

ISSUE

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Do We Have a Population Problem?

YES: David Attenborough, from "This Heaving Planet," *New Statesman* (2011)

NO: Sean Lanahan, from "Debunking the Over-Population Myth," *Countryside & Small Stock Journal* (2013)

Learning Outcomes

After reading this issue, you will be able to:

- Explain the nature of the "population problem."
- Explain the concept of "carrying capacity."
- Explain the potential benefits of stabilizing or reducing population.
- Explain the potential drawbacks of stabilizing or reducing population.

ISSUE SUMMARY

YES: Sir David Attenborough argues that the environmental problems faced by the world are exacerbated by human numbers. Without population reduction, the problems will become ever more difficult—and ultimately impossible—to solve.

NO: Sean Lanahan argues that the world's agricultural system currently produces enough food for at least double the current world population. The "over-population" myth of "unsustainability" is a scare tactic designed to control the lives of individuals and justify dehumanizing acts such as abortion and euthanasia.

In 1798 the British economist Thomas Malthus published his *Essay on the Principle of Population*. In it, he pointed with alarm at the way the human population grew geometrically (a hockey-stick-shaped curve of increase) and at how agricultural productivity grew only arithmetically (a straight-line increase). It was obvious, he said, that the population must inevitably outstrip its food supply and experience famine. Contrary to the conventional wisdom of the time, population growth was not necessarily a good thing. Indeed, it led inexorably to catastrophe. For many years, Malthus was something of a laughing stock. The doom he forecast kept receding into the future as new lands were opened to agriculture, new agricultural technologies appeared, new ways of preserving food limited the waste of spoilage, and the birth rate dropped in the industrialized nations (the "demographic transition"). The food supply kept ahead of population growth and seemed

likely—to most observers—to continue to do so. Malthus's ideas were dismissed as irrelevant fantasies.

Yet overall population kept growing. In Malthus's time, there were about 1 billion human beings on Earth. By 1950—when Warren S. Thompson worried that civilization would be endangered by the rapid growth of Asian and Latin American populations during the next five decades (see "Population," *Scientific American* [February 1950])—there were a little over 2.5 billion. In 1999 the tally passed 6 billion. It passed 7 billion in 2011. Statistics like these, which are presented in *World Population Prospects: The 2015 Revision*; http://esa.un.org/unpd/wpp/Publications/Files/Key_Findings_WPP_2015.pdf; United Nations, 2010), are not promising; the UN says that "The world population is projected to increase by more than one billion people within the next 15 years, reaching 8.5 billion in 2030, and to increase further to 9.7 billion in 2050 and 11.2 billion by 2100." See also Patrick

Gerland et al., "World Population Stabilization Unlikely This Century," *Science* (October 10, 2014). While global agricultural production has also increased, it has not kept up with rising demand, and—because of the loss of topsoil to erosion, the exhaustion of aquifers for irrigation water, and the high price of energy for making fertilizer (among other things)—the prospect of improvement seems exceedingly slim to many observers. Tom Butler ed., *Overdevelopment, Overpopulation, Overshoot* (Goff Books, 2015), notes that the rising human population threatens to make worse every problem facing both humanity and the environment. Yet, say Corey J. A. Bradshaw and Barry W. Brook, "Human Population Reduction Is Not a Quick Fix for Environmental Problems," *Proceedings of the National Academy of Sciences of the USA* (November 18, 2014).

Two centuries never saw Malthus's forecasts of doom come to pass. Population continued to grow, and environmentalists pointed with alarm at a great many problems that resulted from human use of the world's resources (air and water pollution, erosion, loss of soil fertility and groundwater, loss of species, and a great deal more). "Cornucopian" economists such as the late Julian Simon insisted that the more people there are on Earth, the more people there are to solve problems and that humans can find ways around all possible resource shortages. See Simon's essay, "Life on Earth Is Getting Better, Not Worse," *The Futurist* (August 1983). See also David Malakoff, "Are More People Necessarily a Problem?" *Science* (July 29, 2011) (a special issue on population).

Was Malthus wrong? Both environmental scientists and many economists now say that if population continues to grow, problems are inevitable. But earlier predictions of a world population of 10 or 12 billion by 2050 are no longer looking very likely. 2100 is a more likely date for such numbers, with an actual decline in population size to follow. Fred Pearce, *The Coming Population Crash: and Our Planet's Surprising Future* (Beacon, 2010), is optimistic about the effects on human well-being of that coming decline in population. Do we still need to work on controlling population? Historian Matthew Connolly, *Fatal Misconception: The Struggle to Control World Population* (Belknap Press, 2010), argues that the twentieth century movement to control population was an oppressive movement that failed to deliver on its promises. Now that population growth is slowing, the age of population control is over. Yet there remains the issue of "carrying capacity," defined very simply as the size of the population that the environment can support, or "carry," indefinitely, through both good years and bad. It is not the size of the population that can prosper in good times alone, for such a large

population must suffer catastrophically when droughts, floods, or blights arrive or the climate warms or cools. It is a long-term concept, where "long-term" means not decades or generations, nor even centuries, but millennia or more. See Mark Nathan Cohen, "Carrying Capacity," *Free Inquiry* (August/September 2004), and T. C. R. White, "The Role of Food, Weather, and Climate in Limiting the Abundance of Animals," *Biological Reviews* (August 2008).

