The environmental Litany and data

By Bjørn Lomborg, Ph.D., associate professor at the Department of Political Science, University of Aarhus, Denmark

Pls. Note that this is a first (un-edited) version, with references.

We are all familiar with the Litany of our ever deteriorating environment.[1] This is incessantly repeated doomsday message from the media, as when *Time* magazine tell us how "everyone knows the planet is in bad shape,"[2] and when *New Scientist* title their environmental overview with "Selfdestruct."[3]

The general message of the Litany is that the environment is in poor shape here on Earth.[4] Our resources are running out. The population is ever growing, leaving less and less to eat. The air and the water are becoming ever more polluted. The planet's species are becoming extinct is vast numbers – we kill off more than 40,000 each year. The forests are disappearing, fish stocks are collapsing and the coral reefs are dying.

We are defiling our Earth, the fertile topsoil is disappearing, we are paving over nature, destroying the wilderness, decimating the biosphere, and will end up killing ourselves in the process. The world's ecosystem is breaking down. We are fast approaching the absolute limit of viability, and the limits of growth are becoming apparent.[5]

We know the Litany and have heard it so often that yet another repetition is, well, almost reassuring. There is, however, one problem: it does not seem to be backed up by the available evidence.

This is what we will look at throughout this series of articles.[6] We are not running out of energy or natural resources. There will be more and more food per head of the world's population. Fewer and fewer people are starving. In 1900 we lived for an average of 30 years; today we live for 67.[7] According to the UN we have reduced poverty more in the last 50 years than we did in the preceding 500, and it has been reduced in practically every country.[8]

Global warming, though its size and future projections are rather unrealistically pessimistic, is probably taking place, but the typical cure of early and radical fossil fuel cutbacks is way worse than the original affliction, and moreover its total impact will not pose a devastating problem for our future. Nor will we lose 25-50 percent of all species in our lifetime – in fact we are losing probably 0.7 percent. Acid rain does not kill the forests, and the air and water around us are becoming less and less polluted (see sidebar).

Mankind's lot has actually improved in terms of practically every measurable indicator. But note carefully what I am saying here: that by far the majority of indicators show that mankind's lot as *vastly improved*. This does not, however, mean that everything is *good enough*. The first statement refers to what the world looks like whereas the second refers to what it ought to look like.

Take starvation and the population explosion, which has caused so much worry. In 1968, one of the leading environmentalists, Dr Erlich predicted in his best-selling book, "The Population Bomb", that "the battle to feed humanity is over. In the course of the 1970s the world will experience starvation of tragic proportions-hundreds of millions of people will starve to death."[9]

That did not happen. Instead, according to the United Nations, agricultural production in the developing world has increased by 52% per person.[10] The daily food intake in developing countries has increased from 1,932 calories, barely enough for survival, in 1961 to 2,650 calories in 1998, and is expected to rise to 3,020 by 2030 (see chart). Likewise, the proportion of malnourished people in these countries has dropped from 45% in 1949 to

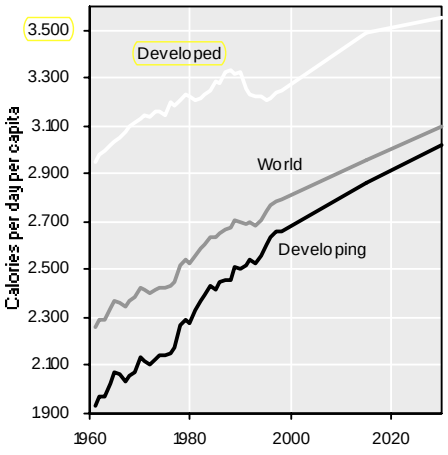

Figure 1 Daily intake of calories per capita in the industrial and developing countries and world. Forecast from 1998. Source: FAO 2000d:23, 2001a.

18% today, and is expected to decline even further to 12% in 2010 and just 6% in 2030.[11] Food, in other words, is becoming not scarcer but ever more abundant. This is reflected in its price. Since 1800 food prices have decreased by more than 90%, and in 2000,[12] according to the World Bank, prices were lower than ever before.[13]

Dr Erlich's prediction echoed that made 170 years earlier by Thomas Malthus. Malthus claimed that, if unchecked, human population would expand exponentially, while food production could increase only linearly, by bringing new land into cultivation. He was wrong. Population growth has turned out to have an internal check: as people grow richer and healthier, they have smaller families. Indeed, the growth rate of the human population reached its peak, of more than 2% a year, in the early 1960s. The rate of increase has been declining ever since. It is now 1.26%, and is expected to fall to 0.46% in 2050.[14] The United Nations estimates that most of the world's population growth will be over by 2100, with the population stabilising at just below 11 billion.[15]

Malthus also failed to take account of developments in agricultural technology. These have squeezed ever more food out of each hectare of land. It is this application of human ingenuity that has boosted food production, not merely in line with, but ahead of, population growth. It has also, incidentally, reduced the need to take new land into cultivation, thus reducing the pressure on biodiversity.

