

A PERFECT STORM APPROACHES [Edition 19]

(as our finite earth is taken to its limits through unremitting growth of consuming and of consumer numbers)

“We have not inherited the earth from our grandparents – we have borrowed it from our grandchildren” (Kashmiri proverb). See www.ecotimecapsule.com re “saying sorry to the future” in environment time capsules buried at Kew & worldwide.

Meeting... “the needs of the present without compromising the ability of future generations to meet their own needs”. (Gro Harlem Brundtland in “Our Common Future”. UN resolution 42/187)

“Unremitting growth: it’s the doctrine of the cancer cell” (Sir Crispin Tickell, Patron of Population Matters)

“I have not seen a major environmental problem facing our planet that would not be easier to solve if there were fewer people – or harder, and ultimately impossible, with ever more”

(Sir David Attenborough, Patron of Population Matters)

The Government’s Chief Scientists and the last President of the Royal Society have all referred to the approaching ‘**perfect storm**’ of population growth and climate change and their potentially catastrophic consequences in this century. Reliable reports on the planet’s health have found water, land, plants, animals and fish stocks all in “inexorable decline”. **Climate change**, already real as shown by ever more extreme climatic events (hurricanes, wild fires, droughts and floods by fresh- or sea-water) and the looming risk of runaway positive feedbacks (eg methane release from permafrost; less albedo effect as the white ice goes) is terrifying enough. But it is far from the only all-life-threatening global problem.

The United Nations' Global Environment Outlook reports at www.unep.org/geo/resources/publications warn of a steady progression of unprecedented ecological damage, the principal driver of which is human population - which at 7600 million in 2018 “had reached a stage where the amount of resources needed to sustain it exceeds what is available”. Each year, according to www.prb.org/wp-content/uploads/2018/08/2018_WPDS.pdf there are in the world c 145 million births and c 53 million deaths, or an annual increase of c 92 million. **Three extra humans per second! Every four days now a city for 1 million people is appearing, somewhere – with all that that implies for additional energy use, greenhouse gas (GHG) production and trashing of habitats for wildlife.**

Overshoot: *Earth overshoot day* marks the annual date when humanity’s aggregate demand on Nature exceeds what the earth can regenerate in that year, so that thereafter we are in ‘overshoot’. Calculated to be August 1st in 2018, it comes sooner each year. See www.footprintnetwork.org). Humankind is on track to need > 200% of the planet’s total biocapacity (forestry, fisheries, croplands) by 2050. What does that mean? The planet is finite. 70% of its surface is salt water, half the rest is desert, mountain, or icecap. Achieving sustainability is not an option, it’s all about how we get there. By 2050, do we have to expect global mega-mortality, to come down by 50% or more? **There is no Plan(et) B.**

WHY is there generally such deafening silence on this, civilisation’s greatest-ever challenge?

Especially as we know what to do about it! Clearly, those who consume way beyond their share, the rich over-consumers in every country, must massively reduce their environmental footprints. But also relevant is the ‘*number of feet*’ involved. **Reducing over-population and over-consumption are two sides of the same coin. To put it another way, contraceptives are at least as important for sustainability as bicycles....**

WWF’s 2018 Living Planet Index This index measures biodiversity abundance levels and in each biennial report shows a persistent downward trend. By the 2018 report the average vertebrate (birds, fish, mammals, amphibians) population was estimated to have declined no less than 60 percent since 1970.

wwf.panda.org/knowledge_hub/all_publications/living_planet_report_2018/ *In a business-as-usual scenario, this downward trend in species populations continues into the future.* A sixth major extinction is under way, for the first time caused by human behaviour: species are becoming extinct a hundred times faster than the rate in the fossil record. According to Professor Vaclav Smil of Canada, in 2016: **“Of the total land mammalian biomass, 98.5 % is now the flesh of humankind or our cows, sheep, goats... leaving just 1.5 % for ALL wild mammals put together....”**

The need for land has increased as populations, living standards, meat-eating (importantly this is responsible for c 20% of GHG emissions) and demand for biofuels all rise. There is no new land: except through continuing forest destruction (over 1 million hectares per month). A hectare that yielded 1.8 tonnes of crops in 1987 now yields 2.5 tonnes, through greater use of fertilisers and water - but often leading to land degradation. The rise even in non-meat productivity is through use of fossil fuels (eg for tractors, oil-based fertilisers, refrigeration and transport), hence ever more GHGs...

