

INTRODUCTION

This human population and resource usage simulation was developed by Jim Lucey and Jon Yoder during the summer of 1994 at Lawrence Hall of Science at University of California, Berkeley as part of a Global Systems Science Institute.

The objectives of this simulation are to look at trends in populations and examine the distribution and utilization of resources between the developed nations (the Haves) and the developing nations (the Have Nots).

Like any simulation, this activity cannot fully represent the complexities of real world situations. The focus is primarily an artificial representation of either developed or developing countries. By the end of the simulation students should come to realize that this is an artificial and over-simplified view of our real world situation. However, the activity should provide an opportunity for students to see how human behavior can effect resource use and availability.

Throughout this simulation, there will be opportunities for discussion and further investigation. Therefore, the length of time needed to complete this activity is variable. Parts I, II, and III each take approximately one class period to complete; additional time will be required for extension activities and assessment.

We hope you and your students enjoy and learn from **The Haves and The Have Nots**. If you have any questions or suggestions on improvement, we encourage you contact us. Good Luck.

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*It has become clear that we do not have just a poverty problem, or a hunger problem, or a habitat problem, or energy problem, or a trade problem, or a population problem, or an atmospheric problem, or a waste problem, or a resource problem. On a planetary scale, these problems are all interconnected. What we really have is a poverty-hunger-habitat-energy-trade-population-atmospheric-waste-resource problem. This mega problem is so new that we did not even have a name for it until 1970 when the late Dr. Aurelio Peccei described it and named it the "global problematique" Although Earth is one biologically and environmentally, it is not one socially and economically.**

THE HAVES AND THE HAVE NOTS

INTRODUCTION

This activity will help focus on the relationship among populations, resource consumption and their interactions. This examination of complex issues and dynamic situations will provide the opportunity to make informed decisions reflecting a global perspective. The differences between the developed countries (the Haves) and the developing countries (the Have Nots), as they relate to the population and resource issues, provide us with the opportunity to reflect on one facet of the global problematique. The danger of losing sight of the interconnectiveness among all of the components in the global problematique may exist when considering any one facet in isolation. Values, beliefs, cultures, traditions... of the peoples represented by a country name are often not considered but have important consequences when discussing many of these issues.

Discussion

1. Speculate as to why a developed country can be referred to as "the Haves" while a developing country can be referred to as "the Have Nots".
2. From a world map, identify three countries that you would predict as developed countries and three countries that you would predict as developing countries.

*Over the past 70 years – roughly the lifetime in many countries – the human population grew from 1.8 billion to 5.3 billion. For every person alive 70 years ago, there are now three.**

Each year, there are added to our numbers. The demographic equivalent of another Mexico. Just a lifetime ago, we were only adding 1.5 million people per year.

*Energy used for corn production in the United States, for example, has increased by a factor of four since 1945. The future of human food supplies is now closely linked to the future of energy supplies.**

**Barney. O. Gerald: *Global 2000 Revisited What Shall We Do?* Millennium Institute. Arlington, VA. (1993).*

PART I: COMPARISONS OF POPULATION CHANGE

TEACHER NOTES

Materials:

- THE HAVES AND THE HAVE NOTS,
- INTRODUCTION (class set) PART I,
- PROCEDURES (class set)
- dice (1 set per 2-3 students)
- DIE ROLL SHEET (as many copies as pairs of dice)
- DIE ROLL DATA TABLES (class set)
- CLASS TOTALS DATA SHEET (class set)
- SITUATION CARDS (cut one set for each continent)

Pass out class sets of materials. To begin activity, students read and discuss THE HAVES AND THE HAVE NOTS, INTRODUCTION.

To set up the simulation divide students into five continents as follows:

Continent Number	Percent of World Population	Number of Students (class size of 24)
1	N. America 5 %	1
2	Latin America 8.5 %	2
3	Europe & former Soviet Union 13	3
4	Africa 12.5 %	3
5	Asia 60%	15

Within continent 5, students should subdivide into smaller groups of 2 or 3 students, yet they still remain part of continent 5. The placement and the amount of space provided for the continents can be set up to help illustrate density differences as an additional element in the simulation. Yarn cut to the following lengths can be used to measure perimeter sizes of the continents (for class of 24):

North America	12 feet
Latin America	17 feet
Europe & former Soviet Union	19 feet
Africa	25 feet
Asia	28 feet

Students proceed through Part I of the simulation. (Teacher will need to facilitate sharing information for students to fill in Table 1 of the CLASS TOTALS DATA SHEET at the end of Part I.)

PART I: COMPARISON OF POPULATION CHANGE

PROCEDURES

You have been divided into five groups representing five continents. If possible divide into smaller groups of two or three within your continent. You will remain in your continent area throughout this activity.

Each student should have

- THE HAVES AND THE HAVE NOTS, INTRODUCTION
- DIE ROLL DATA TABLES
- CLASS TOTALS DATA SHEET

Each group of two or three needs to pick up the following:

- a pair of dice
- DIE ROLL SHEET

Each Continent needs:

- a set of 10 SITUATION CARDS

Select one die to represent population increase and the other die to represent population decrease. Roll the dice and, using the DIE ROLL SHEET, enter the appropriate numbers on the **DIE ROLL DATA TABLES**, under Round 1.

After completing ten rolls:

- a) compute the subtotal for Round 1
- b) add 10 as your beginning population
- c) draw a SITUATION CARD; use information from Part I only
- d) determine your final population for Round 1

Repeat the above steps to complete Rounds 2 and 3.

For rounds 1, 2, and 3, record data on Table 1 of CLASS TOTALS DATA SHEET for all five continents.

