

3 Demography

The Health Explosion

Healthy Mankind no ecological Disaster

In 1798 Malthus' publication on population growth caused a huge stir. Since then the world population has grown six fold. But demographers and health experts – after a period of discomfort and anxiety in the sixties and seventies of the last century – seem to look at the future with trust. And the ecologists, can they relax? Will the eventual 8 till 9 billion people - who will live long and who have high expectations – over demand our good old planet? No, for affluence is exactly the key condition for decent planet management.

A bit more than 200 years ago Thomas Malthus published his "Essay on the principle of populations, as it affects the future improvement of society". He had become interested in demography because he was looking for proof(s) of the generally accepted idea that the population of the British Isles was decreasing. An unpleasant perspective for a nation that was busy constructing a world empire. To Malthus' surprise his results proved the contrary. Despite the high mortality rate of his time, he could not come to any other conclusion than that the British population had been on the increase since the 'Doomsday Book' of 1086. That growth had been achieved with ups and downs, but there really were many more people alive then in those days.

Instead of leaning back in his armchair and watching the expanse of the British Empire with confidence, Malthus got the shivers. Exactly because of the variations in the past he was convinced that a too large population growth would be inevitably punished by the 'Large Plagues'. Three of them we know from the prayer of the Medieval Man: "From hunger, war and plague, save us, Lord". If one of these three were present, the other two were also around. To complete the picture: the fourth Horseman of the Apocalypse, natural disasters, fits in well with the aforementioned three. In 1800 but also in 2005.



Enlarge this picture of the Four Horsemen by clicking on it (and after that click a second time)

Malthus stated that a population invariably has the tendency to grow beyond the means of (it's)existence. Subsequently the scythes of the large plagues mow down the surplus. Unless, of course, a solution is found in the form of expansion of arable land and innovation of agricultural methods. But, warns Malthus, when a population is passing through a number of doublings (1, 2, 4, 8, 16, etc.) the growth of the means of existence is only linear (1, 2, 3, 4, 5, etc.). Moreover, once all the land has been used it will impossible to squeeze more out of an acre than the maximum. It is as if one is reading the blackest pages of the First Report to the Club of Rome (1969).

Vicar Malthus knows that that it is exactly the very poor who tend to multiply in an uncontrolled way. But, says he, there is simply not a serving for everyone at the large table of Nature. Helping the poor is unadvisable; he who cannot maintain himself, will have to perish. The poor and the uneducated should only marry late or not at all, and they should show enormous will in the effort in restricting their number of children. Contraceptive devices are not allowed, for lust without burden is a sin in the view of moralist Malthus. With this rigid and reactionary attitude he is a representative of the conservative segment of the upper class. But luckily enough a large percentage of mankind do not obey their Popes and Ayatolla's.

Life expansion

Malthus is not to be blamed for his fixation on birth rates, when discussing demographic theory. Yet most people jump to these data whenever the subject of population growth is brought up, and then they point mainly in the direction of the third world. But the enormous increase in the number of humans in Europe from 1798, was first of all an increase in life expectancy, resulting in a steady decrease of mortality numbers. If such a phenomenon presents itself in all age groups, a population is able to grow very swiftly.

In the number of births there is not much difference to be seen, especially not in a situation where many women are anyhow already having a child per 1 till 1.5 year. Of course, in the long run the newly born that stay alive lead to more people that reach the fertile age, who are also going to have children. But the increase of then life expectancy is the most influential phenomenon of the population growth of the 19th and particularly the 20th century. That is why for instance China, despite it's one-child-policy, will have to go through a phase of 1.7 till 1.8 billion people before a decline in population can be possible (the aim of an endpoint of 0.6 billion in 2100, as decided at the 25th Party Congress, is unrealistic).

For some social classes, such as the well-to-do Dutch in the 17th century, that expansion of life expectancy was already quite pronounced. A State project of Life Insurances, as designed by our premier Johan de Witt, that was intended to render the State more money for the treasury, became thus a fiasco. For in his sophisticated calculations he had not noticed that the rich moneylenders were intending to live much longer than their forebears.

