Corporate Sustainability and Population – old wine in new bottles?

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'Population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio. In the next twenty-five years, it is impossible to suppose that the produce could be quadrupled… in two thousand years the difference would be almost incalculable, though the produce in that time would have increased to an immense extent[2]*' [Thomas Malthus, 1798]*

'Per capita productive land now half the level of 1961….' [WWF Living planet report, 2010]

'If everyone in the world were to consume natural resources at the same rate as people in the UK, we would need three planets. Therefore, we need to learn fast how to live with the one planet that we have. But can we expect to live sustainably and comfortably without overspending our planet's capital resources? [TVE Earth Report, 2009?][3]

1. The issue

Corporations have embraced the call of 'sustainability' leaving its earlier manifestation as CSR (Corporate Social Responsibility) aside to some extent. The differences between the two concepts have been covered by the author elsewhere[4]. But, there is still a wide spread feeling that POPULATION is the problem – from poverty to climate change to lack of food to congestion to pollution, perhaps even the current recession?

Concerns with population growth running up against limited resources (food supplies at the time) started as long ago as Thomas Malthus some 210 years ago. Yet, we were wrong then, and we are still making the same poor assumptions despite vastly improved data since the earlier time. Unless, of course, there has been a seismic shift? Sometimes one wonders, when listening to the more extreme environmentalists, whether we would all be better off without any population at all? Clearly that is ridiculous and there are obviously problems caused by a growing population that would not be there with a constant population or even fewer people on the planet. Whatever the deniers of climate change say, we have all seen the increase in pollution around the world even though we have learned to deal with some of the more extreme versions – remember the London fogs? But, is population the real problem? Has there been a seismic shift since Malthus time?

On the negative side we see:

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[2] Thomas Malthus: An Essay on the Principle of Population, London, Printed for J. Johnson, in St. Paul's Church-Yard, 1798. http://www.esp.org/books/malthus/population/malthus.pdf

[3] http://www.tve.org/earthreport/archive/doc.cfm?aid=835 accessed Oct 21 2010

[4] http://www.mhcinternational.com/corporate-social-responsibility/publications/sustainable-development-from-words-to-action.html accessed Oct 31st 2010

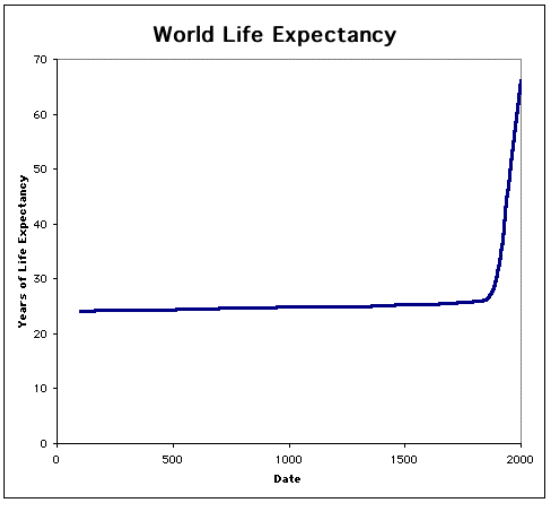
- Pressure on scarce resources
- Fewer natural resources such as fewer fish in the oceans
- Environmental degradation
- Unhappiness with inward migration
- Reduced bio-diversity
- Higher average temperatures
- Increasing carbon levels
- Worries about drinking water shortages

But, there are also positive aspects of increasing population growth such as:

- Increased economic effective demand
- Innovation
- A younger population to support the longer living aged
- The dynamism of inward migration
- Substitution between one natural resource for another

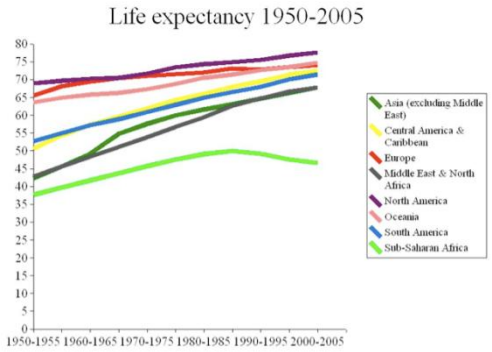
Let's have a look at the facts. It might surprise most people that the ultimate indicator of development – life expectancy at birth – is actually increasing. Further, ask yourself what you think the life expectancy is for the people on the planet on average – 30? 45? 60? No! Incredible as it might seem the average is sixty nine years! And, as Figure 1 shows, world life expectancy sharply increased in the latter part of the last two centuries.

