



LESSON 2

Farming Around the World

LESSON DESCRIPTION

This lesson explores the resources that are available to farmers around the world. Students will contrast farms from different regions of the world. They will use these descriptions to identify productive resources used in agricultural production and draw conclusions about the relationship of resource abundance to goods and services produced.

OBJECTIVES

As a result of this lesson, students will be able to:

1. Compare and contrast types of farms around the world; 2. Discuss the relationship between factors of production and the production process; 3. Make predications about results of changes in agricultural markets.

KEY IDEAS

Economies of Scale. The situation in production where firms face decreasing costs per unit as plant size increases.

TIME REQUIRED

One or two class periods.

MATERIALS

- Visual 1: Indiana's Top Agricultural Products
- Handout 1: Five Farms
- Handout 2: Five Farms Comparison
- Handout 2a: Five Farms Comparison Key
- Encyclopedias
- World maps; atlases or computer programs such as Encarta or MacAtlas (page 38)

PROCEDURES

1. Show **Visual 1: Indiana's Top Agricultural Products**. Point out to students that Indiana ranks in the top ten states in the production of some 20 products. Many of these products end up being exported.
2. Ask students to describe the landscape of Indiana. Many will describe neat croplands with corn, soy beans, or other crops. Ask the students what makes Indiana so rich in agricultural products. Explain that the answer is **productive resources**.
3. Pass out **Handout 1: Five Farms**. Productive resources include the natural resources (elements of the natural environment used to produce goods and services), human resources (people who produce goods and services), and capital resources (tools, machinery, infrastructure, and other manmade resources used to produce goods and services).
4. Have students read the descriptions of the five farms. As they read, have them fill in the reading guide, **Handout 2: Five Farms Comparison**. When students finish, discuss the answers. Have students present their answers to the rest of the class.

CLOSURE

Have the class formulate some generalizations about farming around the world.

Some examples would be:

- Agricultural production is dependent upon the climate of a region.
- Different regions have different productive resources available.
- Abundant natural resources do not guarantee a high quality of life.
- Culture plays an important role in farming around the world.
- All farmers must make choices that are important for the environment.

ASSESSMENTS

1. Have students discuss four factors that influence the ways people farm in different parts of the world.
2. Have students choose an agricultural product produced in another country and then identify a natural, capital, and human resource used to produce this product.
3. Have students briefly discuss the possible consequences of a natural disaster in the region in which the product chosen for question 2 is grown.

EXTENSIONS/CONNECTIONS

1. Take a field trip to two different types of local farms; for example, a hog or dairy farm and a grain farm. Compare and contrast the two farms.
2. Have students involved in 4-H share their projects with the class. Discuss what is involved with each project. Research what types of organizations that are similar to 4-H exist in other countries, such as the FFA, land grant colleges, or agricultural extension offices.
3. Using MacAtlas or Encarta, graph the average number of each type of livestock in various countries and compare the results. Why do some regions specialize in the production of a certain type of livestock?
4. Use the **Material World** CD-ROM to compare and contrast the material goods owned by families around the world.

RESOURCES

- Your local county extension agent can provide more information about a local area's agriculture. Go to <http://www.admin.ces.purdue.edu/field/countyoffices.html> for a complete list of Indiana county extension agents.
- Indiana Department of Commerce, Agriculture Statistics; <http://www.state.in.us/other/agnet/>
- Mary Welch, Assistant to the Director of Academic Programs, 1140 AGAD, Purdue University, West Lafayette, IN 47907-1140; tel. 765.494.8470; fax 765.494.8469.