What is Earth's carrying capacity for human beings? It is surely impossible to set a precise figure on the number of human beings the world can support for the long run. As Joel E. Cohen discusses in *How Many People Can the Earth Support?* (W. W. Norton, 1996), estimates of Earth's carrying capacity range from under a billion to over a trillion. The precise number depends on our choices of diet, standard of living, level of technology, willingness to share with others at home and abroad, and desire for an intact physical, chemical, and biological environment (including wildlife and natural environments), as well as on whether or not our morality permits restraint in reproduction and our political or religious ideology permits educating and empowering women. The key, Cohen stresses, is human choice, and the choices are ones we must make within the next 50 years. Phoebe Hall, "Carrying Capacity," *E—The Environmental Magazine* (March/April 2003), notes that even countries with large land areas and small populations, such as Australia and Canada, can be overpopulated in terms of resource availability. The critical resource appears to be food supply; see Russell Hopfenberg, "Human Carrying Capacity Is Determined by Food Availability," *Population & Environment* (November 2003).

Andrew R. B. Ferguson, in "Perceiving the Population Bomb," *World Watch* (July/August 2001), sets the maximum sustainable human population at about 2 billion. Sandra Postel, in the Worldwatch Institute's *State of the World 1994* (W.W. Norton, 1994), says, "As a result of our population size, consumption patterns, and technology choices, we have surpassed the planet's carrying capacity. This is plainly evident by the extent to which we are damaging and depleting natural capital" (including land and water). The point is reiterated by Robert Kunzig, "By 2045 Global Population Is Projected to Reach Nine Billion. Can the Planet Take the Strain?" *National Geographic* (January 2011) (*National Geographic* ran numerous articles on population-related issues during 2011). Thomas L. Friedman, "The Earth Is Full," *New York Times* (June 7, 2011), thinks a crisis is imminent but we will learn and move on; see also Paul Gilding, *The Great Disruption: Why the Climate Crisis Will Bring on the End of Shopping and the Birth of a New World* (Bloomsbury Press, 2011).

If population growth is now declining and world population will actually begin to decline after about 2100, there is clearly hope. But most estimates of carrying capacity put it at well below the current world population size, and it will take a long time for global population to fall far enough to reach such levels. We seem to be moving in the right direction, but it remains an open question whether our numbers will decline far enough soon enough (i.e., before environmental problems become critical). On the other hand, Jeroen Van den Bergh and Piet Rietveld, "Reconsidering the Limits to World Population: Meta-Analysis and Meta-Prediction," *Bioscience* (March 2004), set their best estimate of human global carrying capacity at 7.7 billion, which is distinctly reassuring. However, there is still concern that global population will not stop at that point; see David R. Francis, "'Birth Dearth' Worries Pale in Comparison to Overpopulation," *Christian Science Monitor* (July 14, 2008).

How high a level will population actually reach? Fertility levels are definitely declining in many developed nations; see Alan Booth and Ann C. Crouter (eds.), *The New Population Problem: Why Families in Developed Countries Are Shrinking and What It Means* (Lawrence Erlbaum Associates, 2005). The visibility of this fertility decline is among the reasons to her question mentioned by Martha Campbell, "Why the Silence on Population?" *Population and Environment* (May 2007). Yet Doug Moss, "What Birth Dearth?" *E—The Environmental Magazine* (November–December 2006), reminds us that there is still a large surplus of births—and therefore a growing population—in the less developed world. If we think globally, there is no shortage of people. However, many countries are so concerned about changing age distributions that they are trying to encourage larger—not smaller—families. See Robert Engelman, "Unnatural Increase? A Short History of Population Trends and Influences," *World Watch* (September/October 2008—a special issue on population issues), "Population and Sustainability," *Scientific American Earth 3.0* (Summer 2009), and his book *More: Population, Nature, and What Women Want* (Island Press, 2008). On the other hand, David E. Bloom, "7 Billion and Counting," *Science* (July 29, 2011), notes that "Despite alarmist predictions, historical increases in population have not been economically catastrophic. Moreover, changes in population age structure [providing for more workers] have opened the door to increased prosperity." Those who deny there is a problem are well represented by the Population Research Institute (www.pop.org) and the Alliance for Life Ministries (<http://www.alliance4lifemin.org/articles.php?id=80>).