DIE ROLL SHEET

Continent 1				Continent 2			
Population Increase Die		Population Decrease Die		Population Increase Die		Population Decrease Die	
Roll	Increase	Roll	Decrease	Roll	Increase	Roll	Decrease
1	= +0	1	= -0	1	= +0	1	= -0
2	= +1	2	= -1	2	= +2	2	= -1
3	= +1	3	= -1	3	= +3	3	= -1
4	= +2	4	= -2	4	= +3	4	= -2
5	= +2	5	= -2	5	= +4	5	= -2
6	= +3	6	= -3	6	= +5	6	= -3

Continent 3				Continent 4			
Population Increase Die		Population Decrease Die		Population Increase Die		Population Decrease Die	
Roll	Increase	Roll	Decrease	Roll	Increase	Roll	Decrease
1	= +0	1	= -0	1	= +1	1	= -1
2	= +1	2	= -1	2	= +2	2	= -1
3	= +1	3	= -1	3	= +3	3	= -1
4	= +2	4	= -2	4	= +3	4	= -2
5	= +2	5	= -2	5	= +4	5	= -2
6	= +3	6	= -3	6	= +5	6	= -3

Continent 5			
Population Increase Die		Population Decrease Die	
Roll	Increase	Roll	Decrease
1	= +1	1	= -1
2	= +2	2	= -1
3	= +3	3	= -1
4	= +3	4	= -2
5	= +4	5	= -2
6	= +5	6	= -3

DIE ROLL DATA TABLES

Roll 1

Roll	Population Increase	Population Decrease
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total _____ + _____ = _____
 (Beginning Population) + 10 = _____
 ± Situation Card = _____
 = Final Population _____

Roll 4

Roll	Population Increase	Population Decrease
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total _____ + _____ = _____
 (Beginning Population) + 10 = _____
 ± Situation Card = _____
 = Final Population _____

Roll 2

Roll	Population Increase	Population Decrease
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total _____ + _____ = _____
 (Beginning Population) + 10 = _____
 ± Situation Card = _____
 = Final Population _____

Roll 5

Roll	Population Increase	Population Decrease
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total _____ + _____ = _____
 (Beginning Population) + 10 = _____
 ± Situation Card = _____
 = Final Population _____

Roll 3

Roll	Population Increase	Population Decrease
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total _____ + _____ = _____
 (Beginning Population) + 10 = _____
 ± Situation Card = _____
 = Final Population _____

Roll 6

Roll	Population Increase	Population Decrease
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Total _____ + _____ = _____
 (Beginning Population) + 10 = _____
 ± Situation Card = _____
 = Final Population _____

Class Totals Data Sheet

Table1: Total Populations
Class results

Round	1	2	3	4	5	6
Continent 1						
Continent 2						
Continent 3						
Continent 4						
Continent 5						

Table 2: Resource Consumption per Capita
Resources (peanuts) ÷ number of students in continent
Class results

Round	4	5	6
Continent 1			
Continent 2			
Continent 3			
Continent 4			
Continent 5			

Situation Cards

Drought causes widespread famine		
	Part I	Part II
Continent 1	-1population	-1 population -1 resources
Continent 2	-4population	-4 population -2resources
Continent 3	-1population	-1 population -1 resources
Continent 4	-4population	-4 population -2 resources
Continent 5	-4population	-4 population -2 resources

Technology improves and with it medical care.		
	Part I	Part II
Continent 1	+1 population	+1 population +4 resources
Continent 2	+3 population	+3 population +1resources
Continent 3	+1 population	+1 population +4 resources
Continent 4	+3 population	+3 population +1resources
Continent 5	+3 population	+3 population +1resources

Good year for crops		
	Part I	Part II
Continent 1	+1 population	+1 population +4 resources
Continent 2	+3 population	+3 population +2 resources
Continent 3	+1 population	+1 population +4 resources
Continent 4	+3 population	+3 population +2 resources
Continent 5	+3 population	+3 population +2 resources

Political unrest and war cause migration and death		
	Part I	Part II
Continent 1	-1population	-1 population -1 resources
Continent 2	-2population	-2 population -2 resources
Continent 3	-1population	-1 population -1 resources
Continent 4	-2population	-2 population -2 resources
Continent 5	-1population	-2 population -2 resources

Floods destroy homes and crops		
	Part I	Part II
Continent 1	-0population	-0 population -0 resources
Continent 2	-2population	-2 population -1 resources
Continent 3	-0population	-0 population -0 resources
Continent 4	-2population	-2 population -1 resources
Continent 5	-2population	-2 population -1 resources

Poor sanitation practices cause an outbreak of disease		
	Part I	Part II
Continent 1	-0population	-0 population -0 resources
Continent 2	-2population	-2 population -1 resources
Continent 3	-0population	-0 population -0 resources
Continent 4	-2population	-2 population -1 resources
Continent 5	-2population	-2 population -1 resources

Earthquake destroys homes & disrupts transportation		
	Part I	Part II
Continent 1	-1population	-1 population -0 resources
Continent 2	-2population	-2 population -1 resources
Continent 3	-1population	-1 population -0 resources
Continent 4	-2population	-2 population -1 resources
Continent 5	-2population	-2 population -1 resources

Oil reserves are discovered		
	Part I	Part II
Continent 1	+0 population	+0 population +4resources
Continent 2	+0 population	+0 population +2 resources
Continent 3	+0 population	+0 population +4resources
Continent 4	+0 population	+0 population +2 resources
Continent 5	+0 population	+0 population +2 resources