In the course of the 18th century we see in large parts of the population in many parts of Western Europe an increase in life years. How come? The medical world, that was then not yet scientifically based, cannot be the cause. And water supply and sewage systems have still to be invented. No, the steadily growing affluence and the associated improvement in diet and housing, plus more schooling, (hygienic) insights and information campaigns, are the elements that bring the quality of life on a higher level. Health is strongly associated with economical factors. In line with the concept of 'economic transition (Weber, Tawney), describing the development from 'closed local economy' to the world market, demographers have introduced the term 'demographic transition'.

This describes a population leaving the stage of 'high turn over' (many births, many deaths) to an end stage of a much larger number at a 'low turn over' (few births, few deaths). It is almost a law that first the life expectancy increases in all age classes, also in the group of 0-4 years old. Subsequently there is, with some exceptions, a decrease in birth rates after one till two generations. That decrease can be rather steep, like for instance from an average of 9 to 4 children per family in 50 years. In this example it can be the case that among those 9 only 3 became adult and that at the moment also 3 of those 4 will survive childhood. But they are a different 3: they will even have fewer children later on.

The population explosion

What pattern did the growth of the world population follow in the last centuries? The actual increase and the expected growth on the base of calculated access percentages are given for 4 years out of the last 350 years (table). The most important column is the third: the access rate. If that increases (so, if the acceleration augments) a very swift doubling of the population is possible. In 1650 demographers (who did not yet exist) might have expected that the 0.5 billion people of 1500 would have grown to 1 billion in 1900. But in that last year there were already 1.6 billion people. Because in the mean time the growth rate had increased and would stay doing so.

Again: the big increase in life expectancy in the course of the 20th century was the main cause of this. For the birth rates were on the decrease in that century, first in the developed, and later on also in the developing countries. It must be stated that many babies and young children didn't die, which can also be seen by the rise of the life span.

A doubling till 3.2 billion had to be expected in 140 years time from 1900, but in half that time, 70 years, there were already 3.6 billion people. It was as if Malthus' pessimism became reality. In the fore last row of the table we see that projecting from 1971 there would be in 2003 about 7.2 billion people on the planet. Fortunately, this has not become the reality. We have now just over 6.3 people. And, even better, the growth rate has declined and will carry on doing so!

The diminishing rates will prevent that we will pass the 10 billion mark in 2032. Around 1990 it was assessed that in the third quarter of the 21st century a level of about 12 billion people would be reached. At the moment demographers expect then not even 10 billion. It might be a plateau phase of 9 or even only 8 billion. Much depends on the AIDS epidemic. This can cause a negative difference of about half a billion. Let's now concentrate on the development of two rich Western countries and after that focus on three countries that are still in the midst of transitions.

The excellent Swedish population statistics show us how the demographic transition was already taking off in the mid eighteenth century, despite the hesitating economical growth. Two and half centuries later the transition has been nearly completed. The very high life expectancy is not really increasing any more, the number of children per family is low and mortality among children has virtually disappeared. This exceptional situation can only be maintained by a flourishing economy and extended (health) facilities.

In The Netherlands the demographic transition began much later. At the beginning of the 19th century an increase in the population size began. This had much to do with a lowering of the marriage age, a cultural phenomenon. There is a slow growth from 2.1 to 3 million around 1850. In that year life expectancy is over 36 for men and over 38 for women. Then follows an acceleration, that has to do with the start of the 'Industrial revolution' in this country around 1860 (a century after it's big neighbours) and the actual economic 'take off' from 1880. The more than 5 million Dutch of 1900 had stretched their life expectancy with about 20 years. And in the one hundred years since 1800 the mortality rate among the 0-4 years old had lowered from a quarter to an eighth. In the mean time the expected life span has been stretched with another 20 years, but this time it took double the time (100 instead of 50 years); at much higher costs per life year won. Nowadays a baby boy can look forward to more than 76 years and a baby girl to nearly 81 (the ultimate limit seems to be 88-90 years). The mortality among young children is negligible.

