Will there ever be too many people on earth?

1st text

The theory of overpopulation according to Malthus

In 1798, English economist and social philosopher Thomas Robert Malthus formulated a theory on population growth in his work "Essay on the Principle of Population". Malthus observed in the American colonies that the population there doubled approximately every 25 years. However, if this kind of population growth is assumed (every 25 years: 1, 2, 4, 8, 16, 32, 64, 128, 256...), this would lead to such a large population in the foreseeable future that there would no longer be enough space and food for people on earth. According to Malthus' considerations, the growth of the population therefore inevitably reaches a natural limit.

Such rapid growth will only be possible if the available natural resources, especially food supply, grow at the same rate or are available indefinitely. Here, however, Malthus assumes that land is a fixed size and that crop yields cannot be improved as needed even with better cultivation methods. For this reason, he assumed that foodstuffs will only grow arithmetically (every 25 years: 1, 2, 4, 6, 8, 10, 12, 14, 16, 18...). However, this inevitably means that the population will no longer be able to feed themselves after a certain period of time.

As can be seen in the fictitious model calculation, the population will exceed food production for the first time in the 13th period (which means after approx. 312 years) – even if the initial level of food production in the model was already estimated to be one hundred times the population value.

Population growth and food production (model calculation according to Malthus)

25-year periods	Population	Food production
1	100	10,000
2	200	20,000
3	400	40,000
4	800	60,000
5	1,600	80,000
6	3,200	100,000
7	6,400	120,000
8	12,800	140,000
9	25,600	160,000
10	51,200	180,000
11	102,400	200,000
12	204,800	220,000
13	409,600	240,000

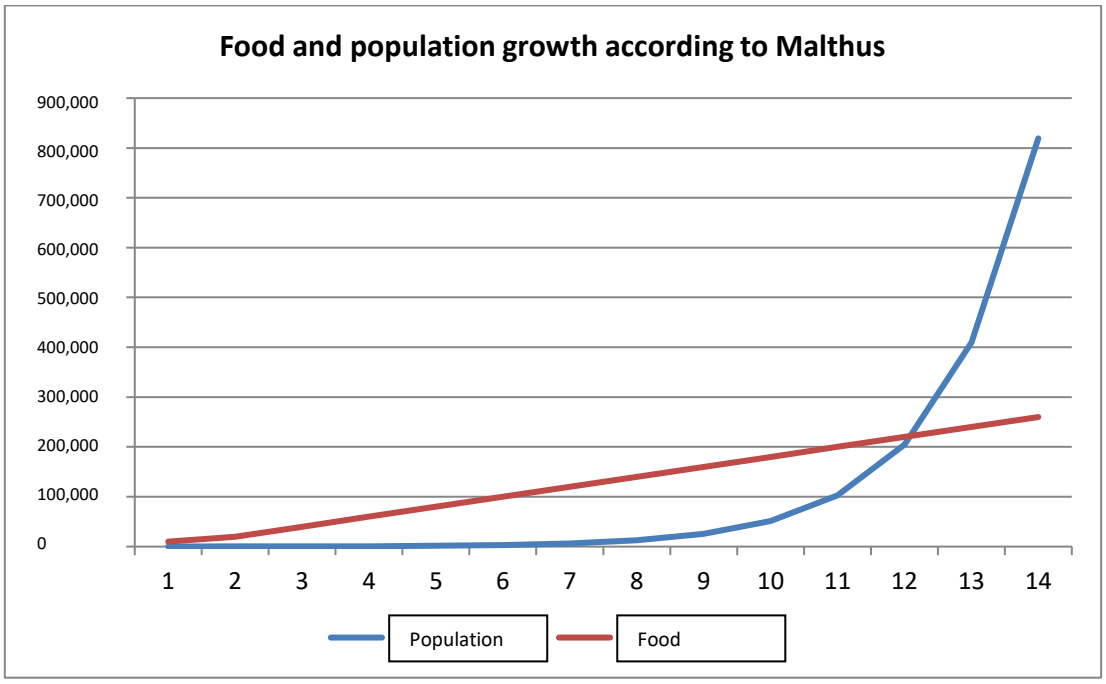

Photo credit: Dr Peter Kührt

2nd text

How fast is mankind really growing?

