Are Malthus's Predicted 1798 Food Shortages Coming True? (Extended version)
It remains to be seen whether his famously gloomy prediction is truly wrong or merely postponed

By Jeffrey D. Sachs

In 1798 Thomas Robert Malthus famously predicted that short-term gains in living standards would inevitably be undermined as human population growth outstripped food production, and thereby drive living standards back toward subsistence. We were, he argued, condemned by the tendency of population to grow geometrically while food production would increase only arithmetically.

For 200 years, economists have contended that Malthus overlooked technological advancement, which would allow human beings to keep ahead of the population curve. The argument is that food production can indeed grow geometrically because production depends not only on land but also on know-how. With advances in seed breeding, soil nutrient replenishment (such as chemical fertilizers), irrigation, mechanization and more, the food supply can stay well ahead of the population curve. More generally, advances in technology in all its aspects—agriculture, energy, water use, manufacturing, disease control, information management, transport, communications—can keep production rising ahead of population.

Another factor undermining Malthus's argument, it would seem, is the demographic transition, according to which societies move from conditions of high fertility rates roughly offset by high mortality rates to conditions of low fertility rates together with low mortality rates. Malthus did not reckon with the advance of public health, family planning, and modern contraception, which together with urbanization and other trends, would result in a dramatic decline in fertility rates to low levels, even below the “replacement rate” of 2.1 children per household. Perhaps the human population would avoid the tendency towards geometric growth altogether.

These critiques of Malthusian pessimism have long seemed irresistible. Indeed, when I trained in economics, Malthusian reasoning was a target of mockery, held up by my professors as an example of a naïve forecast gone wildly wrong. After all, since Malthus's time, incomes per person averaged around the world have increased at least an order of magnitude according to economic historians, despite a population increase from around 800 million in 1798 to 6.7 billion today. Some economists have gone so far as to argue that high and rising populations have been a major cause of increased living standards, rather than an impediment. In that interpretation, the eightfold increase in population since 1798 has also raised the number of geniuses in similar proportion, and it is genius above all that propels global human advance. A large human population, so it is argued, is just what is needed to propel progress.

Yet the Malthusian specter is not truly banished—indeed far from it. Our increase in know-how has not only been about getting more outputs for the same inputs, but also about our ability to mine the Earth for more inputs. The first Industrial Revolution began with the use of fossil fuel, specifically coal, through Watt's steam engine. Humanity harnessed geological deposits of ancient solar energy, stored as coal, oil, and gas, to do our modern bidding. We learned to dig deeper for minerals, fish the oceans with larger nets, divert rivers with greater dams and canals, appropriate more habitats of other species and cut down forests with more powerful land-clearing equipment. In countless ways, we have not gotten more for less but rather more for more, as we've converted rich stores of natural capital into high flows of current consumption. Much of what we call “income,” in the true sense of adding value from economic activity, is actually depletion instead, or the running down of natural capital.

And although family planning and contraception have indeed secured a low fertility rate in most parts of the world, the overall fertility rate remains at 2.6, far above replacement. Sub-Saharan Africa, the poorest region of the world, still has a...
total fertility rate of 5.1 children per woman, and the global population continues to rise by about 79 million per year, with much of the increase in the world’s poorest places. According to the medium-fertility forecast of the United Nations Population Division we are on course for 9.2 billion people by mid-century.

If we indeed run out of inexpensive oil and fall short of food, deplete our fossil groundwater and destroy remaining rainforests, and gut the oceans and fill the atmosphere with greenhouse gases that tip the earth’s climate into a runaway hothouse with rising ocean levels, we might yet confirm the Malthusian curse. Yet none of this is inevitable. The idea that improved know-how and voluntary fertility reduction can sustain a high, indeed rising, level of incomes for the world remains correct, but only if future technology enables us to economize on natural capital rather than finding ever more clever ways to deplete it more cheaply and rapidly.

In the coming decades we will have to convert to solar power and safe nuclear power, both of which offer essentially unbounded energy supplies (compared with current energy use) if harnessed properly and with improved technologies and social controls. Know-how will have to be applied to long-mileage automobiles, water-efficient farming, and green buildings that cut down sharply on energy use. We will need to re-think modern diets and urban design to achieve healthier lifestyles that also cut down on energy-intensive consumption patterns. And we will have to help Africa and other regions to speed the demographic transition to replacement fertility levels, in order to stabilize the global population at around 8 billion.

There is nothing in such a sustainable scenario that violates the Earth’s resource constraints or energy availability. Yet we are definitely not yet on such a sustainable trajectory, and our current market signals do not lead us to such a path. We will need new policies to push markets in a sustainable manner (for example, taxes on carbon to reduce greenhouse gas emissions) and to promote technological advances in resource saving rather than resource mining. We will need a new politics to recognize the importance of a sustainable growth strategy and global cooperation to achieve it.

Have we beaten Malthus? After two centuries, we still do not really know.

*Note: This article was originally printed with the title, "The Specter of Malthus Returns".*

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