India, China and Saudi-Arabia

How are things in countries that are not part of the richest in the world or that only recently started their economic take off? During the rather ideologically coloured years of the 60's and 70's it was nearly a dogma that third world countries would go through a completely different development. The causes for that were not only cultural, religious and ideological differences, but firstly of all the imperialist and (neo)colonial exploitation by a group of 10-20 countries that had succeeded in building up an advantageous position in the last 200 years. This was at the cost of the rest of the world, which they still held in a suffocating embrace, denying it any possibilities of development.

There was no attention given to the inherent mechanisms of development that render changes from within – in any society – apart from the relations with other nations. It is indeed surprising to see that the old dream of sociology: the formulation of ‘laws’ of society (enabling predictions to some degree) seems – in this case – likely to be fulfilled.

China and India are interesting because they support more than a third of the world population. India has already more than a billion people and it is possible that it eventually will surpass China that counts now more than 1.3 billion inhabitants. For many India is a lively anthill and it is often stated that this is the result of a too high birth rate. But also here the phenomenon of an increasing life expectancy is the main growth factor. And stretching life's horizon is occurring at a crazy speed, compared with what has happened in Sweden and The Netherlands during the last 250 years. Doubling life expectancy took India only 50 years to achieve (compared with respectively 250 and 150 years in the aforementioned countries). In the last 25 years mortality among the 0-4 years old Indians had halved, an achievement that took the Netherlands 100 years (1800-1900).

The decline in the number of children per family is amazing. This is clearly demonstrated in the Indian state of Kerala in the South-West, which has a government leaning towards social democracy. Fixed prices for the 20 most basic consumer goods, good education (also for girls), and a low threshold health care, with proper attention for infants, have provided good faith for the future. And birth rates are decreasing steeply.

In China life expectancy has jumped forward. In the years between 1970 and 1995 the increase was even 12 years, a gain of half a year per year! This gives the impression that the ageing Chinese is living with a perpetually disappearing life horizon, but also here there is an end. The population is increasingly becoming confronted with diseases that are defined by the combination of age and affluence. Heart and vessel diseases, for instance, are rising, partly because of the fervent smoking of cigarettes which is leading to an inevitable epidemic of lung cancer and other miseries. Nevertheless the 1 till 2 children per family can expect a long life. But the care for the elderly will be a problem in a society where many are old and very few youngsters are around...

Saudi-Arabia has only seen (economic) transition in the last dozens of years. It landed with a giant jump into the twentieth century, with a fabulous budget, and that implied a development that is different from the basic scheme. In a scheme that normally shows a negative relation between family income and family size, irrespective of country or social class, all over the world. Saudi-Arabia, Oman, and the United Emirates form an exception because a high income is translated into large families. This is partly due to the minimal influence women have on procreation. But this will inevitably change in the future.

Health transition

We have seen that economic transition causes a demographic transition. But this was not an automatic one-to-one relation. The intermediary phenomenon was the 'health transition'. The increasing life expectancy of some countries in the 18th century was not yet related to a marked improvement of health care. Even the smallpox immunisation that started in that century and that was replaced after 1798 by the cowpox vaccination, had only a marginal effect. In epidemic years 10% of the mortality was determined by smallpox, but not every year was an epidemic year. On average only 5% of the mortality was due to smallpox. In the beginning of the 19th century it was proven in Berlin that vaccination indeed reduced the mortality by smallpox among children but not their overall mortality, since at least 20 other diseases were ready to take over the roll of the smallpox as a killing disease.

Here we meet the phenomenon of the dozens of competing and replacing diseases and causes of death that are always around. In those days especially for children and nowadays for the elderly. Fewer deaths from smallpox meant extra numbers of survivors who could catch diphtheria, meningitis, typhoid, cholera, or other mishaps, like work accidents and drowning. Until recently this still counted for children in Bangladesh or Angola. An isolated health improvement on just one single item is meaningless in a situation where one is embedded in health threatening factors. A situation that is mirrored at the end of the health transition: many old people have so many – often internal – health threats that the removal of one after a short while leads to the manifestation of another.