Some people worry that a decline in population will not be good for human welfare. Michael Meyer, "Birth Dearth," *Newsweek* (September 27, 2004), argues that a shrinking population will mean that the economic growth that has meant constantly increasing standards of living must come to an end, government programs (from war to benefits for the poor and elderly) will no longer be affordable, a shrinking number of young people will have to support a growing elderly population, and despite some environmental benefits, quality of life will suffer. China is already feeling some of these effects; see Wang Feng, "China's Population Destiny: The Looming Crisis," *Current History* (September 2010), and Mara Hvistendahl, "Has China Outgrown the One-Child Policy?" *Science* (September 17, 2010). Julia Whitty, "The Last Taboo," *Mother Jones* (May–June 2010), argues that even though the topic of overpopulation has become unpopular, it is clear that we are already using the Earth's resources faster than they can be replenished and the only answer is to slow and eventually reverse population growth. Scott Victor Valentine, "Disarming the Population Bomb," *International Journal of Sustainable Development and World Ecology* (April 2010), calls for "a renewed international focus on managed population reduction as a key enabler of sustainable development." As things stand, the current size and continued growth of population threaten the United Nations' Millennium Development Goals (including alleviating global poverty, improving health, and protecting the environment; see <http://www.un.org/millenniumgoals/>); see Willard Cates, Jr., et al., "Family Planning and the Millennium Development Goals," *Science* (September 24, 2010). Zoe Schlanger and Elijah Wolfson, "Too Many People," *Newsweek Global* (December 26, 2014), note that there is enormous unmet demand for family planning services and contraception. Fred Magdoff, "Global Resource Depletion: Is Population the Problem?" *Annals of Earth* (Vol. 31, No. 1, 2013), notes that reducing the size of the human population can help reduce problems of resource depletion.

In the following selections, Sir David Attenborough argues that the environmental problems faced by the world are exacerbated by human numbers. Without population reduction, the problems will become ever more difficult—and ultimately impossible—to solve. Sean Lanahan argues that the world's agricultural system currently produces enough food for at least double the current world population. The "overpopulation" myth of "unsustainability" is a scare tactic designed to control the lives of individuals and justify dehumanizing acts such as abortion and euthanasia.

YES

David Attenborough

This Heaving Planet

Fifty years ago, on 29 April 1961, a group of far-sighted people in this country got together to warn the world of an impending disaster. Among them were a distinguished scientist, Sir Julian Huxley; a bird-loving painter, Peter Scott; an advertising executive, Guy Mountford; a powerful and astonishingly effective civil servant, Max Nicholson—and several others.

They were all, in addition to their individual professions, dedicated naturalists, fascinated by the natural world not just in this country but internationally. And they noticed what few others had done—that all over the world, charismatic animals that were once numerous were beginning to disappear.

The Arabian oryx, which once had been widespread all over the Arabian Peninsula, had been reduced to a few hundred. In Spain, there were only about 90 imperial eagles left. The Californian condor was down to about 60. In Hawaii, a goose that once lived in flocks on the lava fields around the great volcanoes had been reduced to 50. And the strange rhinoceros that lived in the dwindling forests of Java—to about 40. These were the most extreme examples. Wherever naturalists looked they found species of animals whose populations were falling rapidly. This planet was in danger of losing a significant number of its inhabitants, both animals and plants.

Something had to be done. And that group determined to do it. They would need scientific advice to discover the causes of these impending disasters and to devise ways of slowing them and, they hoped, of stopping them. They would have to raise awareness and understanding of people everywhere; and, like all such enterprises, they would need money to enable them to take practical action.

They set about raising all three. Since the problem was an international one, they based themselves not in Britain but in the heart of Europe, in Switzerland. They called the organisation that they created the World Wildlife Fund (WWF).

As well as the international committee, separate action groups would be needed in individual countries. A

few months after that inaugural meeting in Switzerland, Britain established one—and was the first country to do so.

The methods the WWF used to save these endangered species were several. Some, such as the Hawaiian goose and the oryx, were taken into captivity in zoos, bred up into a significant population and then taken back to their original home and released. Elsewhere—in Africa, for example—great areas of unspoiled country were set aside as national parks, where the animals could be protected from poachers and encroaching human settlement. In the Galápagos Islands and in the home of the mountain gorillas in Rwanda, ways were found of ensuring that local people who also had claims on the land where such animals lived were able to benefit financially by attracting visitors.

Ecotourism was born. The movement as a whole went from strength to strength. Twenty-four countries established their own WWF national appeals. Existing conservation bodies, of which there were a number in many parts of the world but which had been working largely in isolation, acquired new zest and international links. New ones were founded focusing on particular areas or particular species. The world awoke to conservation. Millions—billions—of dollars were raised. And now, 50 years on, conservationists who have worked so hard and with such foresight can justifiably congratulate themselves on having responded magnificently to the challenge.

Yet now, in spite of a great number of individual successes, the problem seems bigger than ever. True, thanks to the vigour and wisdom of conservationists, no major charismatic species has yet disappeared. Many are still trembling on the brink, but they are still hanging on. Today, however, overall there are more problems not fewer, more species at risk of extinction than ever before. Why?