Figure 1: World Life Expectancy at Birth



Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Source: Derived from male and female life expectancy at birth. Male and female life expectancy source: (1) United Nations Population Division. 2009. World Population Prospects: The 2008 Revision. New York, United Nations, Department of Economic and Social Affair, Catalog Sources World Development Indicators, World Bank, Washington DC http://data.worldbank.org/indicator/SP.DYN.LE00.IN?cid=GPD_10, accessed Nov 1st 2010

Figure 2: Life Expectancy across the world



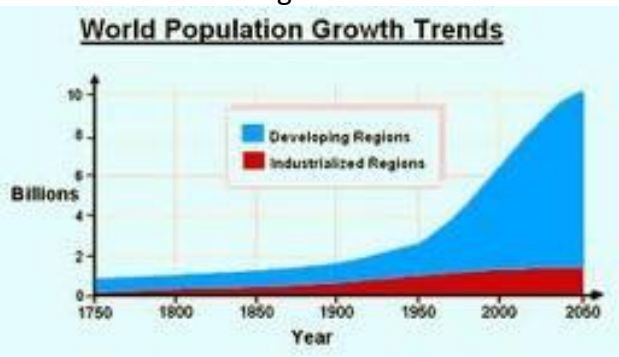
Source: Google Public Data

Figure 2 shows that life expectancy at birth gained in all regions with only sub-Saharan Africa suffering a downward blip largely due to HIV/AIDS and man-made policy stupidity – e.g. President Mbeki of South Africa who famously declared in 1999 that HIV was not the cause of AIDS! So, even though population continues to grow and resources continue to be used, something must be working since we are all living longer! That can only happen if sickness and poverty is reducing and we are all starting to live healthy lives. Of course, I am talking about averages and some areas of the world such as sub-Saharan Africa have life expectancies as low as 40 and probably countries such as Somalia (their last census was in the mid 1970s and even that data have been lost) will be around 30-35 years.

2. Do we need three planets?

The WWF has been one of the instigators – perhaps unknowingly - of the drive against rapid population growth with its insistence that if everyone in the world today had the same standard of living as the United Kingdom then we would need the equivalent of three planets to support that world. Clearly such an evocative view draws more people into the anti-population drive with potential (and actual) unsavory characteristics – especially when we see where the population growth is coming from (see Figure 3) – the developing nations.

Figure 3



Arguably, we may have always needed three planets to support everybody simply because the distribution of income has always been so bad and, in ancient times, lack of technology disallowed

widening the resource base. A static view of the world at any time would show poverty and the need for more resources to support them.

Malthus was worried even in his time that there would not be enough food around as population grew geometrically i.e. exponentially (he didn't know about such things as the demographic transition – see below - as data were very poor at that time) and food only arithmetically. But we know since his day that the rich get richer, and the poor are still with us – estimates vary from one sixth of the world population to as much as 50%. But, remember, in Malthus time in the 18 Century, life expectancy at birth for the UK was only around 35 compared with 80 years today.