VISUAL 1

Indiana's Top Agricultural Products
Ranking Among the 50 States
1998 Production

- #1 Ducks, Eggs (hatched to produce chicks)
- #2 Popcorn, Ice Cream Production
- #3 Tomatoes for Processing
- #4 Soybeans, Peppermint, Cantaloupes
- #5 Corn for Grain, Spearmint, Chickens (excluding broilers), All Hogs, Total Egg Production
- #6 Watermelon, Snap Beans for Processing, Pig Crop
- #7 Blueberries, Turkeys Raised
- #8 Cucumbers
- #9 Tobacco
- #15 Commercial Apples, Winter Wheat, Tomatoes for Fresh Market
- #16 Sweet Corn, Cattle on Feed, Milk Cows
- #17 Milk Production
- #20 Oats

Source: Indiana Agricultural Statistics Service.

Note: This chart relates only to how Indiana compares to other states in the production of specific products. It does not provide information on the value of these products or their relative importance to Indiana's economy.

HANDOUT 1

FIVE FARMS

A Hoosier Farm: The Taylor Farm

Mr. Robert Taylor is an American farmer in his early forties. He and his family of four live in a one-hundred-year-old, three-bedroom home in northern Indiana near Lafayette. The home includes an office with a computer, which Mr. Taylor uses to manage the farm. The Taylor family lives in a rural region of Indiana that has fewer than 21 people per square kilometer (slightly over on-half of a square mile). The largest nearby metropolitan area, Chicago, is about 120 miles to the northwest.

The Taylors own 600 acres of land but rent another 1,200 acres. The total number of acres farmed by the Taylors is over four times the average size of the typical U.S. farm of 400 acres. The value of the rich land that the Taylors farm averages almost \$2,500 per acre. The primary crops grown on the land are corn and soybeans. Both crops are planted in the spring and harvested in late October. Capital is an important resource on the Taylor farm. Mr. Taylor owns four tractors, one large semi-truck, and one combine. The equipment that Mr. Taylor uses is specially designed for use with these types of crops. The combine has two special heads that allow him to harvest eight rows of corn or a 20-foot swath of beans. Mr. Taylor also uses a grain-handling system that allows him to store two-thirds of the crop he harvests. The farm operation generates enough income to support Mr. Taylor, his wife, and their younger son, as well as his grown son and his family. The high level of mechanization means that the entire operation can be run by Mr. Taylor and his grown son. Part-time seasonal help is hired occasionally.

A major problem Mr. Taylor faces is weed control. He is able to approach this problem using a variety of methods. The most popular method is to apply a herbicide using a sprayer, which is pulled behind a tractor. The chemical is applied directly to the plant to avoid the residual effects found with other methods. Mr. Taylor also applies fertilizers to ensure that nutrients are replenished each year.

Source: Mary Welch, School of Agriculture, Purdue University, West Lafayette, Indiana.

Another U.S. Farm: The Sturdivant Farm

Mr. Tommy Sturdivant, an American farmer in his thirties, and his family of four live in a late nineteenth century farmhouse. The two-story structure was built in 1890. There are 16 rooms on three floors. The house stands on a lot approximately 5 acres in size. The Sturdivants live in a sparsely populated corner of Mississippi. On average fewer than 20 people live in a square kilometer of the area known as the "Delta" region of northwestern Mississippi. The Sturdivant farm occupies 1,200 acres of rich soil near the town of Shelby, Mississippi. The farm may seem large, compared to the average U.S. farm of 400 acres. However, most farmers who earn all of their income from farming own farms that are at least 800-900 acres. The value of the Sturdivant land is estimated to be somewhere between \$1,500 - \$2,000 per acre.

Cotton is the primary crop grown on the Sturdivant farm. The other major crop grown on the farm is soybeans. Both crops are planted in the spring and harvested in the late fall. The Sturdivant farm is quite mechanized. Mr. Sturdivant owns five tractors, two large trucks, two cotton pickers, three combines, and other assorted farm equipment. The farm employs six full-time employees, who, because of the high level of mechanization, are able to work the entire farm effectively. A major problem facing Mr. Sturdivant is pest and weed control. He uses both aircraft and special equipment pulled behind a tractor to apply pesticides and herbicides. Fertilizer is also used to replace nutrients lost in the growing process. The amount of fertilizer depends on the amount of land he allows to remain fallow during the year. Because of the large number of acres on the farm, Mr. Sturdivant can afford to allow some of his land to stand idle or fallow (allowing nutrients to build up) to ensure the growth of good crops in the future.

