

Biology and Society

Unit Seven: The Human Impact

Topic Two: How many people can the Earth support?

What are the ethical issues that follow from the explosive growth of the human population?

The questions which focus these ethical issues are:

Is the Earth already over-populated?

And if not?

How many people can the Earth support?

Is the Earth already over-populated?

It depends.



The World at Night

(composite image by C. Mayhew & R. Simmon NASA/GSFC)

Web Reference

http://antwrp.gsfc.nasa.gov/apod/image/0011/earthlights2_dmsp_big.jpg



North America at Night

**If the Earth is not over-populated and the population continues to grow,
how many people can it support?**

Lifestyles and Per Capita Consumption

Humanity's impact on the natural world can be understood by looking at the relationships between population size, per capita consumption, and lifestyles.

- Multiplying the number of people times their rate of consumption gives the total human impact on the Earth.
- Lifestyles determine per capita consumption.
- Affluence and technology determine possible lifestyles.

As a result, per capita consumption varies dramatically between humans depending on their affluence, access to technology, and the lifestyle they either choose or are forced to live.

How much do we consume now?

“Human beings use 40 percent of annual terrestrial plant growth,
60 percent of accessible freshwater runoff, and
35 percent of the ocean’s continental shelf productivity.”

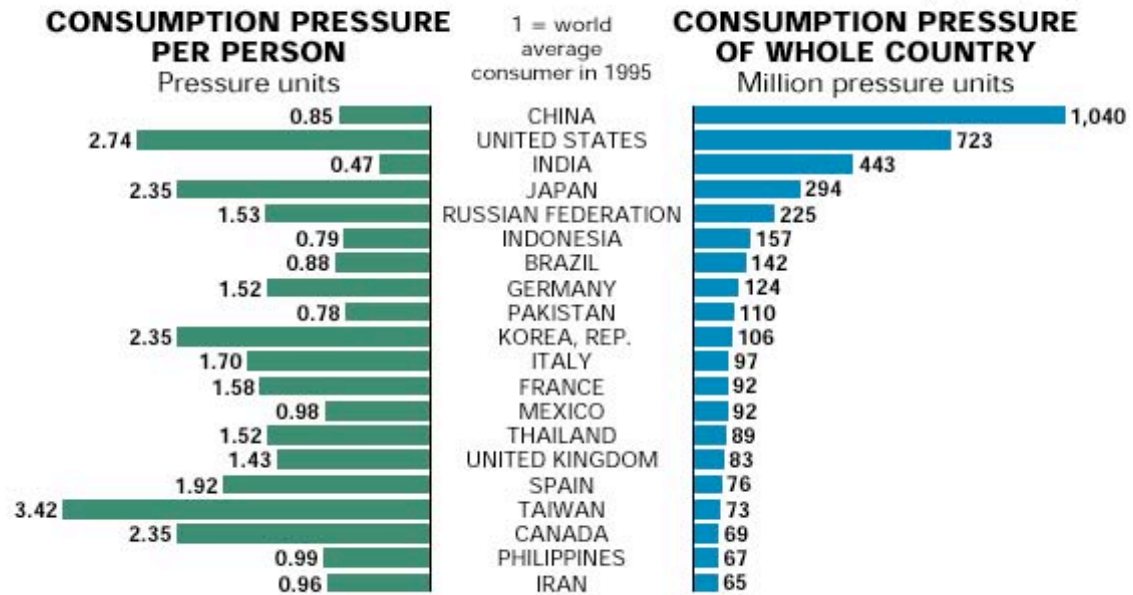
from Stuart Pimm’s
The World According to Pimm: a scientist audits the Earth (2001)

What relative portion of total world consumption do Americans consume?

Rank	Country	Population (millions)
1	China	1,273
2	India	1,033
3	United States	285
4	Indonesia	206
5	Brazil	172
6	Pakistan	145
7	Russia	144
8	Bangladesh	134
9	Japan	127
10	Nigeria	127
11	Mexico	100
12	Germany	82
13	Vietnam	79
14	Philippines	77
15	Egypt	70

CONSUMPTION PRESSURE

A measure of the burden placed on the environment by people, 1995



Consumption as measured by our “ecological footprint” which represents the productive area of the Earth required to support the lifestyle of one individual in a given population:

U.S.A.	30.2 acres per person
Germany	15.5
Brazil	6.4
Indonesia	3.7
Nigeria	3.2
India	2.6

In other words, on average, each American consumes from 6 to 12 times more of the world's resources than an average person in India.