Yet, the imaginative creators of the three planet story do have access to data unheard of in Malthus' time. But they still adopt Malthus' basic proposition and do not allow for substitution of products, human behavioral change (dictated by price rises) nor technological changes – all of which change future behavior including resource use. The basic work behind the three planet story comes from the new field of ecological footprint accounting[5] and is based upon six fundamental assumptions [my comments in brackets]:

i. The majority of the resources people consume and the wastes they generate can be quantified and tracked [these of course change as prices and technology changes]
ii. An important subset of these resource and waste flows can be measured in terms of the biologically productive area necessary to maintain flows. Resource and waste flows that cannot be measured are excluded from the assessment, leading to a systematic underestimate of humanity's true Ecological Footprint [but technological advances are not factored in]
iii. By weighting each area in proportion to its bioproductivity, different types of areas can be converted into the common unit of global hectares, hectares with world average bioproductivity[6].[bioproductivity is not a static concept and can increase as well as decrease]
iv. Because a single global hectare represents a single use, and each global hectare in any given year represents the same amount of bioproductivity, they can be added up to obtain an aggregate indicator of Ecological Footprint or biocapacity. [again assumes a static notion of production and heroic assumptions must be made]
v. Human demand, expressed as the Ecological Footprint, can be directly compared to nature's supply, biocapacity, when both are expressed in global hectares [ignores substitution when prices rise]
vi. Area demanded can exceed area supplied if demand on an ecosystem exceeds that ecosystems regenerative capacity [obviously so but trade has been the historical device for sharing around resources].

[5] Ewing B., A. Reed, A. Galli, J. Kitzes, and M. Wackernagel. 2010. *Calculation Methodology for the National Footprint Accounts, 2010 Edition.* Oakland: Global Footprint Network. P5

[6] A Bioproductive Footprint is the area required to provide the goods and services consumed by individuals, communities or organisations. It can also be derived for products or for particular activities. Using an 'area equivalence' expressed as 'global hectares', the Bioproductive Footprint expresses how much of nature's renewable bioproductive capacity (or 'interest') we are currently appropriating. If more of nature's interest is consumed than is available (i.e. nature's 'capital' is being reduced), then it is possible to assume that the rate of consumption is not sustainable http://www.baliparafoundation.com/bioproductive.html accessed Nov 1 2010

The ecological footprint of an individual is a measure of the amount of land required to provide for all their resource requirements plus[7] the amount of vegetated land required to sequester (absorb) all their CO2 emissions and the CO2 emissions embodied in the products they consume. This figure is expressed in units of 'global hectares'. '*The advantage of this approach is that it is possible to estimate the total amount of productive hectares available on the planet. Dividing this by the world's total population, one can then calculate a global per capita figure on the basis that everyone is entitled to the same amount of the planet's natural resources. Using the latest footprint methodology, resulting in the data in the Global Footprint Network's Ecological Footprint Atlas, the figure is 2.1 global hectares. This implies that a person using up to 2.1 global hectares is, in these terms at least, using their fair share of the world's resources – one-planet living*'[8]. One could note that the world's population is geometric and productive hectares are arithmetic – we have been here before as we see next!

3. The 3 planet argument and scenarios appear faulty

The Malthusian theory dominates WWF's latest Living Planet Report (lpr2010) report[9]. It states:

Ending ecological overshoot is essential in order to ensure the continued supply of ecosystem services and thus future human health, wealth and well-being. Using a new Footprint Scenario Calculator developed by the Global Footprint Network (GFN), this report presents various future scenarios based on different variables related to resource consumption, land use and productivity. Under a "business as usual" scenario, the outlook is serious: even with modest UN projections for population growth, consumption and climate change, by 2030 humanity will need the capacity of two Earths to absorb CO2 waste and keep up with natural resource consumption. Alternative scenarios based on different food consumption patterns and energy mixes illustrate immediate actions that could close the gap between Ecological Footprint and biocapacity — and also some of the dilemmas and decisions these entail.

A key concern of the WWF, as in Malthus' day, is whether *'..there be enough land for us to produce the food, feed and fuel for our needs in the future? And will there also be enough land available to conserve biodiversity and ecosystem services? '* They answer their own question with a quote from FAO who have estimated that *'..an increase of 70 per cent in food production is required to feed the future global population (FAO, 2009). It has concluded that there is enough land. Yet in order to reduce our reliance on fossil fuels we will also need to allocate significant areas of land and forests for biofuels and biomaterials'*.