The issues on food, population and air pollution covered here, and the following issues on resource scarcity, biodiversity and global warming all contradict the Litany. Yet opinion polls suggest that many people, in the rich world, at least, nurture the belief that environmental standards are declining.[16] Four factors cause this disjunction between perception and reality.

One is the lopsidedness built into scientific research. Scientific funding goes mainly to areas with many problems. That may be wise policy, but it will also create and impression that many more potential problems exist than is the case.

A second source of misperception is the self-interest of environmental groups. Though these groups are run overwhelmingly by selfless folk, they nevertheless share many of the characteristics of other lobby groups. They need to be noticed by the mass media. They also need to keep the money that sustains them rolling in. The temptation to exaggerate is surely there, and sometimes, it is indulged in. In 1997, for example, the Worldwide Fund for Nature issued a press release entitled "Two-thirds of the world's forests lost forever".[17] The truth turned out to be nearer 20%.[18]

That would matter less if people applied the same degree of scepticism to environmental lobbying as they do to lobby groups in other fields. Yet a trade organisation arguing for, say, weaker pollution controls is instantly seen as self-interested. A green organisation opposing such a weakening is seen as altruistic, even if a dispassionate view of the controls in question might suggest they are doing more harm than good.

A third source of confusion is the attitude of the media. People are clearly more curious about bad news than good. Newspapers and broadcasters are there to provide what the public wants. That, however, can lead to significant distortions of perception. An example was America's encounter with El Niño in 1997 and 1998. This climatic phenomenon was accused of everything from wrecking tourism,[19] causing more allergies,[20] melting the ski-slopes,[21] and yet dumping snow in Ohio, causing 22deaths.[22] Perhaps the most surprising statement was Disney's accusation that El Niño had caused its shares to fall.[23]

A more balanced view comes from a recent article in the *Bulletin of the American Meteorological Society*.[24] This tries to count up both the problems and the benefits from the 1997-98 Niño. The damage it did was estimated at $4 billion. However, the benefits amounted to some $19 billion. These came from higher winter temperatures (which saved an estimated 850 lives, reduced heating costs and diminished spring floods caused by meltwaters), and from the well-documented connection between past Niños and fewer Atlantic hurricanes. In 1998, America experienced no big Atlantic hurricanes and thus avoided huge losses. These benefits were not reported as widely as the losses.

The fourth factor is poor individual perception. People worry that the endless rise in the amount of stuff everyone throws away will cause the world to run out of places to dispose of waste. Yet, even if the UK waste production increases at the same rate as the US (surely an overestimate, since the UK population does not increase with nearly the same speed), the total landfill area needed for the twenty-first-century UK waste would be a meagre square, 100 feet tall and 8 miles on the side – an area equivalent to 28 percent of the Isle of Man.[25]

Knowing the real state of the world is important, because fear of largely imaginary environmental problems can divert political energy from dealing with real ones. The Harvard University Center for

Risk Analysis has carried out the world's largest survey of the costs of life-saving public initiatives.[26] Only initiatives that have as the primary stated political goal to save human lives are included. Thus, the many environmental interventions which have little or no intention to save human lives are not considered here. We only compare those environmental interventions whose primary goal it is save human lives (as in toxin control) with life-saving interventions from other areas. In total, 587 different initiatives were analyzed, and in the chart we see the typical prices in the various areas, as shown in the chart. Here it is quite obvious that there are tremendous differences in the price to be paid for extra life-years by means of typical interventions: the health service is quite low-priced at $19,000, and the environment field stands out with a staggeringly high cost of $4.2 million.

The advantage of this method of accounting is that it is possible to see the overall effectiveness of the American public effort to save human life. Information exists about the actual cost of 185 programs that account for the annual spending of $21.4 billion which saves around 592,000 life-years. However, had the spending been used to save the most lives, the Harvard study shows that 1,230,000 life-years could have been saved for the same money.[27] *Without further costs it would have been possible to save around 600,000 more life-years or 60,000 more human lives*.[28]

When we fear for our environment, we seem easily to fall victim to short-term feel-good solutions that spends money on relatively trifling issues and thus hold back resources from far more important ones. When we realize we can forget about imminent breakdown, we can see the world is basically headed in the right direction and that we can help to steer this development process by focusing on and insisting on reasonable prioritisation. When the Harvard study shows that we forgo saving 60,000 lives every year, this shows us the cost we pay for worrying about the wrong problems – too much for the environment and too little in other areas.