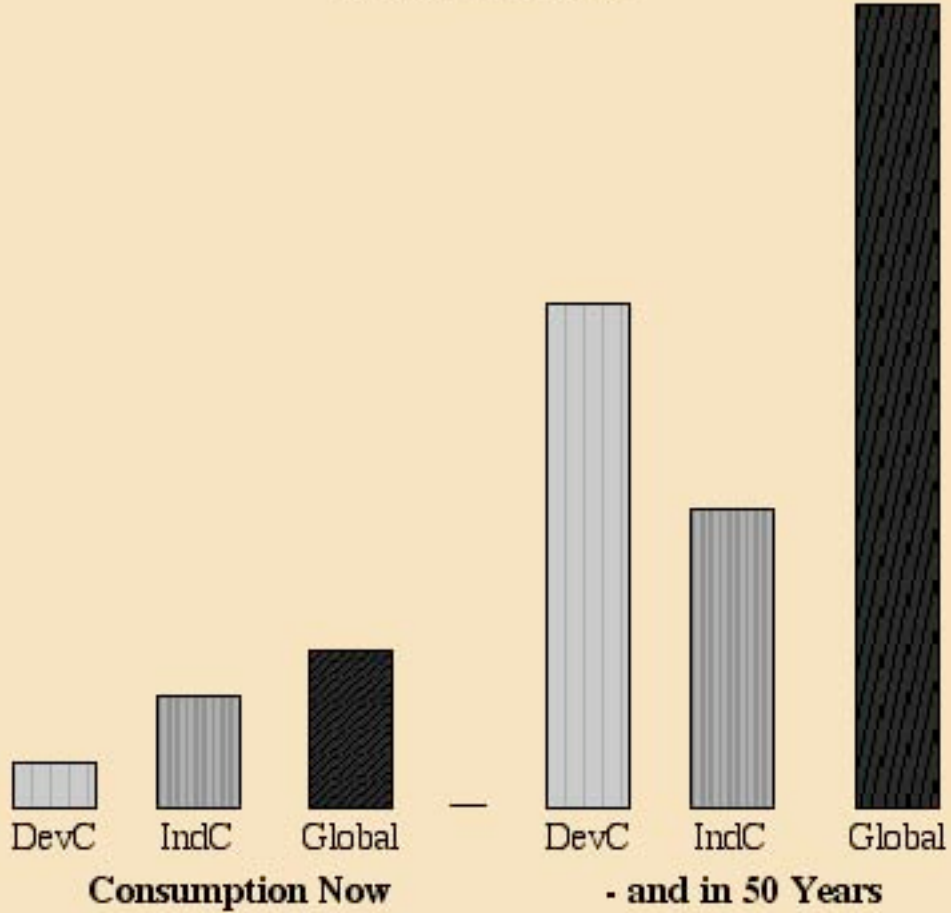
The central questions are:

1. Can we sustain this level of consumption or are we degrading the Earth's ability to support even this current level of consumption?

It is estimated that humanity uses one-third more resources than nature can sustainably replenish. By this measure, the world is already overpopulated. The estimate is that 2 to 3 billion humans could be supported sustainably at the level of consumption of Americans.

2. How much will we consume fifty years from now when our population reaches 9 billion?

Global Consumption Growth over 50 Years
Consumption as calculated with the 5 parameters selected
Growth Factor : 5.2



But we have choices.

The answer to how many people the Earth can support depends on the lifestyle we choose. In America our affluence and technology make many different lifestyles possible. Out of all of the possible lifestyles available to us, we can choose the one that will create the future we want.

But what do we want?

- Do we want as many people as possible on the Earth at one time?
- Or do we want a sustainable world where, over the history of humanity's tenure on Earth, the greatest number of lives could be lived?
- Do we want a certain level of quality to our lives?
- And if so, what increases the quality of our lives?

The answer to the carrying capacity debate is dependent upon the choices we make about our personal reproduction, our lifestyles and consumption, and our political, economic, and social priorities. As Paul and Anne Ehrlich noted in *The Stork and the Plow*:

“Earth can support a larger population of cooperative, far-sighted, vegetarian pacifist saints than of competitive, myopic, meat-eating, war-making typical human beings.

All else being equal, Earth can hold more people if they have relatively equal access to the requisites of a decent life than if the few are able to monopolize resources and the many must largely do without.

The problems of population, social and economic inequity, and environmental deterioration are thus completely intertwined.”

How much do we consume now?

“Human beings use 40 percent of annual terrestrial plant growth,
60 percent of accessible freshwater runoff, and
35 percent of the ocean’s continental shelf productivity.”

(Pimm 2001)

**What, then, is the impact of our current levels of consumption
on the Earth’s environment?**

Humanity’s Impact on the Earth’s Ecosystems

<http://fire.biol.wvu.edu/trent/alles/GlobalEcologyindex.html>

References

Cohen, J. E. (1995). *How Many People Can the Earth Support?* New York: Norton.

Pimm, S. L. (2001). *The World According to Pimm*. New York: McGraw-Hill.

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