Global fresh water supply has become a serious threat to human development as the demand for irrigated crops soars. **The UN reports that only one in 10 of the world's major rivers reaches the sea all year round, because of upstream irrigation....**, with close to 2 billion likely to suffer absolute water scarcity by 2025. Humans will soon be fighting over the last gallons of water just as they always did, and will, fight over resources of land, fuel and minerals.

Marine life : often overlooked, this is similarly in dire straits. **By 2050, the total mass of plastics (as bags, bottles, tiny plastic nurdles) in the oceans will equal the weight of all fish.** Toxic pollutants are adsorbed into the plankton-imitating nurdles, so entering the food chain and, ultimately, our kitchens. While helpfully absorbing CO₂, the oceans are acidifying and warming, bleaching coral reefs and decimating marine habitats. About 30 per cent of global **fish stocks**, a key protein source for billions, are classed as "collapsed" and > 40 per cent are "over-exploited".

The 'P' in the IPAT equation. In 1971-2, Ehrlich and Holdren in 1971-2 identified just three factors that create humanity's environmental (including climatic) impact, as just discussed, related by a simple equation – in my view the most important such simple equation ever derived:

Environmental impact, **I = P×A×T**

in which **A** is **affluence** (material resource consumption and the concomitant “**effluence**” of pollutants such as plastics, industrial chemicals and carbon dioxide (CO₂) *per person*); **T** is technology impact *per person* (in which fossil fuels measure more highly than solar based energy); and **P** is population (*the number of persons*).

If no other factors than these 3 have ever been identified, how come, that that P-factor, over-population, the “upstream” driver of it all, remains persistently “the elephant in the room that no-one talks about”?

In his RSA President's lecture (www.thersa.org/events/audio-and-past-events/2011/rsa-presidents-lecture-2011), **Sir David Attenborough** quoted from **Foresight: The Future of Food and Farming (2011)** [www.bis.gov.uk]. That report, he said: *describes the many obstacles to feeding >7000 million people, increasing in numbers by 80 million (the population of Egypt) each year: soil erosion, salinisation, the depletion of aquifers, over-grazing, the spread of plant diseases by globalisation, the absurd growing of food crops to turn into biofuels to feed motor-cars instead of people, and so on. It makes a number of eminently sensible recommendations, including the need for a “second green revolution”. But, surprisingly, it doesn't state the obvious fact that it would be much easier to feed 8 billion people than 10, so measures to achieve this – voluntary accessible family planning and women's education and empowerment - should be a central part of any programme of action for food security. It doesn't mention what every mother subsisting on \$1 per day already knows, that her children would be better fed if there were four of them round the table rather than ten.*

Sir David went on: *I meet no-one who privately disagrees that population growth cannot ever continue indefinitely. No-one except flat-earthers can deny the planet is finite. We can all see it in that beautiful picture of our earth taken from the Apollo mission. So why does hardly anyone say so publicly? There is a bizarre, sustained taboo around the subject.... The taboo doesn't just inhibit the politicians and civil servants who attend the big conferences. It even affects the people who claim to care most passionately about a sustainable and prosperous future for our children, the environmental and development NGOs. Yet silence implies that their admirable goals can be achieved regardless of how many people there are in the world, even though they all know it can't.*

I simply don't understand it. It is all getting too serious for such fastidious niceties. It remains an obvious and brutal fact that on a finite planet human population will quite definitely stop at some point. And that can only happen in one of two ways. It can happen sooner, by fewer human births – in a word by contraception. This is the humane way, the powerful option which allows all of us to deal with the problem, if we collectively choose to do so. The alternative is an increased death rate – the way which all other creatures must suffer, through famine or disease or predation. That translated into human terms means famine or disease or war – over oil or water or food or minerals or grazing rights or just living space. There is, alas, no third option of indefinite growth.

Population Matters...‘Too many people, not enough planet’

*The biblical command to multiply and “fill the earth” has surely been obeyed; there was no order to **overfill!***

1 **“The world has enough for everyone's need, but not enough for everyone's greed!”** - Are both parts of Mahatma Gandhi's famous saying still true? *Or is the first statement no longer true?* Isn't it certain (given the scientific evidence here), that by 2050 it will be a case of *too many 'everyones'* for the world to supply?

2 **How did this come about?** Mostly not by people actively planning to increase numbers (though some groups, mostly religious or political, do just that, to increase their voice or voting strength). It was the totally *unintended consequence of the GOOD we did when medicine became effective for the first time*, primarily through public health since the mid-19th century and then antibiotics since the mid-20th. Whereas from the dawn of history a couple would have to

have 6 or more children for 2 to reach childbearing years, now most children do this. The world in general and the caring professions in particular were slow to recognize the (now so obvious) need to *bring those numbers back into balance*, through voluntary family planning.