WWF continues: '*Our work on the ground across the world has provided us with the insight that in reality there are likely to be many constraints to making more land available or to raising yields: land tenure rights for small communities and indigenous peoples, land ownership questions, a lack of infrastructure, and water availability are just some of the factors that will restrict the amount of land available for growing crops*.(p44 lpr 2010)

The WWF uses the Footprint Scenario Calculator described in the previous section to present various future scenarios based on different resource consumption, land use and productivity assumptions. Under a "business as usual" scenario, '*the outlook is serious: even with modest UN projections for population growth, consumption and climate change, by 2030 humanity will need the capacity of two*

[7] Arguably some productive land can also absorb emissions e.g. forests for timber production
[8] http://www.happyplanetindex.org/learn/calculating/global.html accessed Oct 22 2010
[9] http://assets.panda.org/downloads/lpr2010.pdf accessed 22 Oct 2010

Earths to absorb CO2 waste and keep up with natural resource consumption. Alternative scenarios based on different food consumption patterns and energy mixes illustrate immediate actions that could close the gap between Ecological Footprint and biocapacity — and also some of the dilemmas and decisions these entail.'

Footprint data between 1961 and 2007 are used for the baseline scenario to project the size of each footprint component in 2015, 2030 and 2050. The "business as usual" scenario is based on:
— A median population increase to 9.2 billion by 2050
— CO2 emissions and biofuel use increasing in line with increased population and economic growth
— Forest area continuing to follow the linear trends seen between 1950 and 2005
— Forest plantation and crop yields remaining constant
— World average daily calorie availability rising to 3130 kcal per person by 2050, an 11 per cent increase over the level in 2003.

They note that the number of calories is high as it represents food production, so includes both food eaten and food wasted. In addition, increases in atmospheric CO2 and methane concentrations associated with the scenarios in food and energy were combined with the estimates of the Intergovernmental Panel on Climate Change (IPCC) to give a projected warming under each scenario. This warming was then combined with a land suitability model (Global Agro-Ecological Zones – GAEZ) to predict changes in the area and suitability of land for growing crops.

They conclude that their model shows that, even with a very low carbon footprint, *if 9.2 billion people were to aspire to the equivalent of the diet of today's average Malaysian, we would still need 1.3 planets by 2050. This raises some serious consequences. Whilst we are using the atmosphere for our excess CO2 emissions, there is no "safety valve" for land. Even converting forests does not provide enough land to grow the food needed for an Italian diet. We need to make our existing land more productive.*

Unfortunately their 'model' was not described nor available in cited references. We can infer from the assumptions made above that simple changes could make the outcomes of the model and its scenarios give very different results. Such was the case with the systems dynamics model used in the 1970s by the "Limits to Growth' team that also proved faulty[10].

Apparently the Footprint Scenario Calculator, according to lpr2010, was first developed for the "Vision 2050" report by the World Business Council for Sustainable Development (WBCSD, 2010). In turn, the Vision 2050 report noted, in seeming contradiction to WWF's conclusions, that *'People are healthier and wealthier, basic needs are increasingly met, former least-developed countries begin to thrive in new trade regimes that benefit all. Education, healthy living and inclusion accelerate. There are sufficient jobs, and high levels of labor productivity through technological advances and skilled labor. Lifestyles that support "living well, within the limits of one planet" are more popular.* [Vision 2050 report]'

So, what are we to believe?

