



POWELL CENTER FOR
ECONOMIC LITERACY

Lesson Plan

WRITTEN BY
Margaret Ray,
Mary Washington College
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The Growing Food Problem: Economics, Resources, and Production

Time Required

Two one-hour class periods

Grade Level and Subject

High School

Keystone Principles

[Principle #8](#) – Quantity and Quality of Available Resources Determine our Living Standards

Voluntary National Content Standards in Economics

Content Standard [#3](#) – Allocation of Goods and Services

Content Standard [#15](#) - Growth

Economic Concepts

Allocation of Resources - *The distribution of scarce resources within an economic system. In a free enterprise system price is the factor used in the decisions as to who receives the goods and/or resources.*

Consumption - *All household purchases of goods and services.*

Production - *The process of manufacturing a good to be sold at a later date.*

Resources - *The inputs to the production process, used to produce goods and services, to satisfy the wants and needs of consumers. Factors of production; land, labor, capital, technology, and entrepreneurial skills.*

Standard of Living - *The level of subsistence of a nation, social class or individual with reference to the adequacy of necessities and comforts of daily life.*

Collegiate School ★ North Mooreland Road ★ Richmond, Virginia 23229

telephone (804) 741-2806 facsimile (804) 740-6701 www.powellcenter.org

Overview

The Growing Food Problem is a data-based, active learning exercise designed to introduce students to the factors of production (land, labor, capital) and the relationship between resources, production, and consumption. The purpose of the activity is to help students see the connection between quantity/quality of resources and food production and consumption in various regions of the world. This activity is also designed to help students see the connection between resources and quality of life in a region and to identify resource-based strategies for dealing with world poverty and hunger.

Objectives

- Students identify and define the categories of resources (factors of production).
- Students see the relationship between resources and production.
- Students understand how to increase the quantity and quality of resources.
- Students see the link between resources, production, consumption, and standards of living.
- Students are made aware of the world population, poverty, and hunger levels.
- Students have an awareness of the basic geography of less developed regions of the world.

Materials and Handouts

- Teacher Material
 - Introductory Lecture
 - Follow-up Lecture
 - Discussion Questions for Teachers
- Student Handouts
 - Handout #1 - **Exercise Data Sheet**
 - Handout #2 - **Agricultural Production Worksheet with Explanations and Strategies**
- Regional maps
- 100 jelly beans (or acceptable substitute)

Teaching Activity

Before the Introductory Lecture, divide the students into groups representing regions of the world. Keep in mind that the size of each group represents the population in the region. The groups' size differences will help show the distribution of the population in the world and highlight distribution and equity issues related to resources, production, and consumption. Divide the class, using the following percentages – roughly reflecting population distribution around the world:

Student Distribution (Class size of 25 students)		
Area	% of students	# of students
Africa	13	4
Asia	61	15
Europe	12	3
Latin America	8	2
North America	5	1

Assemble the materials to give to each group, including the **Exercise Data Sheet** (Handout 1); map showing their region; **Agricultural Production Workshop with Explanations and Strategies** (Handout 2); and jelly beans divided according to the region's share of world production.

Jelly Bean Distribution	
Area	# of jelly beans
Africa	6
Asia	48
Europe	20
Latin America	7
North America	19

Day 1

Present the Introductory Lecture material. Divide the students into regions (groups) and point out the unequal distribution of students. Explain that this represents the share of the world population in the region. Pass out the paper materials to each group. Then give each group its "production" (jelly beans), so that all can see the distribution. Explain that the number of jelly beans given to each group corresponds to the region's share of world food production. Solicit comments from the students as to the distribution of both students and jelly beans (i.e., the inequity/fairness). Explain why production does not equal consumption, and redistribute the jelly beans according to the share of the world consumption in each region. Make it clear that they will get to divide and consume their share!

Redistribution of Jelly Beans	
Area	# of jelly beans
Africa	+2
Asia	+4
Europe	-1
Latin America	+2
North America	-7

Solicit comments from the students about the redistribution and have students work on the **Agricultural Production Worksheet with Explanations and Strategies** (Handout 2). (Depending on time, they can complete this for homework or in the next class.)