Source: Adapted from *The Japanese Economy: Teaching Strategies*. Copyright 1990. National Council on Economic Education, New York, NY 10036. pgs. 22 - 23. Used with permission. All rights reserved.

A Farm in Japan: The Oka

Mr. Oka, a man in his forties, and his family of six live in a modest home a quarter of a mile from their farm, which is located near Tzu City, in south central Honshu. In Japan, the Okas are considered rural, even though their farm is surrounded by houses, businesses, and other structures. Over 324 persons live in an area of one square kilometer (slightly over one-half of a square mile).

Mr. Oka, his wife, their two adult unmarried sons, and Mr. Oka's parents all assist in the farm work. The Oka farm is similar to other Japanese farms, providing 30 percent of the annual family cash income and much food. Mr. Oka and his sons also have full-time manufacturing jobs in Tzu City.

Although Mr. Oka's land is valued at 40 million Yen, or approximately \$360,000, the entire farm occupies only 2 3/4 acres. The Oka farm is smaller than most farms in Japan, but not dramatically so, since the average Japanese farm occupies slightly more than 4 acres. The Okas grow rice and vegetables, which, given the size of their farm, are the only feasible crops.

The Okas' major crop is rice, and the first stage of early spring rice production consists of growing tiny seedlings in trays inside the Okas' barn. The barn is the size of a typical backyard storage shed found in the United States. Later in the spring, the rice beds are prepared and the rice is replanted. At the end of August, the rice is harvested, husked, dried in the barn, and then sold. The Oka farm is highly mechanized: a tractor, cultivator, combine, husking machine, and rice dryer are all used. The equipment, although expensive, is small by American standards. The tractor is the size of an American riding lawn mower. The small acreage of an average Japanese farm means that large equipment would be inefficient to use and difficult to store.

Even though the Okas use a variety of equipment in their farming operation, they do some tasks by hand. The sorting and replanting of the rice seedlings are two examples. One farming technique popular in the

rest of the world is impractical in Japan. In most agricultural regions, land is allowed to remain fallow. This means that farmers allow a portion of the land to remain unplanted in order to restore many of the nutrients lost during the growing period. Since farms are very small in Japan, this method is not used. Mr. Oka must replenish lost nutrients by using large amounts of organic and inorganic fertilizers. This system can be very expensive.

Source: Adapted from *The Japanese Economy: Teaching Strategies*. Copyright 1990. National Council on Economic Education, New York, NY 10036. pgs. 22 - 23. Used with permission. All rights reserved.

A Polish Farm: The Olewnik Farm

There are over two million farms in Poland, each averaging 20 acres less than half the European Union average of 41 acres. Moreover, 55 percent of the farms occupy less than 12 acres and produce food exclusively or mainly for the owners' consumption.

Polish farms are not only small; they are fragmented. They usually comprise several plots that are often not adjacent to each other. This arrangement makes the use of machines in field work difficult. According to the experts, structural changes are inevitable, and many farms will disappear. Those unable to earn a profit will go under, their land taken over by farms taking advantage of the economies of scale. Nevertheless, change won't come quickly, for both historical and cultural reasons, the experts say.

Danuta Olewnik is a farmer in the Mazovian countryside not far from the historic city of Pock, which has a population of 122,000 people. Pock, the sister city of Fort Wayne, Indiana, is located in the central plains of Poland on the Vistula River. This agricultural and manufacturing region has good links to international markets via rail and the river ports of the Vistula.