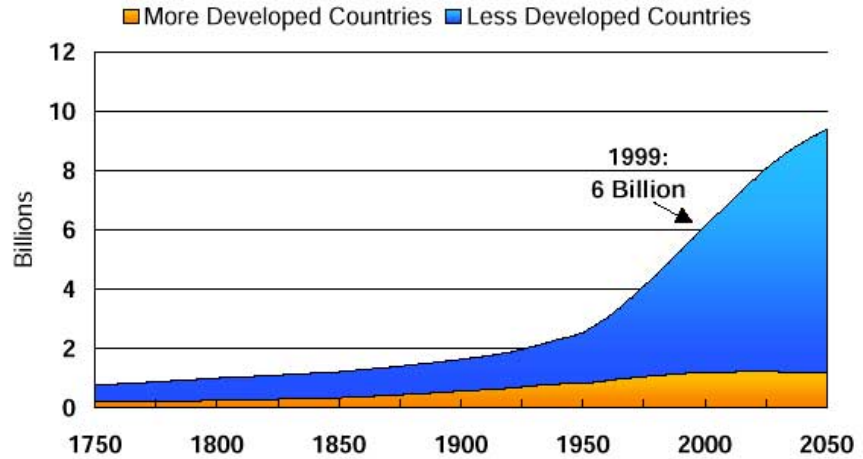
Education improves & literacy rate increases		
	Part I	Part II
Continent 1	-1population	-1 population +1resources
Continent 2	-3population	-3 population +2resources
Continent 3	-1population	-1 population +1resources
Continent 4	-3population	-3 population +2resources
Continent 5	-3population	-3 population +2resources

Birth control is promoted by the government		
	Part I	Part II
Continent 1	-1population	-1 population +1resources
Continent 2	-2population	-2 population +2 resources
Continent 3	-1population	-1 population +1resources
Continent 4	-2population	-2 population +2 resources
Continent 5	-2population	-2 population +2 resources

Real World Trends

World Population Growth

Population growth, 1750-2050



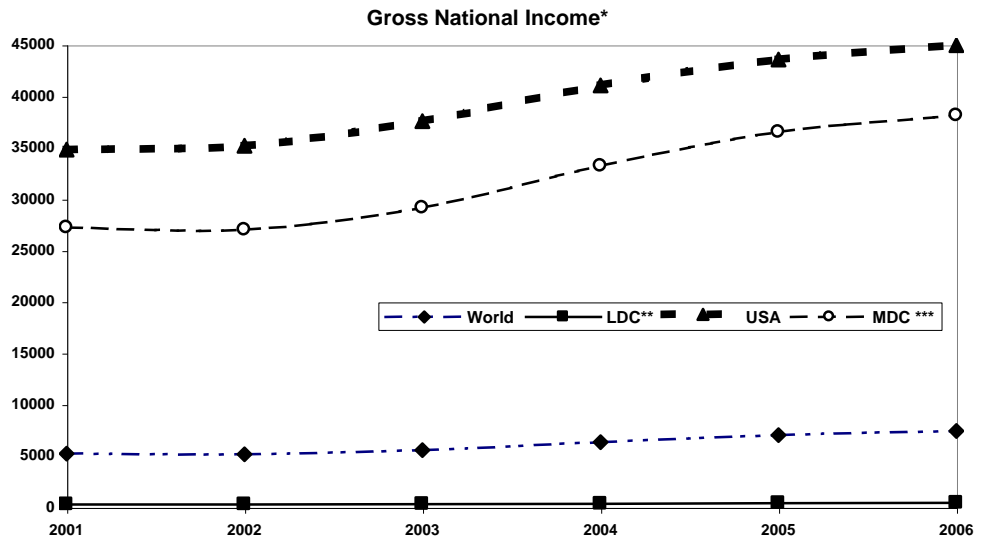
Sources: Before 1950: PRB estimates; 1950-2050: UN, *World Population Projections to 2150, 1998 (medium scenario)*.



Figure 1: Trends and Projections in World Population Growth

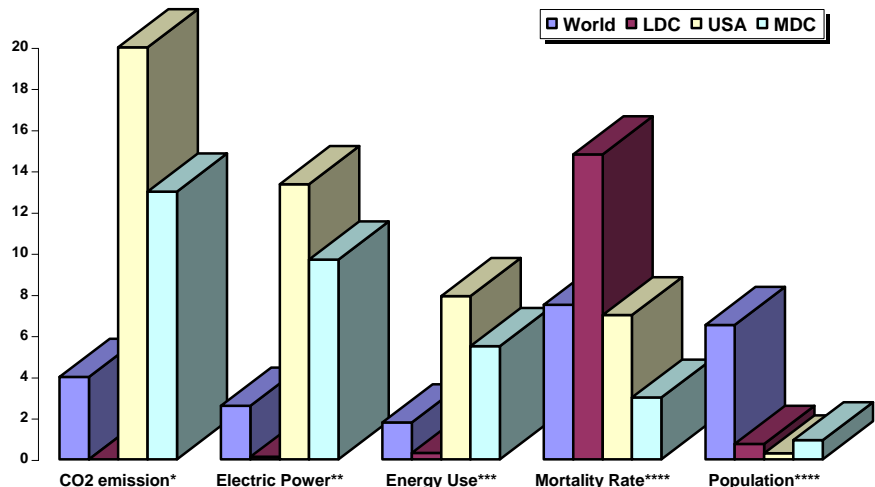
http://www.uwsp.edu/business/economicswisconsin/e_lecture/pop_images/pop_growth.jpg

Figure 2: Trends in Gross National Income Per Capita



*Gross National Income (Atlas method - current US \$)
 **Least Developed Countries, UN definition
 ***More Developed Countries, OEDC
 World Bank Group Quick Query @ <http://www.ciesin.columbia.edu/IC/wbank/wtables.html>

Figure 3: Resource Consumption in Developed and Developing Countries



*Metric tons per capita
 **MWh per capita
 ***Mg of oil equivalent per capita
 ****Under 5 - per 100
 *****Annual %
 2004 Data from World Bank Group Quick Query @ <http://www.ciesin.columbia.edu/IC/wbank/wtables.html>

PART II: POPULATION AND RESOURCES

PROCEDURES

Each student should have

- materials from Part I
- 2 sheets of graph paper

Select a leader for your entire continent. The leader will:

- a) collect your continent's resource (peanuts) allocation from the teacher at the **beginning** of rounds 4, 5, and 6.
- b) draw a **SITUATION CARD** for the entire continent, using information from Part II only. If resources are lost, return peanuts to teacher.
- c) announce the number of resources (peanuts) for the continent and coordinate their distribution for consumption.
- d) collect **all** waste (shells and uneaten peanuts) **before** beginning the next round and put them in a labeled plastic bag.