Day 2

Finish the **Agricultural Production Worksheet with Explanations and Strategies** and discuss the results. Present the material in the **Follow-up Lecture**, including **Discussion Questions for Teachers**.

Introductory Lecture

An economy is a structure through which a society distributes resources to provide for its people. Production takes place in an economy to provide goods and services for people. The inputs used to produce goods and services are called resources. Economists divide resources into three main categories: land, labor, and capital.

- **Land** includes the land itself, as well as natural resources - what is above the ground (trees, lakes, animals, etc.) and what is below the ground (e.g., minerals).
- **Labor** includes the effort that people put into production. Workers provide labor to a firm.
- **Capital** includes goods that can be used to produce other things, for example, a machine, a factory, or another piece of equipment. In economics, money is NOT capital.

The quantity and quality of resources a country has determines how much it will be able to produce of alternative goods and services.

- **Quantity of Resources.** A country can increase the quantity of its resources over time. With more resources, a country can produce more output.
 - *Land.* Barring a change in borders, it is difficult for a country to increase the quantity of land it has. Building dykes in the Netherlands is an example of increasing the area of land. But realistically, in the short-run, countries have a fairly set amount of land.
 - *Labor.* An increase in the population might eventually lead to an increase in labor. But it is important to consider the age distribution of the population. Babies must be cared for, for a number of years, before they are able to contribute to production. Even after that, it will be a while before they contribute more than they consume. Also, as people age, their production may decrease. That is why it is necessary to look at the Labor Force, which is the part of the population that is willing and able to work, rather than just the population.
 - *Capital.* The quantity of capital a country has depends on how it has used its resources in the past. That is, what the country decided to use its resources to produce (capital goods or consumer goods) in the past. When a country puts its resources into production of capital goods, it is investing.
- **Quality of Resources.** The amount of output that can be produced depends on the quality of the resources used. Higher quality resources can produce more than the same amount of lower quality resources. A country can produce more by increasing either the quantity or quality of resources.
 - *Land.* Land is not equally suited to all types of production. For example, some land is good for growing wheat and other land is good for growing

bananas. It is possible, however, to increase the quality of land for any one purpose. Fertilizer or irrigation can improve land for growing crops or machinery can be used to make land more suitable for roads or buildings.

- *Labor.* The quality of labor depends on the characteristics of the workers. A country may have a high quality workforce or a lower quality workforce. The quality of the workforce can be improved through education. The more education a workforce has, the more productive it will be. Improving productivity through education is called human capital investment. Likewise, the quality of the workforce can be improved through better health. The healthier the population, the more productive the workforce will be.
- *Capital.* Investment in more advanced technology represents an improvement in the quality of capital resources, which allows a country to produce more with a given set of resources.

Follow-up Lecture

Begin by providing background information on world hunger, such as:

- By 2020, the world population is expected to reach 8 billion people (40% more than today's 5.8. billion).
- Nearly 800 million people are malnourished (1 in 6).
- 20 % of the developing world's population do not get enough food.
- Most of the world's hungry live in Asia (62%).
- 215 million children under five in the developing world suffer stunted growth from malnutrition.
- There is enough food in the world today to provide every person with enough to eat. However, it is not distributed evenly.

Then discuss information related to resources and food production:

- In Sub-Saharan Africa, 160 million productive acres have turned to desert in the past 50 years.
- 27,000 square miles of farmland are abandoned each year because of degradation. About 4 million hectares of cropland are lost to soil erosion each year.
- 23% of primary school aged children in developing countries do not attend school.
- 30% of children who enroll in primary school do not complete it.