At the time of Christ's birth, there were less than 200 million people on earth. In 1650, it was 500 million, 1800 one billion, 1900 1.6 billion, in 1965 already 3.3 billion and in 2000 6 billion people. Today, in 2018, the world's population is estimated to be about 7.5 billion people.

At present, the population is growing by 2.62 people every second, by almost 10,000 per hour, 230,000 per day and by more than 80 million people per year – the latter is roughly equivalent to the population of Germany.

Experts are arguing over whether growth rates will continue to rise or fall. If the current growth was to continue, approximately 27 billion people would have to share the earth in 2100. However, recent estimates assume that population growth will be significantly reduced. Whereas the growth rate of mankind in the late Middle Ages was still 0.3 % p.a., by 1900 it had risen to approx. 0.8 % and by 1965 to 2 % p.a., which corresponds to the doubling of the world's population within 36 years. Only since then has the growth rate again declined. At present, it is approximately 1.2 % p.a., which means the world's population doubling within 60 years. If this trend persists, there will "only" be 10 to 16 billion people on earth in 2100 instead of 27 billion.

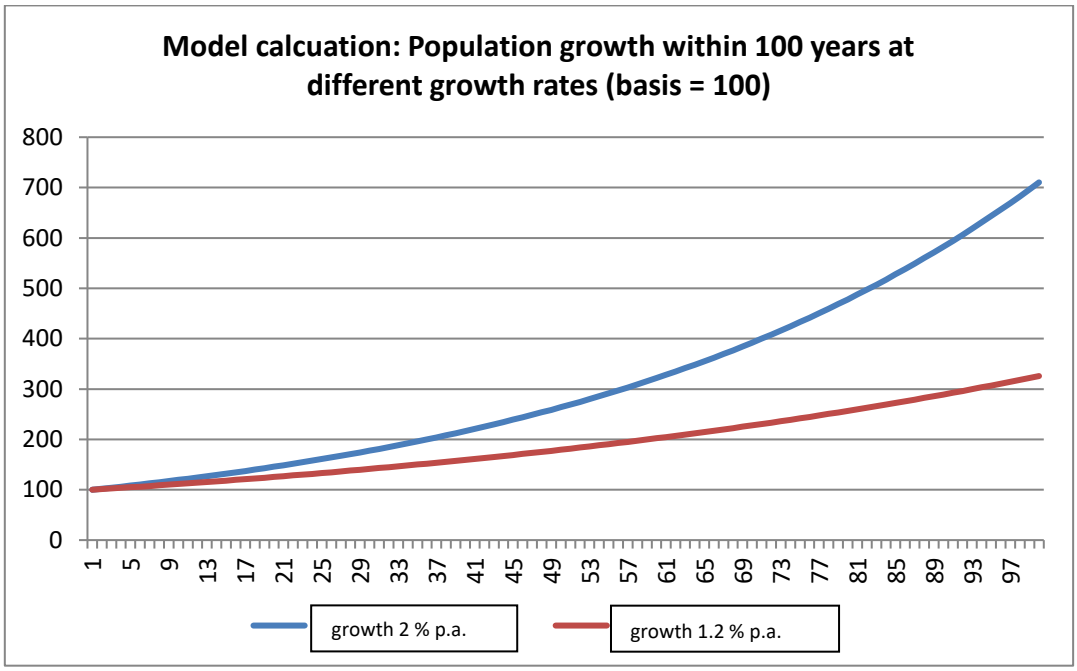

Photo credit: Dr Peter Kührt

3rd text

Africa: population growth is becoming a time bomb

The population in Africa continues to grow rapidly. Although the birth rate is falling, UN experts expect the number of people in Africa to double to 2.5 billion by 2050. By the year 2100, 40 percent of all people – about 4.5 billion – will live in Africa. One sixth of the world's population already live in Africa today. A sustainable lowering of the birth rate there will only be possible with more family planning, better education and a reduction of poverty.

Currently, most children per woman are born in the Republic of Niger: on average, a woman gives birth to 7.3 children there. The global average is two and a half children, but it has recently fallen considerably worldwide. In 1950, every woman had five children.

The world birth rate has therefore fallen significantly, but regional differences in population growth remain very large. In almost all of Africa, some countries on the Arabian Peninsula and in parts of Afghanistan, India and Pakistan, the population growth is much higher than in Europe or North America with an average of three or more children.

