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## Human Population Reaches 7 Billion--How Did This Happen and Can It Go On?

A mere 12 years after surmounting six billion, the world's population will reach seven billion, according to the U.N. But that rate seems to be slowing

By David Biello | Friday, October 28, 2011 | 53 comments

On October 31, 2011, a particularly special person will be born—the seven billionth human alive, according to United Nations demographers. He or she could be delivered by a starving mother in the growing wastelands of Somalia, a failed-state gripped by famine and war. The best odds are that the child will be born in India, which has the highest rate of births per minute in the world. She may even be an American girl, heiress to a complex legacy that is in no small part responsible for the fact that, for better or worse, people are shaping the destiny of the planet that engendered humanity.

Regardless, the seven billionth person raises the question: How much is too much? "Can Earth support seven billion or nine billion or 10 billion people in a good life for a long time?" asked demographer Joel Cohen of Columbia University's Earth Institute at its human population event on October 17. "The addition of four billion people in five decades has no precedent. That is an exceptional event and will probably never be repeated within human history."

There were only one billion people on the planet as recently as the turn of the 19th century and only a few hundred thousand just 10,000 years ago. In fact, there may have been as few as 15,000 of us, roughly 70,000 years ago.

With both more people and longer lifetimes, humanity's absolute numbers continue to rise, even though the number of children per women has halved since 1950. In fact, the absolute growth rate in human population peaked at 2.1 percent between 1965 and 1970, according to Cohen. "We're now down to 1.1 percent per year," he said, although that still means roughly 150 babies born every minute.

### Consumers

The world's richest 500 million people produce half the world's carbon dioxide emissions—the primary greenhouse gas responsible for climate change—whereas the poorest three billion emit just seven percent. The average American—one of 312.5 million—uses up some 88 kilograms of stuff daily: food, water, plastics, metals and other material goods. Americans consume a full 25 percent of the world's energy despite representing just 5 percent of global population, and the band of industrialized nations combine to waste 222 million metric tons of food per year, according to the U.N. Food and Agriculture Organization.

"Population doubled while the economy grew by 15 times, cars by 16 times and fertilizer-use by sixfold," said geographer Ruth DeFries of Columbia at the same event. "There is no end in sight for that increase in consumption," particularly as it is emulated by people around the globe.

All this consumption requires a host of natural resources, from vast copper mines scarring the landscape to ever more land for food. More acreage was converted to growing crops between 1950 and 1980, than from 1700 to 1850, and arable land is one of nine "planetary boundaries" that scientists have identified—limits past which humanity should fear to tread. The others include: climate change, biodiversity loss, nutrient cycles, ocean acidification and freshwater use, among others. "Slowing population growth does not solve all the problems but it makes it easier by slowing demands," Cohen said.

Ultimately, the limiting factor may come down to what the late economist Julian Simon called the "master resource": energy. Simply put, is there enough energy that can be harnessed to provide a rewarding lifestyle to however many billion of us inhabit the planet? Those

limits are already being pushed, as can be seen in the large increases in the price of everything from oil to food over the last decade. "The state of New Jersey's per capita energy consumption exceeds the photosynthetic productivity of the area even if it were pristine," noted physicist Klaus Lackner, director of the Earth Institute's Lenfest Center for Sustainable Energy at the Columbia event. Simply put, without fossil fuels, the New Jerseyans alive today could not survive on the bounty of the Garden State alone. That problem may spread as the 21st century moves forward, thanks to human population growth.

Energy is the key to modern economies, but it may be participation in modern economies that proves key to limiting human population. "If girls and women have the opportunity to generate income and jobs, you see a rapid decline in fertility," DeFries noted. Already, increased opportunity has driven fertility declines in many countries of the world or, as journalist Fred Pearce puts it in his book *The Coming Population Crash* (2010, Beacon Press): "The population bomb is being diffused. By women. Because they want to."

But it is not just economic opportunity; education also is key to restraining future birth rates. "Almost universally, women with higher levels of education have fewer children," wrote demographers in a paper in *Science* on July 29. According to Cohen, it would cost at most \$70 billion to provide universal education to everyone young person on Earth right now.

Fertility rates are not declining everywhere: Indonesia's birth rate has stopped declining and started climbing. A subset of countries in sub-Saharan Africa, including Niger with the current top fertility rate of more than seven children per woman, still have rates above four children per woman. Even the U.S. has seen its fertility rate increase above two children per woman in recent years.

The biggest impact a U.S. citizen can have on global environment problems, such as climate change, is having fewer children. Every American child born will add almost 10,000 metric tons of CO<sub>2</sub> to the atmosphere over his or her lifetime under current conditions. For comparison, that's five times more than a Chinese child and 160 times more than a Bangladeshi baby. According to researchers at Oregon State University, having one fewer child reduces a U.S. family's greenhouse gas impact 20 times more than driving a Toyota Prius, using Energy Star appliances and other lifestyle choices combined.

### Demographic dividend

For the next few decades at least, the world as a whole will have more working age people than dependents (children and the old)—a global "demographic dividend" of the kind that has allowed rapid economic growth in the past. The ultimate question of the 21st century may be, as Cohen put it: "Is economic development the best contraceptive or is voluntary contraception the best [economic] development?"

As for how many people the planet can sustain, the first such estimate came from microbiologist Anton van Leeuwenhoek who calculated roughly 13.4 billion people back in 1679, based on the population density of his native Holland and its size relative to the rest of the globe. More modern guesses are hardly more scientific, ranging from one billion to one trillion. "These estimates are political numbers, intended to persuade people, one way or another: either that too many humans are already on Earth or that there is no problem with continuing rapid population growth," Cohen wrote in his book *How Many People Can the Earth Support?* (W. W. Norton, 1996)

As it is, the world produces enough food to feed everyone alive today—and more. Globally, farms produce enough calories to support a population of roughly 11 billion people fed 2,000 calories per day. That's because human ingenuity—such as the modern breeding of staple crops, such as wheat, for higher yields, known as the Green Revolution—has outpaced, so far, environmental limits.

Yet, there are still more than a billion hungry people on the planet today. "The number of people living on \$2 per day doubled in the 20th century," Cohen noted at the Columbia event. "Hunger is a choice."

### 7 billion and counting...

On October 12, 1999, Adnan Mevic was born in Sarajevo—the anointed six billionth person on the planet and one of 80 million children born that year. Twelve years later one of the 78 million children born this year is the seven billionth person. It may take 14 years to reach eight billion and it may take even longer to reach nine billion.

But we're still not past "peak people," which could top out at 10.1 billion, according to U.N. demographers. After all, in the 1990s, U.N. demographers forecast a peak at 7.8 billion, a milestone we'll blow past before 2030 most likely. "A difference of one child per woman per lifetime between now and 2050 means a difference of 2.5 billion people," Cohen noted.

As it stands, the people of the planet seem to be leaning toward a peak in population followed by a gradual decline—a 21st-century world of the aged, which can be seen today in Japan or parts of Europe—but there is still a good chance of continued growth in our numbers. The U.N. had more recently predicted a leveling off at nine billion but now says we will reach the 10.1 billion figure in 2100—and potentially keep climbing as birth rates have not fallen as far or as fast as previously anticipated. If the choices we make are a little different, there could be as many as 16 billion of us by the end of this century—and that number may prove more than the planet can bear if our lifestyles don't keep pace with our numbers.

"It's both the most intimate of problems—what people do in their beds—and the most public problem," Cohen said. "What people do in their beds has externalities that affect people who aren't in bed with them."

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