Multifactoral health increase

Nevertheless there is a successful approach: combining improvements on many fronts, as is demonstrated nowadays in many developing countries. Also here it is not exclusively better health care that does the job (however, in the last decades, massive vaccination campaigns have had a large influence). Health improves automatically when the family income grows and hence housing and diet can change for the better, also when the educational level of parents increases, particularly of the mother, and when more time is available to spend with the children.

All of this teaches us, in retrospect, how the health transition took place in the nineteenth and twentieth century in The Netherlands. Only after 1900 the then few doctors could begin to be effective; poor people hardly ever saw a doctor, often only at the end of their life. It is true that from 1860 on, engineers started constructing water supply and sewage systems, with the support of visionary doctors (together the professionals were 'Hygienists'). But statistics don't show a sudden jump forward after the introduction of these blessings. No, also in The Netherlands it was necessary to improve on many aspects in order to come to a fundamental increase in health level. More and more the insight is shared that the progress as described

for present day developing countries, that was steered by economic developments, also counts for The Netherlands in between, say, 1860 and 1940.

Hand in hand with the economical changes one sees formidable shifts in the fields of education, life style, insight in the causes and consequences of diseases, ways of raising children, etc. In The Netherlands there has been an interesting 'civilizing offensive' of ladies of the higher classes for their less fortunate sisters. Household schools, tuition pamphlets, courses, cookbooks, household bookkeeping, and more of this kind perhaps make people laugh nowadays. But it is exactly factors like these that have now such an enormous impact in developing countries.

Research has shown which is the most decisive in predicting the health status of a family and especially the children. That is not the income, the presence of latrines or water taps, or the number of rooms. The educational level of the mother decides whether children are instructed about hygiene, whether it is comprehended in time that a child is endangered by a disease, or whether the diet is as balanced as possible on a small income. Since moreover many economic activities are in the hands of women, there are dramatic changes ahead in developing countries, and for a large part for the better.

The international conferences in Cairo (demography) and Beijing (women) at the end of the nineties of the last century paid a lot of attention to the still limited influence of women in the fields of e.g. politics and reproduction. It is evident that most women with a good education and influence generally prefer to limit their families, so global emancipation will not lead to overpopulation.

No structural overpopulation?

Malthus warned about a situation that he hoped never would occur. It is indeed likely that this situation will not take place, due to exactly those changes that our vicar strongly opposed. The emancipation of the 'wretched of the earth' (for whom according to Malthus the table had not been laid) means a peaceful revolution and the only realistic perspective for an ecologically acceptable survival. Poverty renders backwardness, plunder, negligence, large families and an immense waste of human talents. So: long live prosperity and everything associated with it. "But", say the pessimists, "is a rather long period (e.g. 2060-2110), with for instance 10 billion people, not creating an irreversible destruction of the ecological basis of the planet?"

It depends. It is possible that - with 6 billion people - we are inflicting more damage to vulnerable ecosystems than in a future more than half a century from now with nearly a doubled world population. Reduction of damage implies that innovation in many fields is absolutely necessary. Less combustion emissions, more recycling of materials, energy

production using wind, sunlight, rivers and the surf of the sea, alternatives for the explosive increase of meat consumption, the creation of acceptable public traffic.

All these things are even more urgent since the larger world population will be different in composition from what we have been accustomed to. The average life expectation will be globally very soon nearer to 70 than to 60 years. Until recently at least half the world population were children aged 0-17 years. Quite soon three quarters of the people on earth will be adults and among them there will be a growing percentage of elderly. For them counts: "I'm old and I have the right to...". Children can often be satisfied with a little, but the developed adults of the future have high demands. An explosive increase in the consumption of goods and services is inevitable. The great challenge is not to wave these developments away but to face the problems with creativity and technical intelligence.