Follow the same procedures from Part I to conduct Rounds 4 - 6. (Reminder: only continent leader draws the **SITUATION CARD** at the end of each round.) Record the data on the **DIE ROLL DATA TABLES** (Resource Consumption per capita = number of peanuts : number of people in your continent.)

Record data on Table 1 and Table 2 of CLASS TOTALS DATA SHEET for all five continents for Rounds 4, 5, and 6.

Graph:

- Total Populations from the CLASS TOTALS DATA SHEET (Table 1)
- Resource Consumption per capita from the CLASS TOTALS DATA SHEET (Table 2)

Each group of two or three needs to pick up **REAL WORLD TRENDS** graphs.

Analysis:

- Compare your graphs with figures 1 and 2 from **REAL WORLD TRENDS**
- Observe the waste (shells and uneaten peanuts) produced by each continent and compare to figure 3 from **REAL WORLD TRENDS**
- Identify each continent as developed or developing. Justify your answer based on population growth, waste production, and energy consumption.

PART III: CONTINENTS TO COUNTRIES

TEACHER NOTES

Materials

CASE STUDIES (one per 2-3 students)

PART III, PROCEDURES (class set)

Have students review the Table on their **PART 111, PROCEDURES** sheet and complete the questions that follow.

PART IV: PERFORMANCE TASK

Optional

Creating Mythical Countries (Display)

A. Your task is to create a display of two mythical countries, one developed and one developing. You need to include the following information in your countries' profile:

- age distribution
- growth rate
- birth rate
- death rate
- doubling time
- GNP per capita
- waste production
- energy consumption
- literacy rate

B. You need to include a variety of other information (visual and written) on your two countries that highlight differences between a developed and developing countries.

Summary and Analysis (Written Paper)

- A. Summarize differences between a developed and developing country.
- B. Discuss some of the problems or difficulties found in developed and developing countries.
- C. Offer suggestions or solutions to these problems.

PART III: CONTINENTS TO COUNTRIES

PROCEDURES

Study this Table (2006 data):

Country	Growth Rate (%)	Doubling Time (years)	GNP \$ Per Capita 1983 / 1994	Energy Use (kg per capita)	CO ₂ Emissions (tons per capita)	Literacy Rate (%)
Kenya	2.8	25	410/580	470	0	85
China	0.61	115	1000/2010	1242	3	91
Hungary	-0.25	--	4800/10950	2608	6	99
India	1.6	44	460/820	531	1	61
Brazil	1.0	70	3300/4730	1114	2	89
USA	0.89	78	34800/44920	7920	20	99
Japan	-0.09	--	35050/38410	4173	10	99

1. Develop criteria and group the above countries as either Developed or Developing. What characteristics do you feel are most important in making this distinction? Why?
2. Read the **CASE STUDIES** provided by your teacher for these countries. What information do you find in the case studies to support your groupings?
3. Which country/countries from the **CASE STUDIES** best fits your continent's profile from Parts I and II? What evidence supports your decision?
4. Referring to the discussion questions at the start of this simulation, what changes would you make to your responses?
 - i. Speculate as to why a developed country can be referred to as "the Haves" while a developing country can be referred to as "the Have Nots".
 - ii. From a world map, identify three countries that you would predict as developed countries and three countries that you would predict as developing countries.
5. Suppose that each year there were an award for the world's best nation. If you were one of the judges, how would you make your decision? Would you rank nations by their wealth, their military power, or their civil liberties? By lawfulness? By cleanliness of the environment? Donella Meadows, *The Global Citizen*, Island Press (p 47) 1991.

PLEASE NOTE
THAT I DID NOT
HAVE THE TIME
TO UPDATE
ANY OF THE
FOLLOWING
INFORMATION
FROM 1994.

PART III: CONTINENTS TO COUNTRIES

PROCEDURES

Study this Table (1994 data):

Country	Growth Rate (%)	Doubling Time (years)	GNP \$ Per Capita 1983 / 1994	Energy Use (BTU's per capita)	Urban Solid Waste mil. ton/yr	Literacy Rate (%)
Kenya	3.4	19	340/349	3	0	69
China	1.5	53	290/362	26	76.6	73
Hungary	-.18	0	2150/2682	97	1.9	99
India	1.9	34	260/330	9	35.2	48
Brazil	1.9	37	1890/2950	21	22.7	81
USA	.9	89	14090/22517	273	230	97
Japan	.4	217	10100/26909	111	53.2	99

6. Develop criteria and group the above countries as either Developed or Developing. What characteristics do you feel are most important in making this distinction? Why?
7. Read the **CASE STUDIES** provided by your teacher for these countries. What information do you find in the case studies to support your groupings?
8. Which country/countries from the **CASE STUDIES** best fits your continent's profile from Parts I and II? What evidence supports your decision?
9. Referring to the discussion questions at the start of this simulation, what changes would you make to your responses?
 - i. Speculate as to why a developed country can be referred to as "the Haves" while a developing country can be referred to as "the Have Nots".
 - ii. From a world map, identify three countries that you would predict as developed countries and three countries that you would predict as developing countries.
10. Suppose that each year there were an award for the world's best nation. If you were one of the judges, how would you make your decision? Would you rank nations by their wealth, their military power, or their civil liberties? By lawfulness? By cleanliness of the environment? Donella Meadows, *The Global Citizen*, Island Press (p 47) 1991.