Population growth is greatest in the world's poor countries, despite a lack of resources, drought and poor hygienic conditions. In addition, the political situation is often volatile, ranging from war and displacement to corruption, which enriches the political elite and leads to the impoverishment of large sections of the population. Climate change aggravates this development. Two billion people already live in regions with insufficient water reserves. UN experts now expect more than 20 million climate refugees per year.

In addition, in developing countries alone, 90 million women and girls become unintentionally pregnant every year. The United Nations estimates that 43 percent of all pregnancies in developing countries are unplanned. This reveals significant differences in education levels. According to the 2017 World Population Report, poor girls will have three times as many children as rich ones in the course of their lives because they have less access to education and contraception.

More education and information are therefore likely to be the keys to reducing global population growth, especially as consistent contraception is not yet acceptable to the majority, mainly for religious reasons. Only China has attempted to implement a drastic birth control policy in the form of a one-child policy; it has now, however, abandoned this policy.

All hope lies in an increase in prosperity and individual education in order to protect humanity from the “time bomb” of population growth.

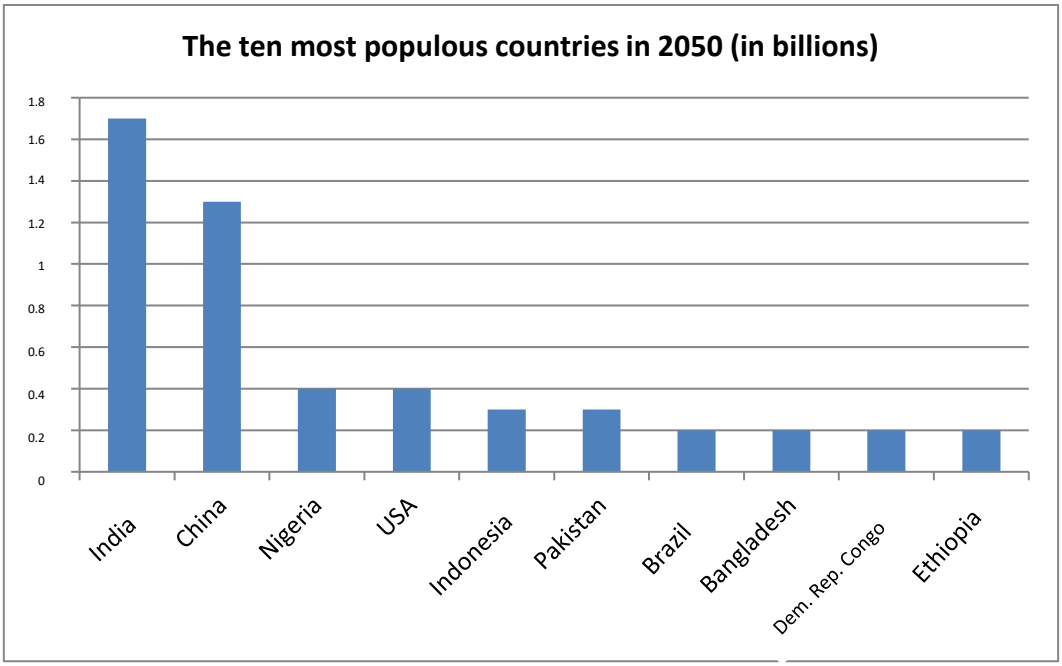

Photo credit: Dr Peter Kührt, according to forecasts by the United Nations Department of Economic and Social Affairs

Assignment: Issues facing humanity in the future

You are a team of young, critical scientists. You are now expected to form an opinion about issues facing humanity in the future.

Watch the video clip "The future (2014)" and answer the following questions in working groups. The results of the working groups will then be presented and compared in turn.

Video clip:

http://www.mediatheque.lindau-nobel.org/videos/34259/the-future

Exercises:

1. Nobel laureate Christian de Duve says: "If we let things go, we are doomed!" What does he mean by that?
2. What does Malthus' population theory indicate?
3. Why have Malthus' predictions not yet materialised?
4. Will there ever be a point in the future where there will be too many people on earth?
5. What could be done to reduce the current rapid increase in the world's population? Take a look at the theses of Nobel laureate Steven Chu and record your suggestions on a poster. The posters can then be presented in a vernissage.

