

Malthus revisited

The mother of all pollution is still human population, says S.Ananthanarayanan.

It is not power plants, not air travel or too many cars. It is not just larger energy demands, finally, it is the larger number of people making the demands that has tipped the balance and pushed the earth into what may be a spiral of warming.

Thomas Malthus



Back in the year 1800, the population of the world was still below 1 billion (It reached that figure in 1802. It is now approaching 7 billion). But in 1800, the population was low, machines and steam power had been discovered and there was only hope for the future, there was no reason to fear over-crowding. In fact, even the modern states of India and China did not really awaken to the problem of over-population till the late 20th century.

Still, Thomas Malthus (1766-1834), had the vision to see that population growth would one day outstrip the capacity of the earth to feed its occupants.

While Malthus also spoke of the tendency of scarce ‘means of subsistence’ to be cornered by the richer classes in a growing population, the basic work was that the addition to the population itself increased when the population increased. The increase in food supplies, on the other hand depended on farm inputs, etc and these tended to decrease, rather than increase as food production increased.

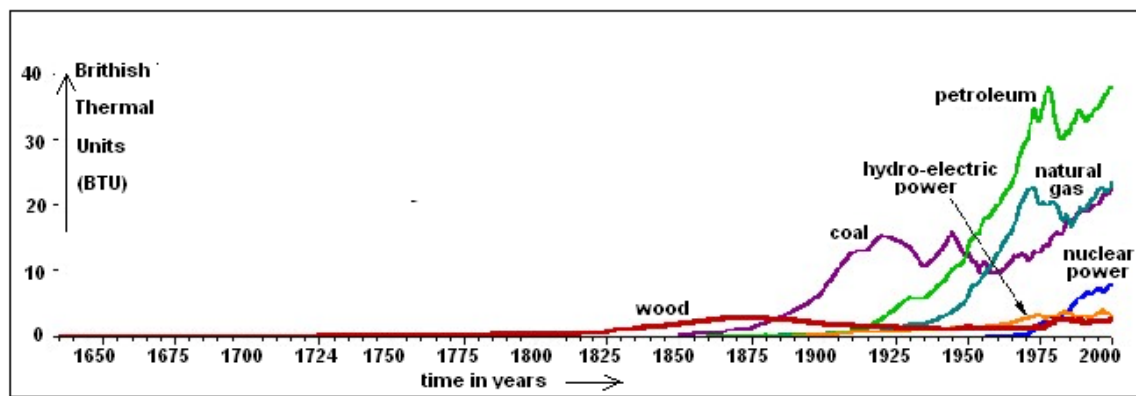
The dependence of the rate of increase on the population itself, as happens in *compound interest*, is called *exponential growth*. A handy rule to help calculations in exponential growth is the *rule of 70* – that the population will double in 70 years if the growth is 1% per annum, or in 35 years if the growth is 2% per annum, etc. Now suppose two persons (a husband and wife) were to have three children by the time they were forty years old – there is an increase (of reproductive people) from two to three, or 50 %, in forty years. This is growth of $50/40 = 1.25\%$ per annum. According to the rule of 70, this implies doubling of the population every $70/1.25=56$ years. This implies quadrupling in 112 years and is not far off from an increase of 7 times in 200 years, which has actually taken place, if we take into account the effect of disease, wars and the very approximate nature of our calculation.

Rate of production

The *Malthusian catastrophe* refers to the runaway increase in population, which would outstrip the means of production of food. The great power for increased production and distribution that the industrial revolution enabled was considered by many to be the answer to Malthus' grim prediction – that he had not counted for the ingenuity of mankind in increasing production to match demand.

The history of the world during the last 200 years has then been a drive to *prove Malthus wrong* – to produce so much and so well that all want is eliminated – and the so called improvements in the quality of life through travel, housing and heating of cities during the winter - all while the increase in population marched on.

The simple arithmetic of Malthus was probably answered by creating higher increases in production through technology and human effort, but what got left out of the reckoning was the capacity of the earth to sustain such unrestrained growth. The graph shows that the use of energy, particularly of coal and petroleum, the major sources, has increased dramatically since around the year 1800.



Global warming

The world is now coming to grips with what this has done to the environment – the increase in CO₂ in the atmosphere, rising temperatures, melting of polar ice – and all that follows. There is massive investment in 'green' technology, international protocols on containing emissions, public awareness programmes, but any reduction in the rate of emissions is not apparent.

The answer is clearly not in emission control alone. Even new, emission free technology in a few fields may not help if population keeps increasing. It seems there has to be a concerted population control strategy and the reduction of demands on the environment. Political and social devices need to be developed to restrain the urge of people with enough to eat to reproduce. Malthus had said that the tendency of populations is to increase. The demand now is to reverse this – to make the population shrink!

Even if some strategy or evangelism could make this happen, there would be demographic and political changes that would need managing too. The vast majority of the world's population is of young people. They would live a long time. If births were restrained while this continued, the work force would steadily grow older – with changes in requirements and capacity. Trade lines and frontiers would be altered. And this would be apart from the changes in topography and population distribution that the climatic changes would cause in the coming century.