Fifty years ago, when the WWF was founded, there were about three billion people on earth. Now there are almost seven billion—over twice as many—every one of them needing space. Space for their homes, space to grow their food (or to get others to grow it for them), space to build schools, roads and airfields. Where could that come from? A little might be taken from land occupied by other people but most of it could only come from the land

which, for millions of years, animals and plants had had to themselves—the natural world.

But the impact of these extra billions of people has spread even beyond the space they physically claimed. The spread of industrialisation has changed the chemical constituents of the atmosphere. The oceans that cover most of the surface of the planet have been polluted and increasingly acidified. The earth is warming. We now realise that the disasters that continue increasingly to afflict the natural world have one element that connects them all—the unprecedented increase in the number of human beings on the planet.

There have been prophets who have warned us of this impending disaster. One of the first was Thomas Malthus. His surname—Malthus—leads some to suppose that he was some continental European philosopher, a German perhaps. But he was not. He was an Englishman, born in Guildford, Surrey, in the middle of the 18th century. His most important book, *An Essay on the Principle of Population*, was published in 1798. In it, he argued that the human population would increase inexorably until it was halted by what he termed “misery and vice.” Today, for some reason, that prophecy seems to be largely ignored—or, at any rate, disregarded. It is true that he did not foresee the so-called Green Revolution (from the 1940s to the late 1970s), which greatly increased the amount of food that can be produced in any given area of arable land. And there may be other advances in our food producing skills that we ourselves still cannot foresee. But such advances only delay things. The fundamental truth that Malthus proclaimed remains the truth: there cannot be more people on this earth than can be fed.

Many people would like to deny that this is so. They would like to believe in that oxymoron “sustainable growth.”

Kenneth Boulding, President Kennedy’s environmental adviser 45 years ago, said something about this: “Anyone who believes in indefinite growth in anything physical, on a physically finite planet, is either mad—or an economist.”

The population of the world is now growing by nearly 80 million a year. One and a half million a week. A quarter of a million a day. Ten thousand an hour. In this country [UK] it is projected to grow by 10 million in the next 22 years. That is equivalent to ten more Birminghams.

All these people, in this country and worldwide, rich or poor, need and deserve food, water, energy and space. Will they be able to get it? I don’t know. I hope so. But the government’s chief scientist and the last president of the Royal Society have both referred to the approaching “perfect storm” of population growth, climate change and

peak oil production, leading inexorably to more and more insecurity in the supply of food, water and energy.

Consider food. For animals, hunger is a regular feature of their lives. The stoical desperation of the cheetah cubs whose mother failed in her last few attempts to kill prey for them, and who consequently face starvation, is very touching. But that happens to human beings, too. All of us who have travelled in poor countries have met people for whom hunger is a daily background ache in their lives. There are about a billion such people today—that is four times as many as the entire human population of this planet a mere 2,000 years ago, at the time of Christ.

You may be aware of the government’s Foresight project, *Global Food and Farming Futures*. It shows how hard it is to feed the seven billion of us alive today. It lists the many obstacles that are already making this harder to achieve—soil erosion, salinisation, the depletion of aquifers, over-grazing, the spread of plant diseases as a result of globalisation, the absurd growing of food crops to turn into biofuels to feed motor cars instead of people—and so on. So it underlines how desperately difficult it is going to be to feed a population that is projected to stabilise “in the range of eight to ten billion people by the year 2050.” It recommends the widest possible range of measures across all disciplines to tackle this. And it makes a number of eminently sensible recommendations, including a second green revolution.

But, surprisingly, there are some things that the project report does not say. It doesn’t state the obvious fact that it would be much easier to feed eight billion people than ten billion. Nor does it suggest that the measures to achieve such a number—such as family planning and the education and empowerment of women—should be a central part of any programme that aims to secure an adequate food supply for humanity. It doesn’t refer to the prescient statement 40 years ago by Norman Borlaug, the Nobel laureate and father of the first green revolution.

Borlaug produced new strains of high-yielding, short-strawed and disease-resistant wheat and in doing so saved many thousands of people in India, Pakistan, Africa and Mexico from starvation. But he warned us that all he had done was to give us a “breathing space” in which to stabilise our numbers. The government’s report anticipates that food prices may rise with oil prices, and makes it clear that this will affect poorest people worst and discusses various ways to help them. But it doesn’t mention what every mother subsisting on the equivalent of a dollar a day already knows—that her children would be better fed if there were four of them around the table instead of ten. These are strange omissions.

How can we ignore the chilling statistics on arable land? In 1960 there was more than one acre of good

cropland per person in the world—enough to sustain a reasonable European diet. Today, there is only half an acre each. In China, it is only a quarter of an acre, because of their dramatic problems of soil degradation.