10 H. Cole *et al*, eds, *Thinking About the Future* (Ghatto and Windus/Sussex University Press, 1973)

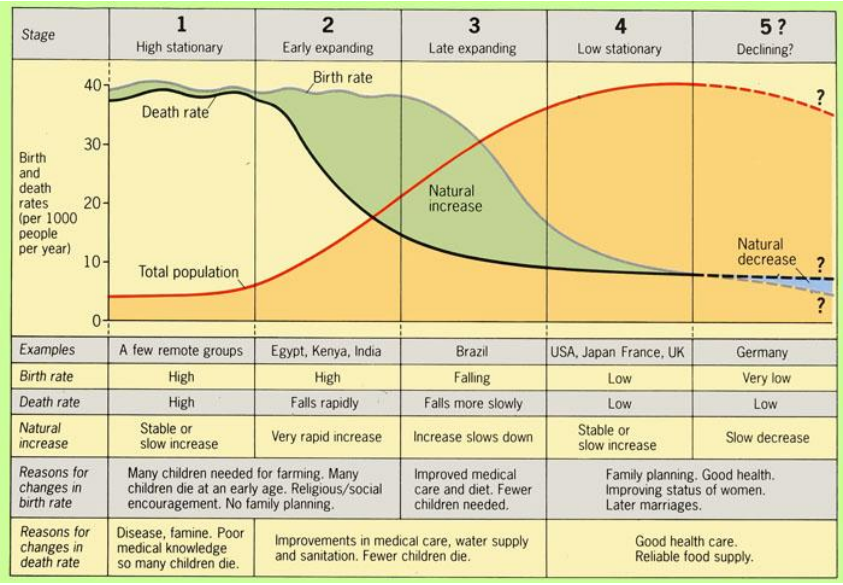
We saw from the introductory quote that Malthus believed that population, when unchecked, increases in a geometrical ratio. Subsistence increases only in an arithmetical ratio[11]. Malthus wrote '*By that law of our nature which makes food necessary to the life of man, the effects of these two unequal powers must be kept equal. … In the next twenty-five years, it is impossible to suppose that the produce could be quadrupled. It would be contrary to all our knowledge of the qualities of land.*

But Malthus, acting upon the limited data available to him at that time (he couldn't even know the population of his own country the UK) could not know many things that have since occurred. He lived at a time (see Figure 1 above) when many trends were unknown - technology, rise in life expectancy, population asymptoting because of the demographic transition (see Figure 4 below); nor had Keynes elaborated the idea - some 130 years later than Malthus - of effective demand that has proved so helpful in reducing unemployment.

To conclude this section, clearly humans *do* have an effect on the environment. But this has always been the case. The Stern report on the economics of climate change[12] was convincing in that small actions today could lead to big benefits in the future regarding climate change. Whatever we believe, the risk is too high to envisage anything but continuing to take the warnings seriously since, over and above population growth, climate change was something never envisaged by the ancient sages.

The issue, as always, is whether future generations will suffer because of actions today and, even more, are the actions today irreversible as some would have us believe? Before looking at one aspect of substitution, we must remember that *current* generations are suffering extremes of poverty with as many as half the world's population living on less than $US2 a day, and they already suffer the extremes foretold by our Malthusian soothsayers – desertification, pollution, lack of clean drinking water etc.

Figure 4: The demographic transition



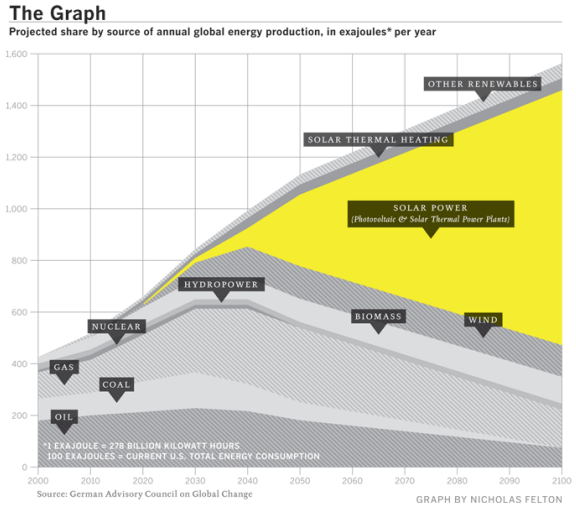
[11] Thomas Malthus: An Essay on the Principle of Population, London, Printed for J. Johnson, in St. Paul's Church-Yard, 1798. http://www.esp.org/books/malthus/population/malthus.pdf

[12] Nicholas Stern 'The Economics of Climate Change' Cabinet Office - HM Treasury Paperback ISBN: 780521700801 Publication date: January 2007