This does not mean that rational environmental management and environmental investment is not often a good idea – only that we should compare the costs and benefits of such investments to similar investments in all the other important areas of human endeavour. And to ensure that sensible, political prioritisation we need to abandon our ingrained belief in a mythical Litany and start focusing on the facts – that the world is indeed getting better, though there is still much to do.

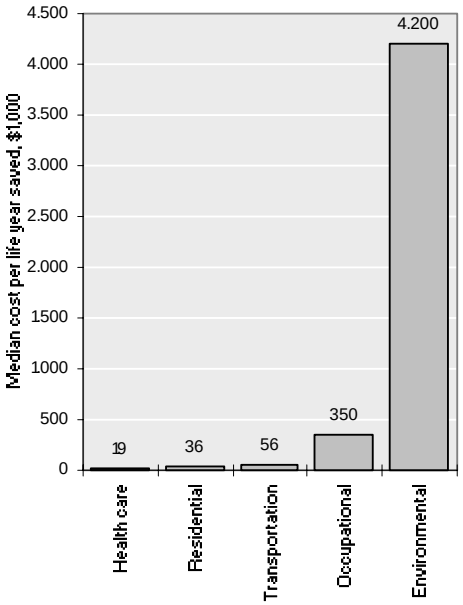

Figure 2 Median cost per life-year saved for different sectors of society in 1993$. Number of interventions for each sector is 310, 30, 87, 36, and 124 respectively. Source: Tengs et al. 1995:371.

Air pollution

Of all the different types of pollution affecting human health, by far the most important is air pollution. Of all the major US EPA statute areas (air, water, pesticides, conservation, drinking water, toxic control, liability) and even by the agency's own reckoning, 86-96 percent of all social benefits stem from the regulation of air pollution.[29]

We often assume that air pollution is a modern phenomenon, and that it has got worse in recent times. However, air pollution has actually been a major nuisance for most of civilization, and actually, the air of the Western world has not been as clean as it is now for a long time. In ancient Rome, the statesman Seneca complained about "the stink, soot and heavy air" in the city.[30] In 1257, when the Queen of England visited Nottingham, she found the stench of smoke from coal burning so intolerable that she left for fear of her life,[31] and in 1285, London's air was so polluted that King Edward I established the world's first air pollution commission. The poet Shelley wrote: "Hell must be much like London, a smoky and populous city."[32]

For London, the air pollution consequences were dire. Whereas throughout the eighteenth century London was foggy 20 days a year, this had increased to almost 60 days by the end of the nineteenth

century.[33] Not surprisingly this meant that London got 40 percent less sunshine than the surrounding towns.[34] Equally, thunderstorms had doubled in London from the early eighteenth to the late nineteenth century.[35]

