smooth and steady, even under big variations of the load. Uneven feeding doesn't affect the running, nor do wet bundles.



In dry-farming districts, also, the 30-60 OilPull is proving itself the ideal tractor for heavy service. It will pull plows, drills, and harrows all at one time, preparing the ground, putting in the seed, and covering over with a fine mulch to preserve all the moisture.

Then, when the crops are ready for market, the OilPull will haul long trains of loaded wagons many miles, where the nearest shipping point is at quite a distance. It averages at least 6,000 pounds pull at the drawbar in decent footing.

Toiling and Tilling the Soil: Rumely. Chicago, IL: The Franklin Co., 1979. Facsimile reprint. Originally published in La Porte, Ind.: M. Rumely Co., 1912, p. 26.
(Indiana Historical Society, Pamphlet Collection, S713.M11 T6 1979, p. 26)