J. SCOTT CHRISTIANSON

Global population increases exponentially

"Man is like every other species in being able to reproduce beyond the carrying capacity of any finite habitat. Man is like no other species in that he is capable of thinking about this fact and discovering its consequences."

— William R. Catton

Many people are surprised to learn that global human population will double from 5.6 billion people to more than 10 billion in only 39 years. In 40 years, there will be twice as many people to feed and twice as many using the planet's resources. Understanding that our population grows exponentially is the key to understanding this dramatic increase in our numbers.

"A quantity grows exponentially when its increase is proportional to what is already there," wrote Donella Meadows in "Beyond the Limits."

"If a child invests $100 at 7 percent per year interest and lets the interest income accumulate in the account, the invested money would grow exponentially. The first year's interest will be 7 percent of $100 or $7, making a total of $107 in the account. The next year's interest will be 7 percent of $107, which is $7.49, bringing the total to $114.49.... By the tenth year, the account will have grown to $201.37."

"The percent added each year to a bank account is constant, but the amount added is not," Meadows wrote.

All populations tend to grow exponentially. "Exponential growth occurs in population because children, the analog of interest, remain in the population and themselves have children," said Paul Ehrlich of Stanford University.

A population's growth rate is calculated as the birth rate minus the death rate divided by the total population. For example, if there are 100 mice, and then 15 are born and 10 die, the growth rate is 15 percent and the death rate 10 percent. If the death and birth rates remain constant, the population will grow 5 percent each year.

World population in 1971 was 3 billion and was growing at 2.1 percent annually. Population increased by 76 million around the globe that year.

Compare those figures, however, to 1991, when humans numbered 5.4 billion and were increasing by 1.7 percent a year. Global population increased by 92 million that year. So, even though the percentage of growth was less in 1991 than in 1971, the number of people added to the world population was greater.

One would expect that if the world's people reproduced at replacement rate — each couple having two children — that global population would stabilize. However, populations with a high number of people in their reproductive years continue to grow after the population's average fertility has reached replacement rate.

As an illustration, if India's current population of 800 million people reduced its growth rate to zero, the population would continue to increase for the next 40 years, until it stabilized at 2 billion people. This "population momentum" is caused by the tremendous number of young people in the population who have yet to reproduce.

For more information on exponential population growth, consult "Beyond the Limits" by Donella Meadows, Dennis Meadows and Jorgen Randers.

If you have a suggestion for a column, a gripe, a success story or whatever, write it down and send it to me, care of the Columbia Daily Tribune, PO Box 798, Columbia, Mo., 65205.