Although Danuta has more land than a typical Polish farmer, she is concerned about the future. "The situation is terrible," confesses Olewnik. "I really worry." Without the latest in equipment, she fears that the farm will be uncompetitive and will rapidly lose out to the more advanced farms in Western Europe. "We just don't have enough money to buy everything we need. We know about it but just don't have the practical means of getting it," she says. She would like to install a ventilation system in the buildings that house the pigs, but this improvement is way beyond her budget and so remains nothing more than a plan. Olewnik faces many other problems; for example, how to dispose of manure. Currently, on her farm much of the manure is spread onto the fields as fertilizer, but under future regulations, this quantity will have to be reduced. To get rid of the surplus waste, she will have to construct a treatment plant for it. The thousands of zlotys this will cost makes it unfeasible. The consequence is that by 2003, her farm will be unable to comply with all the regulations, and so it could face possible sanctions.

Source: *The European Union Farming Report*.

A Southern Tanzanian Farm: The Kinanda Farm

Mr. Kinanda, a 30-year-old farmer in southern Tanzania, lives with his wife and two children in a three-bedroom house of fired brick. Their home is well constructed compared to the houses made of an adobetype of material that are common to the area. The family lives in a large village of about 3,000 people, 55 miles from the nearest urban center, Songea. This region of Tanzania has a wet-dry climate with a rainy season and a dry season, each about six months long. The Kinandas have a 10-acre corn field three miles away from their home and a garden that they irrigate with water from a perennial river. (Some rivers and streams in this area dry up in the dry season.) They also grow vegetables, bananas, and sugar cane in the gardens. Next to the corn field, there is a 2-acre plot where they intercrop beans, peanuts, cassava, and yams. They also have a 15-acre rice farm about 13 miles away, on the flood plains of a river. The family has 8 goats, 6 pigs, more than 15 chickens, and a fish pond. A more typical farm size for small-scale farmers in Tanzania is about 10 acres.

Mr. Kinanda and his wife use hand hoes to farm in their corn field and in their vegetable, banana and sugar cane gardens. Like most farmers in many parts of Tanzania, they do not own a tractor or any motor vehicle. This greatly limits their ability to expand their farm, even though land is free. Once a year, at the beginning of the six-month rainy season, they may brew their own beer, slaughter a goat, and ask friends and relatives to help for one day in the corn field. They expect to return the favor to those who ask for their help.

This is not a tradition that is still maintained in most areas. For the rice farm, however, they hire one of the three tractors in the village to plough. Unlike the plains, which have rich deep alluvial soils, their area has only a thin layer of soil, which gets easily damaged by tractors.

Like most farmers in the district, the Kinandas grow most of their staple foods: corn, rice, bananas, beans, potatoes, and vegetables. For meat, they rely on their goats, chickens, and pigs. They sell the surplus crops to national crop marketing boards or traders from various cities who come to the village.

Many farmers in the village, and in the district in general, also grow tobacco, which is an export crop. The money they earn is used to buy basic consumer commodities such as clothes, sugar, soap, and cooking oil. When the children start going to school, the Kinandas will need to set aside some money for school fees and supplies. The Kinandas always set aside money to buy inputs such as fertilizers and pesticides. Although fertilizers and pesticides are extensively used in southern Tanzania, making the region the breadbasket of the country, they are not that popular in other parts of Africa.

Source: Deogratus Ngonyani, African Studies Program, Indiana University Bloomington.

HANDOUT 2

FIVE FARMS COMPARISON

Compile the following data from the readings on the Five Farms. Use atlases, maps, encyclopedias, almanacs, or computer programs to help you find the required information.

1. On a world map, find and label each of the five farms. What is one characteristic that is common to all of the farms?
2. List the approximate latitude for each of the Five Farms
 - The Taylor Farm:
 - The Sturdivant Farm:
 - The Oka Farm:
 - The Olewnik Farm:
 - The Kinanda Farm:
3. What climate dominates each farm's region?
 - The Taylor Farm:
 - The Sturdivant Farm:
 - The Oka Farm:
 - The Olewnik Farm:
 - The Kinanda Farm:
4. What vegetation zone does each farm occupy?
 - The Taylor Farm:
 - The Sturdivant Farm:
 - The Oka Farm:
 - The Olewnik Farm:
 - The Kinanda Farm:
5. Using examples from the readings, explain how the climate influences farming and how the land is used.
6. Compare the Taylor and the Sturdivant farms. How can the Taylor Farm be operated by just two full-time workers? Why do the Sturdivants need six full-time employees?