Extension and Possible Assessment Tools

- 1) Research on eof the above countries to obtain a bigger picture of the relationship among the cultural, religious, political, and economic components of an environmental issue in that country. Is there a regional (neighboring countries) influence?
- 2) Supplement and/or update the newspaper clippings with current articles specific to your country.
- 3) Update the information in the tables on the previous page.
- 4) Locate local resources (colleges, governmental agencies, web pages...) that can provide additional information on cultural and environmental issues. Make a resource list, class presentation and/or class debate /senate hearing with the information you collected concerning some of the issues discussed above.
- 5) Write position papers (pro/com) focusing on a global environmental issue from the perspective of different countries.
- 6) Use the Internet to contact schools and/or agencies in different countries to foster an exchange of information of pressing environmental concerns.
- 7) Run a mock United Nations Session where population, resource and waste issues will be the focus. The students can represent the countries they have been working within this simulation.
- 8) Create a concept map of this simulation.
- 9) Create a situation where the students negotiate the resources (peanuts) and the waste (peanut shells) among the continents.

References

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KENYA POPULATION

Population in 1950 - 6,100,000

Population in 1988 - 23,300,000

Population in 2020 - 79,200,000

At the current rates, it will take Kenya's population 17 years to double.

Kenya's growth rate is about 4% per year, highest in the world.

Currently,

The average number of children born by a woman is 8.

A newborn today can expect to live about 55 years.

About 17-18% of the babies weigh less than 5.5 pounds at birth, indicating that the mothers are malnourished and that the babies have a high risk of dying.

For every 1,000 babies born alive, 76 die as infants.

On the average, people consume 2,100 - 2,200 calories per day.

LAND AND FOOD PRODUCTION

Kenya is predominantly agrarian (living and working off the land; a way of life characterized by farming), but there is not much land good for raising crops. Recurrent droughts since the 1960s have created problems, so that food production has fallen far behind population growth.

Increase in urban population, 1950-1988: 6-19%

There are 5 to 10 people per hectare of arable land.

ECONOMICS AND SOCIETY

Average annual growth rate of gross domestic product, 1980-86: 3.4% Projected annual growth rate of labor force 1985-2000: 3.7% Per capita income is about \$250. (U.S. dollars)

Family farms often cannot support the large families, so the husband may leave the family to go to the nearest town in search of work. The wife is left to run the farm and raise the children. Women have very low status and little or no education in most African nations, yet they have the primary responsibility for food production and child rearing.

By tradition, farmland is divided among sons when a farmer dies. After so much subdivision, farming becomes uneconomical. Therefore, many young men seek land or a living somewhere else. This might be poaching or living on some land in national parks. In turn, this hurts Kenya's economy more, because it interferes with tourism in game parks (Kenya's main source of foreign exchange).

Each household has an average of 1.75 rooms.

About 70% of the males and about 50% of the females over age 15 years can read and write.

There is one doctor or nurse for every 1000 people.

On the average, energy equal to 1/2 of one U.N. standard barrel of oil is consumed per person per year.

A CASE STUDY FROM KENYA

The Munorus

Members of the Kikuyu, Kenya's most westernized tribe, Njoroge and Susan Munoru raise four children on a pittance of land: one of six adjoining half-acre strips passed on to Njoroge and his five brothers. Unlike his brothers' plots which often lie idle, Njoroge actively tends his land.

Njoroge and Susan Munoru have a dream: to see their four children through secondary school. A modest goal in many countries, it will require great sacrifices from the Munorus, whose coffee crop last year earned them only \$120 after expenses for fertilizers and pesticides. The primary school, where seven-year-old Julius and his classmates assemble each morning for flag raising, charges \$75 a year. Next year the bill will double when Julius's five-year-old sister, Njeri, enters first grade. Three years later, when the twins, Nganga and Beati (a boy and girl), come of age, the fees will double again. To boost his income, Njoroge has increased his coffee plantings from 120 to 250 trees. While there will still be marginal grass to support his one cow, there will be less space for food crops, such as corn and potatoes.

Like many of Kenya's small landholders, Njoroge, a trained stonemason, supplements his income with day work in nearby towns, where he earns about five dollars a day. When work is available, Susan earns about two dollars a day in the fields of larger farms. But even with their extra income, they barely can afford the necessities of life. Meat is a luxury rarely enjoyed.

For Susan life is an endless of long, burdensome treks. Charcoal for cooking must be hauled from a kilometer away. For food staples she walks four kilometers to the market town of Githumu, returning by bus when she can afford it. Even water must be carried from a distant stream. But during the rainy season, runoff is collected from the roof of their small mud and wattle house, where Njeri gets a shampoo and hair treatment from her cousin Mary.

Reflecting a new attitude in Kenya, the Munorus do not want more children. "If we have more, how can we send them to school, how can we feed them?" asks Susan. In a major change of policy, Kenya's leaders now talk of the need for family planning.

Reference: National Geographic, Volume 174, No. 6. December 1988.

CHINA

POPULATION

Population in 1950 - 550,000,000
Population in 1988 - 1,087,000,000
Population in 2020 - 1,404,000,000

At the current rates, it will take China's population 49 years to double.

China's population is the largest in the world, representing 21% of the total human species.

Until about 10 years ago, China had one of the faster growing populations. However, due to a very vigorous and effective national family-planning program as well as effective health and educational programs, China's population growth rate has been cut in half. What makes this achievement more remarkable is that this reduced growth rate has occurred even though mortality rates often fall.

By 1970, China's leaders estimated that the natural resource base could only support about 700 million people in the long run. The rapid population growth was also hindering economic development. In 1979, the government launched its "one-child family" program. Incentives were offered to couples who pledged to only have one child.

Currently,

The average number of children born by a woman is 2.5.

A newborn today can expect to live about 65 years.

About 6% of the babies weigh less than 5.5 pounds at birth, indicating that the mothers are malnourished and that the babies have a high risk of dying.