Source: http://hs-geography.ism-online.org/2010/09/07/the-demographic-transition-model/ accessed 29 Oct 2010

3. Substitution

There are a number of inter-related issues where products can be substituted. Two such areas are oil and water. Much has been made of peak oil (water) whereby at some future (quite near) date the amount of oil (water) in the world will start to reduce (the arithmetic argument) as the demand for oil (water) increases (the geometric argument). But, when oil (water) becomes scarce (remember its price is still less for a litre than a litre of milk) its price will rise and substitution will become economically more attractive as we see in the Graph below.



The key issue, of course, is that substitution takes time and cannot be immediately be relied upon. The alternatives for oil are clearly shown in the above graph, and there may well be others not thought of today or even too expensive. For water, there is the sea. But energy is required to extract drinking water from the sea. In the short-term we see that price signals cannot generate the longer-term investment required. What is required is far-sighted politicians who see the need for such investment. But we know that either price rises or far-sighted politicians always come too late for the investment required. For instance, *The Economist* reporting on a meeting of leading politicians on potentially disastrous climate effects on the Mediterranean and neighboring countries lifestyles noted[13] that:

There is no lack of ideas for ways in which the two shores of the sea could collaborate in producing and distributing green energy. The most ambitious is Desertec, an initiative backed by German firms that would see vast solar power plants built in north Africa at a cost of up to €400 billion ($US552 billion), with much of the electricity sent to Europe. But the potential backers of such projects are in shock after an abrupt change of tack by the Spanish government, which has slashed subsidies for windmills and solar panels. Italy is also scaling back incentives for solar energy, looking, like Spain, to trim its budget deficit. Nor is there any guarantee that north African countries with abundant fossil-fuel stocks will welcome big solar installations.

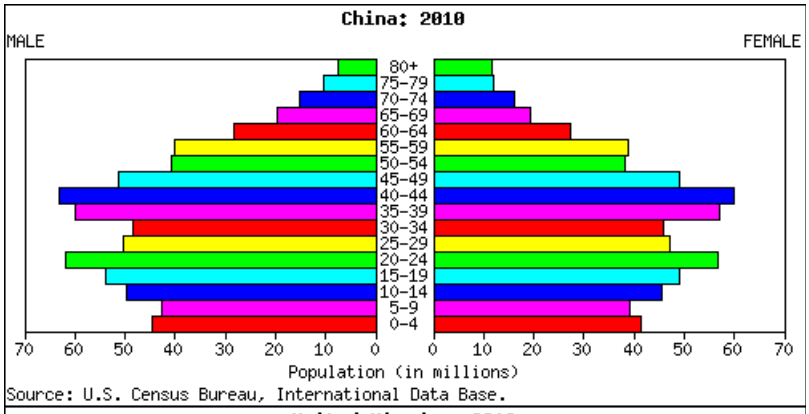
[13] http://www.economist.com/node/17363668?story_id=17363668 Climate change and the Mediterranean Saving our sea Cooling the climate in a hot region Oct 28th 2010 | ATHENS

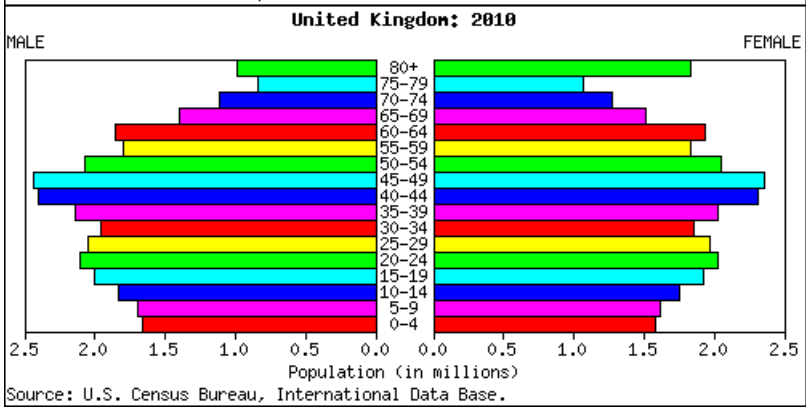
Given the cost of the Iraq war at several trillion dollars or even Obama's stimulus package of $US750bn, there are resources to finance the above. Consequently, the climate change-population-sustainability problem is one, not so much of comprehension but one of *politics!*