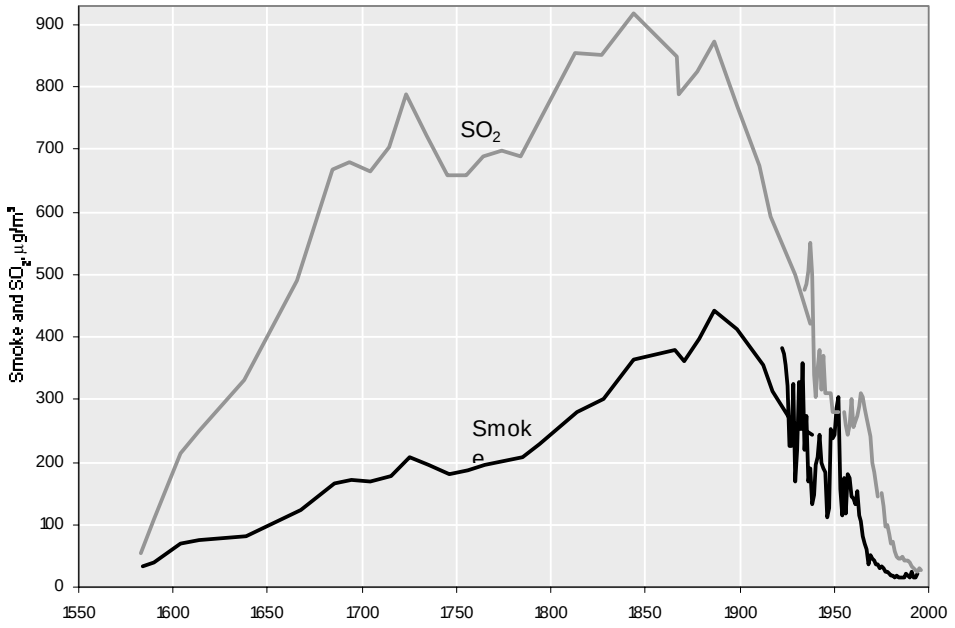

Figure 3 Average concentrations of SO_2 and smoke in London, 1585-1994/95. Data from 1585-1935 are estimated from coal imports and have been adjusted to the average of the measured data. Source: Brimblecombe 1977:1161, Elsom 1995:477, QUARG 1996:75, EPAQS 1995:Figure 3, Laxen & Thompson 1987:106, OECD 1985a:28, 1987:31, 1999:57.

We have data for the air pollution in London back from 1585, estimated from coal imports till 1935 and adjusted to measured pollution form the 1920s till today (see chart). This shows how levels of both smoke and sulphur pollution increased dramatically over the 300 years from 1585, reaching a maximum in the late nineteenth century, only to have dropped even faster ever since, such that the levels of the 1980s–1990s are *below* the levels of the late sixteenth century. And despite increasing traffic, particulate emissions are actually expected to decrease over the next ten years by 30 percent in the UK.[36]

Smoke or particles are probably by far the most dangerous pollutant – the latest US EPA report on air pollution estimated almost entirely deaths from particulate pollution.[37] Thus, with respect to the worst pollutant the London air has not been as clean as it is today since the Middle Ages. Almost all of the modern period has been *more* polluted with smoke than it is today.

Generally, the data indicates that this picture holds true for all developed countries. Although air pollution is increasing in many developing countries, analyses show that they are merely replicating the development of the industrialised countries. When they grow sufficiently rich they, too, will start to reduce their air pollution.

The mortality linked to previous levels of air pollution has been massive. Yet, even with the drastic reduction in particulate pollution, the current and historically low level still costs many human lives: in the UK, the number of excess deaths from particle pollution today can be estimated at about 64,000,[38] which is a much higher number than the deaths from road accidents, costing 3,581 lives in 1998.[39] Thus, cutting particle pollution even further would actually make good sense – and especially for diesel cars, which only make up 6 percent of the total car park but contributes 92 percent of all vehicle particle emissions.[40]

Thus, carefully analyzing the data on air pollution shows us both where our preconceptions are wrong (not a new phenomena getting worse, but an old phenomena getting ever better) and allowing us to focus on the most important areas still to make progress (particle pollution from diesel cars).

---

[1] The term "the Litany" as well as the following description is from Regis (1997).

[2] Hertsgaard 2000.

[3] New Scientist 2001.

[4] I often hear it claimed that no one would make these statements anymore, but an almost identical description was the backbone of *Time* magazine's presentation of the state of nature in their special edition for 2001: "Throughout the past century humanity did everything in its power to dominate nature. We dammed earth's rivers, chopped down the forests and depleted the soils. Burning up fossil fuels that had been created over cons, we pumped billions of tons of greenhouse gases into the air, altering atmospheric chemistry and appreciably warming the planet in just a few decades. And as our population began the year 2000 above the 6 billion mark, still spreading across the continents, dozens of animal and plant species were going extinct every day, including the first primate to disappear in more than 100 years, Miss Waldron's red colobus.

At the start of the 21st century there were unmistakable signs that exploitation of the planet was reaching its limit-that nature was beginning to take its revenge. Melting ice in the polar regions suggested that the climate was changing rapidly. Weather was even more erratic than usual, giving some places too little rain and others too much. Fires raced across the parched American West last summer, and recent storms spread devastation from Britain to Taiwan. No specific event could be directly blamed on global warming, but scientists say that in a greenhouse world, deluges and droughts will be more frequent and severe. Already the hotter climate has increased the range of tropical diseases such as malaria and yellow fever. Other ominous signals from an overburdened planet include falling grain and fish harvests and fiercer competition for scarce water supplies." Annon. 2001b.

[5] Perhaps the most concentrated statement exemplifying all the Litany comes from Isaac Asimov and Frederik Pohl's book on *Our Angry Earth* (1991:ix): "It is already too late to save our planet from harm. Too much has happened already: farms have turned into deserts, forests have been clear-cut to wasteland, lakes have been poisoned, the air is filled with harmful gases. it is even too late to save ourselves from the effects of other harmful processes, for they have already been set in motion, and will inevitably take their course. The global temperature will rise. The ozone layer will continue to fray. Pollution will sicken or kill more and more living creatures. All those things have already gone so far that they must now inevitably get worse before they can get better. The only choice left to us is to decide how *much* worse we are willing to let things get."