For every 1,000 babies born alive, 44 die as infants.

On the average, people consume 2,600.- 2,700 calories per day.

LAND AND FOOD PRODUCTION

China has a high per capita energy use, which partly reflects a widespread use of coal and locally cut fuelwood in households. These products result in inefficient combustion, which also has created severe air pollution and acidic rainfalls. If energy use for China reached the high levels of developed nations, the consequences for the atmosphere worldwide would be catastrophic.

ECONOMICS AND SOCIETY

Average annual growth rate of gross domestic product, 1980-86: 10.5%.

Projected annual growth rate of labor force, 1985-2000: 1.4%.

Per capita income is about \$250. (U.S. dollars)

Increase in urban population 1950-88: 11-21 %.

On the average, energy equal to 3 U.N. standard barrels of oil is consumed per person per year.

China's approach to limiting population has had its problems:

- The traditional preference for sons has led to extra births and an increase of female infanticide (killing female babies).
- There is concern about a generation of mostly single children faced with supporting a much larger generation of elderly parents.
- A new policy that allows families to earn private incomes has resulted in a spectacular increase in food production. However, more children are now desired, to help earn the income. The result has been a surge in the birthrate.
- Each household has an average of 3.75 rooms.
- About 85% of the males and about 55% of the females over age 15 years can read and write. - There is slightly more than 1 doctor or nurse for every 1000 people.

A CASE STUDY FROM CHINA

The Kuos

Living in a town full of relatives, Koping Kuo and his wife, Chao I Ping, often find the courtyard of their home bustling with communal activity such as shared laundry chores. Following tradition, Chao I Ping moved in with Koping and his parents, Dal Hong and Ah Mai, when they were married. On four hectares (ten acres) in the fertile delta of the Yangtze, or Chang Jiang, the Kuos cultivate cotton, rice, wheat, and corn, which they sell to a state cooperative for an annual income of about \$700. Though they could earn more by growing produce for a cash crop, they have been encouraged by the government to concentrate on food grains for the benefit of the nation. Thus Ah Mai needs to buy many of their foods in the village market of Chiu Chin. Though poor by Western standards, the Kuos enjoy a relatively comfortable life. Meals usually include rice, fish soup, and homegrown vegetables. Slowly the amenities of modern life are appearing in their household, including a washing machine and a television set. Electricity, however, is not available during the day, when the energy demand of the province's growing number of rural industries takes priority.

Reference: National Geographic, Volume 174, No. 6. December 1988.

BRAZIL POPULATION

Population in 1950 - 53,400,000

Population in 1988 - 144,400,000

Population in 2020 - 233,800,000

At the current rates, it will take Brazil's population 34 years to double.

Brazil's population is increasing about 2% per year.

Over 1/3 of its present population is under the age of 15 years.

Currently,

The average number of children born by a woman is 3.5.

A newborn can expect to live about 65 years.

About 8 to 9% of the babies weigh less than 5.5 pounds at birth, indicating that mothers are malnourished and the babies have a high risk of dying.

For every 1,000 babies born alive, 63 die as infants.

On the average, people consume 2,600 to 2,700 calories per day.

LAND AND FOOD PRODUCTION

- Deforestation & desertification in the extremely poor northeast have driven people to southern cities and development projects in the Amazon basin.

- Small farms in the south have been converted to industrialized agriculture for export crops, also displacing thousands of people from the land.

In the early 1970s, the federal government began giving land to those who would settle in western Brazil in the Amazon valley. By 1984, a highway through the Amazon was complete, and the migration of people was heavy. The damage to the environment has been severe. As much as 20% of the rain forest may have been destroyed. Immigrants cut roads into the rain forest and clear large tracts of land to secure claims.

The population of this area has doubled during the 1980s. The soil in many areas cannot be used agriculturally. Therefore, instead of providing the food planned for export, the state imports most basic foods.

In 1981, the World Bank required Brazil to set up preserves protecting the rain forest and Indians living in it. However, the population rush means farmers, loggers and miners often invade protected areas. There are too few officials to patrol land. Deforestation has continued in even protected areas. Farmers usually clear the forest, harvest a few seasons' crops and leave the fields to cattle ranchers. Herds graze for a decade or so and then the exhausted land is abandoned. The rain forest may never reclaim the land.

The rest of Brazil is seeing a flight to the cities: Increase in urban population, 1950-88: 34 to 71%. There are 1:3 people per hectare of arable land.

ECONOMICS AND SOCIETY

Average annual growth rate of gross domestic product, 1980-86: 2.7%.

Projected annual growth rate of labor force, 1985-2000: 2.1%.

Per capita income is about \$1,750. (U.S. dollars)

Brazil is often referred to as a middle-income country. Its per capita income is far below the rich countries of Europe and North America, but well above the levels typical of India and Kenya. Brazil is a good example of a two-tiered society - wealth is concentrated in the hands of a small fraction of the population and the majority is poor. The nation is also divided by the impoverished tropical north and the concentration of industry and wealth in the south.

Overpopulation has swelled the groups of unemployed and underemployed. Over 1/3 of the present population is under the age of 15 years and due to enter the labor force during the next 15 years.

Brazil also has a social system that perpetuates economic inequity, racism, sexism and an extensively corrupt, inept government.

Each household has an average of 2 rooms.

About 75% of the males and females over age 15 years can read and write.

There are not quite 2 doctors or nurses for every 1,000 people.

On the average, energy equal to 3 U.N. standard barrels of oil is consumed per person per year.

A CASE STUDY FROM BRAZIL

Artera and Edmar

One Day at a Time: That is Artera do Carmo's approach to life. With her daughter Raimunda at her side, she nurses her two-year-old daughter, Eduarda: a common practice among mothers in the favela, where mothers milk is a vital nutrient for as long as it lasts. Migrants from Brazil's droughtplagued northeast, Artera and her husband, Edmar, are typical of the 11,000 people who live in Santa Marta. Having never practiced birth control, they have had seven children, one of whom died of pneumonia at five. A family produce stand, which earns them about four dollars a day, is their primary support. Though Artera sometimes splurges on junk food for her children, rice and black beans are support. Though Artera sometimes splurges on junk food for her children, rice and black beans are their main diet.