Another impressive government report on biodiversity published this year, *Making Space for Nature in a Changing World*, is rather similar. It discusses all the rising pressures on wildlife in the UK—but it doesn't mention our growing population as being one of them—which is particularly odd when you consider that England is already the most densely populated country in Europe.

Most bizarre of all was a recent report by a royal commission on the environmental impact of demographic change in this country which denied that population size was a problem at all—as though 10 million extra people, more or less, would have no real impact. Of course it is not our only or even our main environmental problem but it is absurd to deny that, as a multiplier of all the others, it is a problem.

I suspect that you could read a score of reports by bodies concerned with global problems—and see that population is one of the drivers that underlies all of them—and yet find no reference to this obvious fact in any of them. Climate change tops the environmental agenda at present. We all know that every additional person will need to use some carbon energy, if only firewood for cooking, and will therefore create more carbon dioxide—though a rich person will produce vastly more than a poor one. Similarly, we can all see that every extra person is—or will be—an extra victim of climate change—though the poor will undoubtedly suffer more than the rich. Yet not a word of it appeared in the voluminous documents emerging from the Copenhagen and Cancún climate summits.

Why this strange silence? I meet no one who privately disagrees that population growth is a problem. No one—except flat-earthers—can deny that the planet is finite. We can all see it—in that beautiful picture of our earth taken by the Apollo mission. So why does hardly anyone say so publicly? There seems to be some bizarre taboo around the subject.

This taboo doesn't just inhibit politicians and civil servants who attend the big conferences. It even affects the environmental and developmental non-governmental organisations, the people who claim to care most passionately about a sustainable and prosperous future for our children.

Yet their silence implies that their admirable goals can be achieved regardless of how many people there are in the world or the UK, even though they all know that they can't.

I simply don't understand it. It is all getting too serious for such fastidious niceties. It remains an obvious and brutal fact that on a finite planet human population will quite definitely stop at some point. And that can only happen in one of two ways. It can happen sooner, by fewer human births—in a word, by contraception. That is the humane way, the powerful option that allows all of us to deal with the problem, if we collectively choose to do so. The alternative is an increased death rate—the way that all other creatures must suffer, through famine or disease or predation. That, translated into human terms, means famine or disease or war—over oil or water or food or minerals or grazing rights or just living space. There is, alas, no third alternative of indefinite growth.

The sooner we stabilise our numbers, the sooner we stop running up the “down” escalator. Stop population increase—stop the escalator—and we have some chance of reaching the top; that is to say, a decent life for all.

To do that requires several things. First and foremost, it needs a much wider understanding of the problem, and that will not happen while the taboo on discussing it retains such a powerful grip on the minds of so many worthy and intelligent people. Then it needs a change in our culture so that while everyone retains the right to have as many children as they like, they understand that having large families means compounding the problems their children and everyone else's children will face in the future.

It needs action by governments. In my view, all countries should develop a population policy—as many as 70 countries already have them in one form or another—and give it priority. The essential common factor is to make family planning and other reproductive health services freely available to every one, and empower and encourage them to use it—though without any kind of coercion.

According to the Global Footprint Network, there are already more than a hundred countries whose combination of numbers and affluence have already pushed them past the sustainable level. They include almost all developed countries. The UK is one of the worst. There the aim should be to reduce over time both the consumption of natural resources per person and the number of people—while, needless to say, using the best technology to help maintain living standards. It is tragic that the only current population policies in developed countries are, perversely, attempting to increase their birth rates in order to look after the growing number of old people. The notion of ever more old people needing ever more young people, who will in turn grow old and need even more young people, and so on ad infinitum, is an obvious ecological Ponzi scheme.

I am not an economist, nor a sociologist, nor a politician, and it is from their disciplines that answers must come. But I am a naturalist. Being one means that I know something of the factors that keep populations of different species of animals within bounds and what happens when they aren't.

I am aware that every pair of blue tits nesting in my garden is able to lay over 20 eggs a year but, as a result of predation or lack of food, only one or two will, at best, survive. I have watched lions ravage the hundreds of wildebeest fawns that are born each year on the plains of Africa. I have seen how increasing numbers of elephants can devastate their environment until, one year when the rains fail on the already over-grazed land, they die in hundreds.

But we are human beings. Because of our intelligence, and our ever-increasing skills and sophisticated technologies, we can avoid such brutalities. We have medicines that prevent our children from dying of disease. We have developed ways of growing increasing amounts of food. But we have removed the limiters that keep animal populations in check. So now our destiny is in our hands.

There is one glimmer of hope. Wherever women have the vote, wherever they are literate and have the medical facilities to control the number of children they bear, the birth rate falls. All those civilised conditions exist in the southern Indian state of Kerala. In India as a whole, the total fertility rate is 2.8 births per woman. In Kerala, it is 1.7 births per woman. In Thailand last year, it was 1.8 per woman, similar to that in Kerala. But compare that with the mainly Catholic Philippines, where it is 3.3.