7. Which of the five farms is more dependent on foreign markets? How would changes in the world price of the crop grown on the farm affect the farm?

8. Give an example of each type of resource for each farm.

Taylor Farm

- Natural resource:
- Human resource:

Sturdivant Farm

- Natural resource:
- Human resource:

Oka Farm

- Natural resource:
- Human resource:

Olewnik Farm

- Natural resource:
- Human resource:

Kinanda Farm

- Natural resource:
- Human resource:

9. Explain how the amount of capital resources that are used on the farm influences how the farm operates.

HANDOUT 2a

FIVE FARMS COMPARISON KEY

Compile the following data from the readings on the Five Farms. Use atlases, maps, encyclopedias, almanacs, or computer programs to help you find the required information.

1. On a world map, find and label each of the five farms. What is one characteristic that is common to all of the farms? **Answers will vary, some correct answers are: all families live within 60 degrees of equator, in grassland or agricultural area, etc.**
2. List the approximate latitude for each of the Five Farms
 - The Taylor Farm: **approximately 41 degrees North**
 - The Sturdivant Farm: **approximately 34 degrees North**
 - The Oka Farm: **approximately 36 degrees North**
 - The Olewnik Farm: **approximately 53 degrees North**
 - The Kinanda Farm: **approximately 10 degrees South**
3. What climate dominates each farm's region?
 - The Taylor Farm: **warm humid summer, snowy winter**
 - The Sturdivant Farm: **warm humid summer, mild winter**
 - The Oka Farm: **warm humid summer, mild winter**
 - The Olewnik Farm: **mild and rainy summer, mild winter**
 - The Kinanda Farm: **hot with rainy and dry seasons**
4. What vegetation zone does each farm occupy?
 - The Taylor Farm: **cropland and grassland**
 - The Sturdivant Farm: **cropland and forest**
 - The Oka Farm: **cropland and forest**
 - The Olewnik Farm: **cropland and grassland**
 - The Kinanda Farm: **cropland and grassland**
5. Using examples from the readings, explain how the climate influences farming and how the land is used. **Answers will vary, but could include dryer areas in Tanzania are better for grazing, wetter and milder climate better for rice, etc.**

6. Compare the Taylor and the Sturdivant farms. How can the Taylor Farm be operated by just two full-time workers? Why do the Sturdivants need six full-time employees? **The key here is that both farms use capital resources extensively, they are able to farm huge areas with few human resources.**
7. Which of the five farms is more dependent on foreign markets? How would changes in the world price of the crop grown on the farm affect the farm? **The US farms are very sensitive to what happens in foreign markets. Price changes would have a larger impact on the Taylor and Sturdivant farms.**
8. Give an example of each type of resource for each farm. **Some correct answers:**

Taylor Farm

- Natural resource: **fertile land**
- Human resource: **Mr. Taylor, wife and younger son**
- Capital resource: **tractor and herbicides**

Sturdivant Farm

- Natural resource: **fertile land**
- Human resource: **Mr. Sturdivant and six employees**
- Capital resource: **trucks, cotton pickers, and pesticides**

Oka Farm

- Natural resource: **rainfall**
- Human resource: **Mr. Oka and family**
- Capital resource: **equipment, barns, fertilizers**

Olewnik Farm

- Natural resource: **fertile land**
- Human resource: **Mrs. Olewnik**
- Capital resource: **building that house pigs, irrigation system**

Kinanda Farm

- Natural resource: **long growing season**
- Human resource: **Mr. Kinanda and wife**
- Capital resource: **tractors**

9. Explain how the amount of capital resources that are used on the farm influences how the farm operates. **The key is that capital resources tend to make farms more productive.**