While their father, who is an alcoholic, sleeps late, Raimunda, 10, and her brother Edson, 16, rise at 4 a.m. to pick through the discarded fruits and vegetables of a nearby market.

Salvageable items they take to Edmar's produce stand, before he arrives around 9 a.m. Angela, 17, supplements the family income by working as a nanny. Only she and her sister Ana, 12, can read or write. Edson and Raimunda, like their parents, are practically illiterate. Raimunda is still in the first grade, where she has trouble staying awake after her morning chores. Worse yet, her mother cannot afford the textbooks she needs.

Despite Edmar's drinking problem, he and Artera enjoy an affectionate relationship. Both look forward to their occasional nights out at neighborhood parties. The Roman Catholic Church figures strongly in the family's life, though Artera also follows the animist macumba cult. "It won't do me any harm," she says. "And you never know."

HUNGARY POPULATION

Population in 1950 - 9,300,000

Population in 1988 - 10,600,000

Population in 2020 - 10,500,000

At the current rates, Hungary's population will never double.

The average Hungarian family has fewer than two children and the population has begun a slow decline. In fact, the government is actively trying to encourage people to have more children. It is meeting with little success in this effort, however.

Currently,

The average number of children born by a woman is about 1.8.

A newborn today can expect to live about 70 years.

About 10% of the babies weigh less than 5.5 pounds at birth, indicating that the mothers are malnourished and that the babies have a high risk of dying.

For every 1,000 babies born alive, 19 die as infants.

On the average, people consume 3,500 calories per day.

LAND AND FOOD PRODUCTION

Hungary, like other Eastern-bloc nations, has weak pollution control policies. As a result, it suffers severe water pollution and acid rain. Too much of the energy use contributes to environmental deterioration rather than the well-being of people.

Increase in urban population 1950-88: 37-58%.

There are 1 to 3 people per hectare of arable land.

ECONOMICS AND SOCIETY

Average annual growth rate of gross domestic product, 1980-86: 1.6%

Projected annual growth rate of labor force, 1985-2000: 0.3%

Per capita income is about \$2000. (U.S. dollars)

Political leaders see the disadvantages of a nongrowth population and are trying to reverse it. Disadvantages include:

- an increased burden of elderly people to support - an aging work force
- slower economic growth

The advantages, which are less obvious, could be used well: - a stable work force

- a smaller burden of children to support and educate
- lower crime rates
- less pressure on resources
- less pollution and other environmental deterioration.

Hungary has shared in the economic stagnation seen throughout the communist bloc in recent years, despite its pioneering role in allowing some entrepreneurial activity.

Each household has an average of 3 rooms.

About 95% of the males and females over 15 years can read and write.

There are not quite 10 doctors or nurses for every 1,000 people.

On the average, energy equal to 18 U.N. standard barrels of oil is consumed per person per year.

A CASE STUDY FROM HUNGARY

The Budais

Keeping up with the Joneses, Hungarian style, Nandor and Iona Budai possess all the tokens of middle-class comfort: their own home, several appliances, attractive clothes - even a Soviet-made car for picnics in the country. Like that of most Hungarians, however, theirs is a lean prosperity, earned through sacrifice and moonlighting in the "underground economy" found in Eastern-bloc nations. Besides helping her husband in his machine shop, for example, Iona works part-time making venetian blinds for another company.

The boldest economic reformers in Eastern Europe, Hungarians saw their standard of living rise dramatically during the 1970's. Today, in her supermarket, Mrs. Budai finds an abundance and variety of food not seen in most Communist nations. Now heavily in debt, however, the Hungarian government is attempting to curb consumerism and has introduced something unheard of in Communist countries: a personal income tax.

For Nandor prime time is a soothing soak in one of the many thermal baths of Budapest, a popular diversion since the days of the Romans. Avid windsurfers, the Budai children also share a taste for American pop music, which 17-year-old Monika listens to with headphones while jogging. Though she prefers jeans, Monika wears a miniskirt when shopping with her mother in downtown Budapest, which in recent years has become a shopping center for bargain-hunting foreigners.

Far from their school in Budapest, the Budai children spend two hours a day commuting by bus and subway. Career oriented, both are diligent students. Nandi, 14, hopes to become an electrical engineer, while Monika wants to become an artist.

INDIA POPULATION

Population in 1950 - 369,900,000

Population in 1988 - 816,800,000

Population in 2020 - 1,308,800,000

At the current rates, it will take India's population 35 years to double.

India's population is the world's second largest (after China's) and is still increasing by 2% per year, despite an active family planning program since the 1950's. Family planning efforts may be less successful than in China because India is a democracy while China has a powerful centralized government.

Currently,

The average number of children born by a woman is 4.25.

A newborn today can expect to live about 55 years.

About 30% of the babies weigh less than 5.5 pounds at birth, indicating that the mothers are malnourished and that the babies have a high risk of dying.

For every 1,000 babies born alive, 104 die as infants.

On the average, people consume 2,100 - 2,200 calories per day.

LAND AND FOOD PRODUCTION

India has both a developed industrial structure and an impoverished majority living traditional lives from a previous century.

In the late 1960s, when monsoon failures created havoc with food production, India became a pioneer in the green revolution. At this time, a high-yield wheat supported by extensive irrigation and a growing fertilizer industry was introduced. For years, the nation was a green revolution showcase, self-sufficient in food in most years, largely because of successful increases in the wheat harvest.