Here and there, at last, there are signs of a recognition of the problem. Save the Children mentioned it in its last report. The Royal Society has assembled a working party of scientists across a wide range of disciplines who are examining the problem.

But what can each of us do? Well, there is just one thing that I would ask. Break the taboo, in private and

in public—as best you can, as you judge right. Until it is broken there is no hope of the action we need. Wherever and whenever we speak of the environment, we should add a few words to ensure that the population element is not ignored. If you are a member of a relevant NGO, invite them to acknowledge it.

If you belong to a church—and especially if you are a Catholic, because its doctrine on contraception is a major factor in this problem—suggest they consider the ethical issues involved. I see the Anglican bishops in Australia have dared to do so. If you have contacts in government, ask why the growth of our population, which affects every department, is as yet no one's responsibility. Big empty Australia has appointed a sustainable population minister, so why can't small crowded Britain?

The Hawaiian goose, the oryx, and the imperial eagle that sounded the environmental alarm 50 years ago were, you might say, the equivalent of canaries in coal mines—warnings of impending and even wider catastrophe.

Make a list of all the other environmental problems that now afflict us and our poor battered planet—the increase of greenhouse gases and consequential global warming, the acidification of the oceans and the collapse of fish stocks, the loss of rainforest, the spread of deserts, the shortage of arable land, the increase in violent weather, the growth of mega-cities, famine, migration patterns. The list goes on and on. But they all share one underlying cause. Every one of these global problems, social as well as environmental, becomes more difficult—and ultimately impossible—to solve with ever more people.

DAVID ATTENBOROUGH is a British naturalist and broadcaster who has produced numerous popular wildlife documentaries.





Sean Lanahan

Debunking the Over-Population Myth

Many in the world today . . . claim the world is on the brink of unsustainable failure due to our growing population. The entire population of seven billion people could take a nap inside the state of Connecticut. The same amount of people can live inside the state of Texas with the same population density of New York City, leaving the rest of the globe devoid of human life.

But that is not enough for most skeptics. They want to know about the impact of a growing population on food, water, air, waste, forests, oceans, animals, etc. Let's take a look at food. Is there enough? The earth is more than able to support not only seven billion souls, but up to two to four times as much with a little work and little impact to other life.

Most of the raw data that I use to prove my points are from official government sources such as the FAO (Food and Agriculture Organization of the United Nations) and USDA (United States Department of Agriculture).

Calculating Calories

Using the FAO world wide food production reports from 2010 and standard nutritional data, I have calculated the total calories produced by each food category, divided by seven billion people per year (Calories, Per Person, Per Year—C,PP,PY):

- Grains (corn, wheat, rice, etc.)—848,810
- Roots and tubers (potatoes, yams, carrots, etc.)—113,856
- Oils, pulses & nuts (olives, soybeans, peanuts, etc.)—302,586
- Fruits and vegetables (oranges, tomatoes, lettuce, etc.)—78,091
- Meat and eggs (chicken, beef, pork, etc.)—113,856
- Fish and seafood (salmon, clams, lobster, etc.)—21,496
- Dairy (milk, cheese, butter, etc.)—61,581
- Raw sugar (sugar cane, sugar beets, etc.)—121,483

Total of all calories produced by God's creation—1,661,460 calories, per person, per year or about 4,552 calories, per person, per day! Multiply by seven billion people and you have an approximate grand total of 11.63 quadrillion calories that were produced in the year 2010.

Considering an average healthy caloric intake of 2,000 calories per person per day (2000 calories $\times$ 365 days = 730,000) 730,000 calories are consumed per person, per year.

Generally men consume more than women. In 1971 American men consumed 2,450 calories per day, while women consumed 1,542, a combined average of 1,996 calories per day.

The earth produced 1,661,460 C,PP,PY minus an average consumption of 730,000 C,PP,PY = 855,519 extra calories, per person, per year. More than enough to sustain an additional population of seven billion for a total of 14 billion people!

Land Use

According to the FAO, there are 12.07 billion acres of agricultural land, all land capable of producing food. This includes arable land of 3.41 billion acres capable of producing temporary crops such as grains and vegetables. Permanent crop land of 375.8 million acres producing nuts and fruits in trees or vines. Pasture/meadow land of 8.28 billion acres providing for livestock foraging. Of the land above, only 769.8 million acres is irrigated. Most often irrigated lands can produce twice as much as non-irrigated. Total acreage of agricultural land per person equals 1.725 acres.

All things being equal, 1.725 acres of land produces 1,639,964 calories per year (calories per person, per year, minus calories from fish and seafood). This is well over twice as much land as needed per person with very little that is actually irrigated!

Where Do All the Calories Go?

A good chunk of the extra calories produced each year are consumed by the people of the planet. The average American diet in 1971 was about 2,000 calories a day. According to a survey in 2004, that average consumption has expanded to 2,247, over a 10% increase, and has likely increased even more eight years later. It's not just Americans that are eating more, but most of the world as well. From 1961 to 2003, the available (for consumption) calories per capita has risen from 2,254 to 2,809, over 24% increase in about four decades.