[6] See the individual claims within each article.

[7] Preston 1976:ix, World Bank 2000a:233.

[8] UNDP 1997. “Few people realize the great advances already made. In the past 50 years poverty has fallen more than in the previous 500. And it has been reduced in some respects in almost all countries.”

[9] Ehrlich 1968:xi.

[10] FAO 2001a.

[11] Grigg 1993:50, WFS 1996:1:Table 3, FAO 1999:29, 2000c:27, 2000d:20.

[12] Mitchell 1988:752-8, MAFF 2000:5:4, FAO 2000, UK CPI 2000.

[13] IMF 2001a.

[14] USCB 2001a.

[15] UNPD 2001b:27, 1998b:37, 1998c.

[16] E.g. Dunlap et al. 1993:14.

[17] WWF 1997e.

[18] Goudie (1993:43) estimates 20 percent; Williams (1994:104) 7.5 percent and Richards (1990:164) 19 percent during the last 300 years. IPCC also estimate a global forest area reduction of 20 percent from 1850 to 1990 (2001a:3.2.2.2).

[19] Brady 1998.

[20] Gorman 1998.

[21] Griffith 1998.

[22] Nash and Horsburgh 1998.

[23] Because of Disney’s lower theme park attendance (Anon. 1998a).

[24] Changnon 1999.

[25] For the US: Using the cumulative growth rate of total waste per person for 1990-2005 (0.07 percent) and using the middle population projection from USBC 2000c, yields a total waste production of 1.727e10 tons. With one ton using 1.43 m^3 (Ågerup 1998:110), this gives us 2.469e10 m^3, close to 30 m x28,688 m x 28,688 m = 2.469m^3, or a square 17.83 miles on the side, 100 feet deep. For the UK: The UK annual landfill is 21.8e6 tons or 20.185 percent of the American. Thus the total area will be 318 mi^2 x 20.185% = 64 mi^2 or a square 8 miles on each side. The Isle of Man is 227 mi^2 (http://www.gov.im/geography.html).

[26] Tengs *et al.* 1995; Tengs 1997; Tengs and Graham 1996; Graham 1995.

[27] Tengs 1997.

[28] Graham 1995; Tseng 1997.

[29] Major areas, e.g. Luken 1990:7. Based on EPA estimates, Hahn finds that the benefit from the Clean Air Act is $280.6 billion out of a total benefit of all EPA regulation estimated at $325.1 billion or 86 percent (Hahn 1996a:222). Based on the new and updated EPA analyses (especially EPA 1997d), the Office of Management and

Budget finds that environmental benefits make up $1,450 billion of the total EPA benefits of $1510 billion, or 96 percent (OMB 2000:11; similar ranges in OMB 1997, 1999). Notice that estimating benefits gives the better view, since they indicate the absolute size of pollution costs, irrespective of the regulatory approach to redressing the problem. However, it is only indicative, since many areas are not under EPA purview or could not reasonably be regulated (like indoor air pollution).

[30] Miller 1998:466.

[31] Brimblecombe 1977:1,158; Elsom 1995:476.

[32] Miller 1998:466.

[33] Brimblecombe 1977:1,159.

[34] Elsom 1995:480.

[35] Brimblecombe 1977:1,159.

[36] DETR 1999:27.

[37] EPA 1997d:34. This choice has also been made because uncertainty still exists regarding the causal pathway and it was therefore decided to use particles as "a surrogate for a mix of criteria pollutants" (p. 34, note 48).

[38] Current UK smoke pollution in 1997-8 was 9.4 $\mu g/m^3$ (Loader *et al.* 1999:4.3). In $PM_{2.5}$ this is equivalent to about 19.6 $\mu g/m^3$ (QUARG 1996:84). With a linear, no threshold effect, this would mean a mortality decrease of 11.35 percent. Since 632,500 die each year in the UK, and 89 percent live in urban areas (UNPD 1998a:85), this implies an excess mortality of 63,892. For Denmark, the estimate runs about 50 $\mu g/m^3$ (TSP), 33 $\mu g/m^3$ (PM_{10}) and 18.5 $\mu g/m^3$ ($PM_{2.5}$), producing a relative decrease in mortality of 10.7 percent. Since about 60,000 people die every year in Denmark, and of these about half live (and die) in urban areas, this implies an excessive mortality of around 3,210 (cf. Larsen *et al.*'s assessment that reducing particle levels to a third would mean an annual fall in mortality of 300-400 urban dwellers [1997:11]).

[39] EC-ET 2000:87; 3,137 in GB, DETR 1998c:18.

[40] QUARG 1993:1.