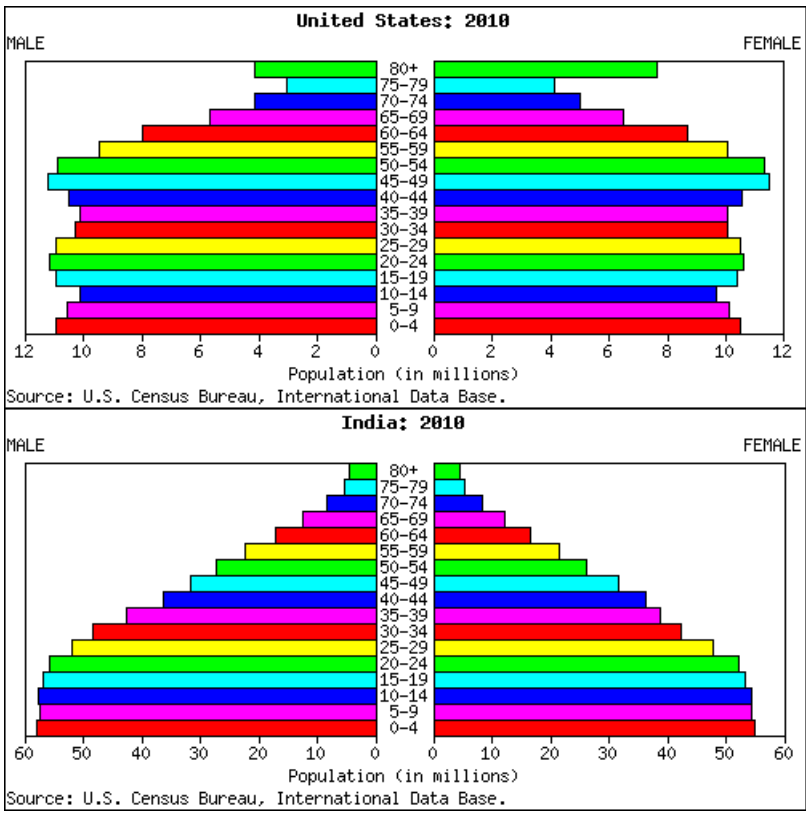
4. Current population issues

The path to deal with future problems seems bleak even though, if the above arguments are accepted, environmentalists, sustainability experts and the like do seem to have overstepped the mark by ignoring feedback mechanisms. Their advocacy is still required but it should focus on short term inaction versus longer term benefits.

As our charts show below, there is a population problem and that is one of aging and migration. In the four charts below of the population pyramids in China, UK, USA and India – only India has a young population. The young active population, at least until 65years of age (today's 65 is yesterday's 45), are required to support the steadily aging population. The increasing refusal to accept or tolerate immigrants is another area where the aging countries are causing future problems for themselves. Politics again!







5. Final remarks

There are concerns that we are running out of resources, that we shall need three planets to service the world's population at current levels of population growth and resource consumption. In short, the present path of the planet is unsustainable. These are not new concerns as I showed by citing the concerns of Thomas Malthus several centuries ago. In one sense we have already ran out of resources for the poor of the world. Future projections imply that we, the rich of the world, will also suffer in the future. But, as shown in this paper the projections can be challenged.

Either way, therefore, the argument for change in our behavior is convincing. Without change we, the rich, *may* suffer. With change we, the rich, will *not* suffer. Consequently, and taking a leaf out of the Stern conclusions, better to act now with small changes to save the potential future catastrophe. But let's act upon better models of what is required that take account of substitution and technological change and less on Malthusian scare stories.