In that same four-decade span, the global population blossomed from three billion in 1961 to 6.3 billion in 2003, over double the population. At the same time, life expectancy rose from an average of 52.2 years in 1961 to 66 years in 2003, over 25% increase across the globe. Not only did the population more than double, but we lived longer and consumed even more calories over a lifetime. The Earth, along with our fruitful domination, creativity, our hard work and ingenuity, and God's blessed provision, has been able to produce more than enough. Because we have been created in God's likeness, we have the ability to do amazing and wonderful things.

Over-Abundance

We've actually created an over-abundance of food. So much so that hundreds of thousands of calories per person, per year (C,PP,PY) are lost or wasted every year.

Roughly 564,532 (34%) calories, per person, per year are lost or wasted through the activities of harvest, post harvest, processing, distribution, and consumption.

The developed world (Europe, North America and Industrial Asia) is very good at preventing losses from harvest to distribution, but is rather wasteful from retail to the dinner plate. The opposite is true for the under-developed world (Africa, Asia and Latin America). Often their largest losses occur from harvest to distribution, but they are very efficient at the consumption level. What is the reason?

The developed world has the equipment, infrastructure, and experience to efficiently move product from harvest to retail with relatively little loss. So much so that now it costs a relatively small portion of personal spending. Thus, what is not valuable to us is often taken for granted, the West has become picky, with little regard to throwing away food that is no longer "appetizing."

For example, for the past 80 years, the citizens of the USA have enjoyed a steadily shrinking food budget. From 1929 to 2010, food expenditures as a percentage of disposable income fell from 23.4% to 9.4%. At the same

time, the food demand from a burgeoning population has grown. Food production over the past 80 years has not only kept pace with demand, but surpassed it by a great amount. Though I appreciate Benjamin Franklin's quote "waste not, want not," I can't help but think that in today's over-abundance, the better term is actually "want not, waste much."

The under-developed world unfortunately does not have the equipment, infrastructure, and experience needed to efficiently move product from harvest to retail. Threshing grain by hand, for example, incurs greater losses than if done by machine. However, once the product reaches the store and the dinner plate, the under-developed world becomes very efficient in consumption. Food costs as a percentage of personal income are greater in the developed world, thus they value food more and waste little.

If it were possible for the developed world to consume more efficiently (the same as Sub-Saharan Africa), and the under-developed world were to use modern equipment, infrastructure, and experience (the same as North America and Europe), by my estimation food loss and waste could be reduced from 34% to 19.8%—a savings of about 235,213 C,PP,PY. Keep in mind that if the under-developed world were to use modern farming practices, not only would they preserve more food, but they would produce more as well.

For example, modern irrigation can increase wheat crop yields per acre from 32.8 bushels per acre to 71.4 bushels per acre, a 117% increase. At 60 lbs. of wheat per bushel, an extra 3,434,628 calories can be produced. This is enough to feed an extra 4.7 people, per acre, per year (at a 2,000 calorie diet per day) just by adding irrigation. Many may wonder why Africa is starving. The answer has nothing to do with the earth's ability to produce what they need. Rather, the cause is a ridiculous geo-political aberration surrounding faulty notions of "sustainability."

Feed People or Cars?

There is also a contingent of food produced and wasted that does not end up in a landfill, but actually makes it into your fuel tank. Vegetable cooking oil is now being recovered on a large scale in the West, chiefly used for bio-fuels, specifically . . . bio-diesel. Some corn, sugar beets, and sugar cane (not included in the food data above), is being grown for bio-fuels such as ethanol. Some agricultural lands that are used to grow fuel could produce food for human consumption instead. More calories would become available to feed more people instead of fueling cars and trucks.

Farming in Israel

From its founding, Israel's farming has been a monumental effort of self-preservation. They have literally had to cultivate hard, rocky soil in an arid climate to produce food for themselves. Over the past 60 years they have become extremely successful.

Wikipedia states: "Modern agriculture developed in the late nineteenth century, when Jews began settling in the land. They purchased land which was mostly semi-arid, although much had been rendered untillable by deforestation, soil erosion, and neglect. They set about clearing rocky fields, constructing terraces, draining swampland, reforestation, counteracting soil erosion, and washing salty land. Since independence in 1948, the total area under cultivation has increased from 408,000 acres (1,650 km²) to 1,070,000 acres (4,300 km²), while the number of agricultural communities has increased from 400 to 725. Agricultural production has expanded 16 times, three times more than population growth.

"Water shortage is a major problem. Rain falls between September and April, with an uneven distribution across the country, from 28 inches (70 cm) in the north to less than two inches (5 cm) in the south. Annual renewable water resources are about 5.6 billion cubic feet (160,000,000 m³), of which 75% . . . is used for agriculture. Most of Israel's fresh water sources have been consequently joined to the National Water Carrier . . . network of pumping stations, reservoirs, canals and pipelines which transfers water from the north to the south.