Yield increases in corn and rice, however, were not as great. Crops such as lentils and other legumes were neglected as wheat acreage expanded, but the legumes are important in a society with vegetarian habits or people too poor to buy animal protein.

Potential additional increases from green revolution technology are limited, and the population keeps growing. Monsoons in the 1980s have once again brought food shortages.

There are more than 500,000 rural villages in India, remote from 20th century life.

There are 3 to 5 people per hectare of arable land.

Increase in urban population, 1950-88: 17-25%.

ECONOMICS AND SOCIETY

Average annual growth rate of gross domestic product, 1980-86: 4.9%.

Projected annual growth rate of labor force, 1985-2000: 1.8%.

Per capita income is about **\$250**. (U.S. dollars)

India's efforts at population control have also been hampered by high rates of

- illiteracy
- low status of women
- conflict between castes and religious groups
- inconsistent government policy
- poor internal communications
- and, of course, poverty.

Each household has an average of 2 rooms.

About 55% of the males and 30% of the females over age 15 years can read and write.

There is less than 1 (about 0.5) doctor or nurse for every 1,000 people.

On the average, energy equal to 1 U.N. standard barrel of oil is consumed per person per year.

A CASE STUDY FROM INDIA

The Patels

Life-giving rains arrived on schedule in June, bringing joy and relief to Ranchod Patel, who surveys his cornfields - four acres of his own, and four leased - in the fertile hills of western India. In recent years the monsoons, key to existence for 70 percent of India's farmers, have been disappointing. When they are good, Ranchod earns about \$700 a year, roughly the amount he spent on his oldest daughter's marriage. Never having lost a child or practiced birth control, Ranchod and his wife, Fundli, have six children, five still at home. Common to rural India, only the sons, Zam Singh and Ramish, can read and write, though the youngest daughter, Kavita, hopes to break that tradition. Recently married, Zam Singh practices birth control with help from a clinic.

With his six goats, four oxen, two cows, one buffalo, and electricity in his home, Ranchod is considered a wealthy man by village standards, a position affirmed by the murals in his home, painted by itinerant artists. Nonetheless, life is hard for the Patels. During dry months, when fodder is scarce, they must strip their few trees of branches to feed their animals. To supplement income between harvests, the sons and one daughter travel 85 miles to the city of Baroda to work as laborers.

Reference: National Geographic, Volume 174, No. 6. December 1988.

UNITED STATES POPULATION

Population in 1950 - 152,300,000

Population In 1988 - 246,100,000

Population in 2020 - 296,600,000

At the current rates, it will take the U.S. population 100 years to double.
The U.S. growth rate is about t % per year (0.7% through natural increase, the rest by immigration).

Currently,

The average number of children born by a woman is 1.9.

A newborn today can expect to live about 75 years.

About 7 to 8 % of the babies weigh less than 5.5 pounds at birth, indicating that the mothers are malnourished & that the babies have a high risk of dying.

For every 1,000 babies born alive, 10 will die as Infants.

On the average, people consume 3,600 - 3,700 calories per day.

LAND AND FOOD PRODUCTION

Increase in urban population, 1950-88: 64 to 74

There are 1 to 3 people per hectare of arable land.

Extremes in weather like last summers drought and heat wave in the North American grain belt result in great crop losses. Crop losses in this region are a world disaster; roughly 100 other nations depend on this region of the North American farm belt for grain

ECONOMICS AND SOCIETY

Average annual growth rate of gross domestic product, 1980-86: 3.1%

Projected annual growth rate of labor force, 1985-2000: 0.8%

Per capita income is about \$17,000. (U.S. dollars)

The U.S. typifies the impact of affluent nations on earth's resources. Conveniences taken for granted include cars, televisions, refrigerators, dishwashers, ranges, air conditioners and numerous small appliances. These items are impossibly beyond the reach of most Kenyan or Indian households.

This mobile society has approximately 180 million cars and trucks. The metals used are nonrenewable resources produced at a variety of environmental costs: air pollution and destruction of ecosystems at mine sites from building roads and dumping.

Side effects from vehicle use include:

- environmental cost of petroleum extraction, refining and transportation
- pollution and ecosystem damage from building roads, bridges, parking garages, shopping centers, gas stations, etc.; and,
- exhaust that irritates eyes, causes emphysema and lung cancer, and contributes to acid rain and the greenhouse effect.

One measure of impact is energy consumption. The U.S. family uses much more of earth's resources than an Indian or Kenyan family.

Each household has an average of 5 rooms.

About 95% of the males and females over age 15 years can read and write.

There are about 7.5 doctors or nurses for every 1,000 people.

On the average, energy equal to 40 U.N. standard barrels of oil are consumed per person per year.

A CASE STUDY FROM THE U.S.

The Brogans

In her sugar-and-spice bedroom, Melody Brogan, 9, picks out clothes for one of her family's monthly 85-mile drives to Martinsville, Virginia, where her parents, Arnold and Patricia (Arnie and Trish), were born and raised. While there, her grandmother Goldie Brogan helps her dress for a family wedding, some 50 miles farther away in Roanoke.

In their van - one of two family vehicles - the Brogans also take six weekend vacations a year to the far ends of their state: their alternative to an extended holiday. Their favorite getaways are a church camp in the mountains of western North Carolina and Surf City, a beach resort 175 miles southeast of Durham. There they stay in a beach home rent free in exchange for maintenance that Arnie performs for the owner.

Economies like this are important to the Brogans, who wage constant battle with their sons, Matt, 13, and Mark, 11, over expensive clothes. Trish, who works as a mortgage loan processor, helps stretch the family budget by cutting everyone's hair.

A former carpenter, Arnie recently started work as a contract administrator for a development company. The Brogans center their lives around the Southern Baptist Church, where Arnie serves as a deacon and Trish teaches Sunday school. A quiet and devout man, Arnie rises at 5:30 on most mornings to read Christian literature and enjoy his "quiet time."