Sources: Care development facts at

www.care.org/devrescenter/devfact.html#hunger/resmag/feed2.htm

Discussion Questions for Teachers:

1. How many of you decided that quality of life is guaranteed to improve with better use of land, labor, and capital?
2. Which other factors might impact quality of life?
3. What is the connection between standards of living and resources? Do more resources mean a better standard of living? Based on which data?
4. What are some strategies for dealing with world hunger that you may have noticed from studying this data?
5. Is the only difference between developed and underdeveloped countries the distribution of resources? (Other contributing factors may be religious beliefs or geographic isolation from world markets like Tibet or Siberia.)
6. How do cultural factors impact the distribution of resources? (political systems that oppress people by controlling food distribution; religious factors that impact who can work in a society such as the absence of women laborers in the Middle Eastern countries)

Exercise Data Sheet

Resources	World	Africa	Asia	Latin Am	Europe	North Am
Land						
% World Cropland		13	41	10	21	16
Cropland (hectare per person)	.22	.27	.18	.36	.43	.79
Average Cereal Yield (kilograms per hectare)	2,817	1,220	2,895	2,547	2,884	3,919
% Urban Population	47	38	38	69	75	77
Labor						
% World Population		13	61	8	12	5
% Population between 15 and 65 years	63	54	64	62	68	67
% School Enrollment (level 1, 2, and 3)	58	41	53	68	80	80
Capital						
Gross Domestic Investment (as % of GDP)	22	16	25	19	22	22
% of World Tractors		2	28	6	44	21
% of World Harvesters		1	44	4	32	20
Consumption						
Average Calories per day	2,700	2,300	2,400	2,600	3,400	3,600
Consumption as a % Of Production		133	109	123	95	67
% Grain Fed to Livestock		14	24	42	59	65
Food Assistance (% of cereal donations)		38	41	13	8	
Production						
% World Cereal Production		6	48	7	20	19
GDP Per Capita		2,083	5,470	4,929	12,773	22,688

Source: United Nations and World Bank data. For details, contact author.

Regions	Africa	Asia	Latin America	Europe	North America
8. Look at the percentage of the population who is enrolled in school. How does this impact the labor force?					Larger percentage of school children means more highly trained work force.
Capital Resources					
9. Add the percentages of tractors and harvester in each region and divide by 2 to get the percentage of both each region has.		$\frac{28\% + 44\%}{2}$ 36% of world's tractors and harvesters are in Asia			
10. Agricultural capital is #9 above. Does more capital mean more output looking at cereal yields above.					
11. How would each region increase its output? Different answer if have enough capital versus needing more capital.				Fertilizer, irrigation & pest control would increase the production in Europe	
Consumption/ Production					
12. How do the average calories consumed per day compare to the world's consumption?			2600 cal/day- 2700 cal/day= - 100 calories less per day than the world average		
13. How much food has to be imported to meet consumption needs?	133% consumed, less 100% produced, means importing 33% of food.				

14. How much less GDP does each region have compared to North America					\$22,688 per capita in North America
15. Look back over data and rate each area in these categories: high, average or low	Land Resources: Labor Resources: Capital Resources: Agricultural Production: Food Consumption:	Land Resources: Labor Resources: Capital Resources: Agricultural Production: Food Consumption:	Land Resources: Labor Resources: Capital Resources: Agricultural Production: Food Consumption:	Land Resources: Labor Resources: Capital Resources: Agricultural Production: Food Consumption:	Land Resources: Labor Resources: Capital Resources: Agricultural Production: Food Consumption:
Data Analysis					
16. How could each region increase the quality of its land?					
17. How could each region increase its labor force?					
18. How could each region increase its capital?					
19. How can food consumption be increased in each region?					

20. Does an increase in the quality of land use, quantity of capital, and improved labor force automatically guarantee an improved quality of life? Defend your answer.

HANDOUT 2

Agricultural Production Worksheet with Explanations and Strategies

Regions	Africa	Asia	Latin America	Europe	North America
Land Issues					
1. What percentage of the world's cropland is in each region?	13%				
2. How many hectares of cropland are available per person compared to the world average?				.43 - .22= +.21 more hectares per person of cropland	
3. How many kg of cereal are yielded per hectare compared to world averages?			2547 - 2817= -270 kg per hectare (less than the world averages)		
4. What factors might impact a given area of land to yield more or less in each region?		More people means more labor to work the fields			
Labor Issues					
5. What percentage of the world's population lives in each region?					5% of the world lives in North America
6. What percentage of the region's population can work compared to the world percentage?	54% - 63%= Africa has 9% less population able to work between ages 15 - 65.				
7. Which factors may contribute to the population work force in each region?	More people die younger due to disease and famines.				

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