"The area of irrigated farmland has increased from 74,000 acres (30,000 ha) in 1948 to some 460,000 acres (190,000 ha) today. Israeli agricultural production rose 26% between 1999 and 2009, while the number of farmers dropped from 23,500 to 17,000. Farmers have also grown more with less water, using 12% less water to grow 26% more produce."

The population of Israel has increased from 1.25 million in 1950 to 7.48 million in 2012, a 500% increase. The otherwise "useless" land has been subdued and dominated to the point of not only producing enough food for its rapidly growing population, but also an abundance for export to the tune of 22% of production. Since 1948 they expanded the total area of cultivation from 408,000 acres to 1,070,000 acres (about 150% increase), while increasing production 16-fold. This is from what was once considered desolate wasteland (read Mark Twain) combined with some sweat equity and God's blessing.

New Technology

What about the deserts of the world? Consider the Seawater Greenhouse (seawatergreenhouse.com):

"A single Sahara Forest Project facility with 50 MW of concentrated solar power and 50 hectares of seawater greenhouses would produce 34,000 tons of produce, employ over 800 people, export 155 GWh of electricity and sequester more than 1,500 tons of CO₂ each year."

Let's project this amazing potential. The major hot arid deserts cover 15,577,000 sq.km. If but a meager 1% of that desert space was used to build these types of seawater greenhouses with the above specifications listed in the article:

- 311,540 facilities could be built (50 hectares apiece) 10.592360 billion tons of food could be produced per year (about three times as much as the current grain, tuber, root, fruit and vegetable harvest, equaling 3.580572593 billion tonnes per year) At a paltry 25¢ per pound, the value of that produce could bring \$5.29618 trillion dollars in sales.
- 48.2887 trillion kilowatt hours could be generated (at a better than fair price of 10¢ a kilowatt hour, \$4.82887 trillion dollars of revenue could be generated). And 249.232 million jobs could be created. These SWGs are not fantasy-land daydreams, many are already in existence and more are slated to come on line.

No Longer Doom and Gloom

At this point, your doom and gloom about the planet's prospects should be lifting slightly, maybe causing a half smile to form across your lips. There is more than enough room, food, water, trees and space for all our garbage. You've heard it said that "necessity is the mother of invention," God, man and the earth have not only met every demand from a burgeoning population but have exceeded them abundantly! It's true that the human family has exploded in growth over the past several decades, but as I have demonstrated, our ability to produce food has grown even more so, creating huge surpluses, bringing down the costs for food for all people.

Consider these calculations. If you were to take every single man, woman and child on the face of the planet (nearly seven billion precious souls to date) and make them lay down on the ground side by side and head to

toe, laying out an immense "human carpet," that "carpet" of human beings would not even cover the state of Connecticut.

Here's the math. This allows 18 square feet per individual ($3' \times 6'$). Granted, children would take up much less room, but they are a bit squirmy and don't sit still very well.

- 18 square feet times seven billion people equals 126 billion square feet.
- 27,878,400 square feet are inside one square mile.
- 126 billion square feet divided by 27,878,400 equals 4,519.63 square miles.

Connecticut is the 48th largest state at 5,544 square miles, only beating out Rhode Island and Delaware in size. That's right, the entire population of planet Earth can lay down and take a nap inside the state of Connecticut with some room to spare, leaving the remainder of the globe completely uninhabited.

"But all those people couldn't possibly live like that!" you exclaim. "Come on dude, get real!"

Okay, what if all of those seven billion inhabitants were to live in one big fully functional "mega city," the same size population density of New York City? They would fit inside the foot print of the state of Texas, again leaving the remainder of the globe completely devoid of human life.

Here's the math. The population of New York City is 8,175,133 and covers 303 square miles.

- 8,175,133 divided by 303 equals a population density of 26,980 persons per square mile.
- Seven billion people living at a population density of 26,980 per square mile would require a mega city, which encompasses 259,451 square miles.

The state of Texas sits on 268,580 square miles—more than enough room. But, I doubt them Texans would appreciate all them city slickers moving in on their turf.

The entire land mass on planet Earth (excluding Antarctica, and who would want to live there anyway?) is 52,208,738 square miles. Our fictitious "mega city," housing every single individual on planet Earth, some 259,451 square miles, would only take up 0.5% of the entire land mass. That's right, only half of one percent, leaving 99.5% of terra firma completely uninhabited.

Fortunately for most of us, we don't have to live in such relative "claustrophobic" conditions.

Unfortunately, a population control movement in the world today is seeking to scare the masses with the "over-population" myth of "unsustainability." A scare tactic used by them to control the lives of individuals and justify all kinds of dehumanizing acts, primarily abortion and euthanasia.

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