3 Even when that need for balance is accepted, a common myth originating in some bad programmes (eg India in the 1970s, China since 1980) is that any quantitative concern about population must necessarily and intrinsically be *coercive* – particularly of poor people. Not so, as well as being plain wrong, compulsion in reproductive health has usually proved counter-productive anyway. Forget compulsion – indeed [to help end this myth it is best to avoid even saying together the two words *population* + *control*](#). So long as we are inadequately resourcing the voluntary things: primarily, *ensuring that any sexually active woman on the planet who wants to use contraception has that choice*. Not doing this is probably the ideal way to ensure that more future Governments will legislate, most regrettably, for birth control policies that do lead to coercion.

Others distrust this quantitative concern as inevitably *exclusive* – of other key humanitarian interventions: social justice, poverty alleviation, healthcare, measures to improve child survival and women’s education and rights. Not so, we surely do not have to talk “either-or” here, it can be “both-and”! ie just making contraceptive services a fully-funded and priority *component* of development aid.

4 If the world were run by biologists rather than economists, our leaders would have known sooner what *all* species get to know by hard experience: that multiplication beyond ecological limits leads to a population crash. To quote Sir David again “*I have seen how increasing populations of elephants can devastate their environment until, one year, when the rains fail on the already over-grazed land, they die in hundreds*”. Politicians, if population growth ‘gets on their radar’ at all, commission demographers to study population trends in each country: but they treat it as a “GIVEN”, something to which we must forever adapt, by first predicting then providing (always, for however many, and for ever), rather than as something highly amenable to (benign) policy intervention. This is analogous to a man, granted a last request before being pushed out of an aeroplane, who chooses an altimeter rather than a parachute! With a catastrophic impact looming he continues to say, as he monitors each 1000 metres of descent, “we’ve managed fine so far”...! Yet, for the population crisis, for humans unlike elephants a parachute really does exist: it’s called *family planning* (fully accessible and with no obstacles impeding women’s entirely voluntary choice to use it).

5 **Good news and bad news about population growth**

Small thanks to religious and other opponents to family planning, since mid-20th century the world’s mean total fertility rate (TFR or mean family size) has reduced impressively, from 5.2 to 2.4 in 2018. So about 50 % of humans live where mean family size is at or below replacement levels (UN and PRB data). Indeed, in 2013 an influential TV film by Hans Rosling gave many the impression that the population problem is essentially ‘sorted’.

However even here there is hidden some “bad news”. First, c 45% of the world’s people live in countries with TFRs from 2.1 to 5, and 9% have even higher TFRs. In the 48 UN-designated Least Developed Countries (LDCs) the population is projected (in 2015) to triple by 2100. In much of sub-Saharan Africa fertility reduction has stalled, even in Kenya where this had seemed well established. The UN’s median projection of 11.2 billion by 2100 is predicated on continuing reductions in TFR: in their absence the constant fertility variant projects to an ecologically apocalyptic total, c 28 billion by 2100. Secondly, a major problem is inexorable “*demographic momentum*”, due to the population ‘bulge’ of young people who have yet to start their families, born when TFRs were higher. In (for example) Niger and Uganda, 50 % of the population are not yet grown-ups: all under age 15. They will be tomorrow’s *many* parents.

6 Unsurprisingly, SEX is at the root of population growth! Economists who argue that poor people need and *choose* to have large families ignore one vital fact: that potentially fertile intercourse occurs far more frequently than the minimum needed for desired conceptions. Hence having a large rather than a small family is usually not, as so often portrayed, a planned decision – couples in low resource settings (LRSs) *actively setting out* to have many children for economic and ‘social security’ reasons, or, given expected high child mortality in such settings, to ‘be on the safe side’. It is instead an automatic outcome of human sexuality. Something active needs to be done to separate sex from conception—namely, family planning (FP). Without that intervention being accessible, the biological norm or ‘default state’ for absolutely all fertile couples on the planet is a large family. They quite *simply happen when you are not able to not have a large one...* It’s not the poor having more sex. If fertile, sex at normal frequency plus absent FP means a large family. No “trying” needed! But access to FP is often difficult for poor people, many children arrive, often by chance not choice, but are, naturally, then welcomed. The crucial factor is the numerous powerful *barriers* to women being able to choose to have a smaller family – including the basic barrier of not having ACCESS to the FP methods. Obviously increasing per-capita wealth usually removes that and other barriers. Yet *there is no need to wait* in the (often forlorn) hope of that happening, or use compulsion to hasten change. There is no country with above replacement fertility which cannot now, with zero coercion, make a good start in enabling couples to reduce average family size:

- For a start, there is a wide-open door of need. Despite the well-known cultural and religious endorsement for large families in many LRSs, very few women want the maximum biologically possible number of children (>8), and teenage and late-order births are frequently regretted. Between a 1/3 and 1/2 of all conceptions are not planned, totalling c 80 million per year. Survey data show that about 215 million women without access to modern contraceptive methods want no more children.
- To change the context of decision-making in LRSs requires contraceptives to be available and accessible and promoted, by good use of the Media (www.populationmedia.org). Primarily by education the multiple barriers to their use need to be removed. These include fatalism ('God has planned my family size'), misinformation about contraceptive side effects, religious prohibitions, political correctness. Dealing with barriers to women, caused largely by men, in a rights-based way is the tried and tested means which worked in the success-story countries (eg Iran or Thailand) & states (eg Kerala). See my PS, the final page of this document, for more.

7 What are the 5 Rs of the environment?

In order of preference: Refuse - Reduce - Re-use - Repair - Recycle (& of course bicycle!)

All but the first one in that list (meaning don't do it at all if bad for the environment and avoidable) are of course aided by greener technologies - the "T" of I=PAT. These must of course be researched then utilised on a far bigger scale than to date: including not only greener energy sources but also obvious energy conservation measures like the recent Nobel-prize-winning technology of LEDs for white lighting – and proper insulation of every single building, given that ***"the greenest energy of all, is the energy you don't use – at all"***.

However most people, if they are honest (and think about them at all), find those R's rather a nuisance. Fundamentally ***it's not easy being 'green'***. So if we can get away with it (often using the possibility of science finding techno-fixes as excuses for ourselves), wouldn't we all prefer to avoid the lifestyle changes the "A" factor requires? There is in short absolutely **no unmet need** for us to reduce consumption! Contrast the reality of unmet need just described, for the fully accessible family planning that would ensure fewer humans on the planet, to be 'doing' so much **affluence with its inevitable accompanying effluence**.

8 When the camel collapses with a broken back, it is important to remember that the last straw did not really do it. It was the fault of all the straws. To achieve environmental sustainability, *everyone* must be involved, reducing per-person consumption (each person's environmental footprint) AND bringing the whole world's average family size or TFR down to replacement (an average of just over 2).

When any field of common land is right at the point of being over-grazed, Garret Hardin called the situation the "Tragedy of the Commons". This is because each herdsman continues to find it advantageous, personally and for his family, to put yet one more cow on the land – and another and another, even if the later new arrivals are thinner and less productive than before – right up to the point that the grazing limit is finally exceeded and all the cows die and all the families suffer.

The personal self-interest of the individual is thus at the common cost of the whole group, progressively and - without intervention - ultimately catastrophically. This is Hardin's "tragedy".

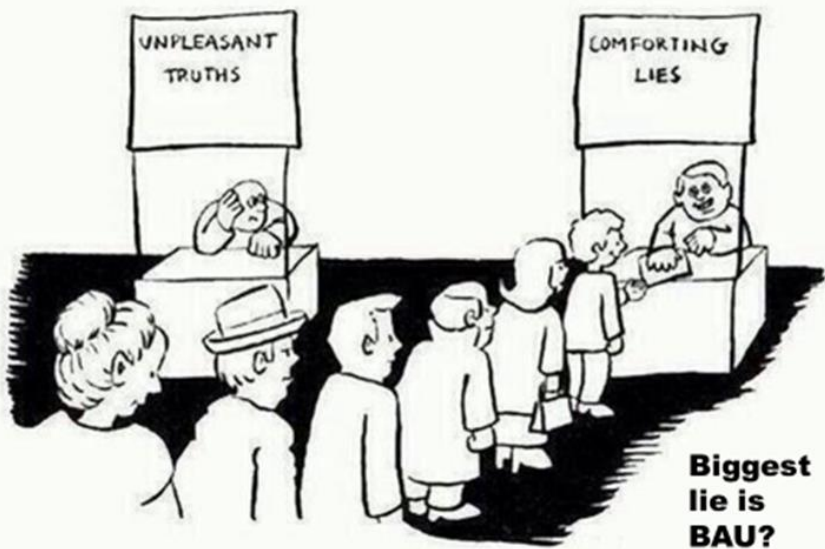
A more modern example is: to each fisherman it remains acceptable to take his boat to the nearly over-exploited fishery - getting ever smaller and fewer fish. But still he says "my boat is my livelihood, it's those other fishermen that are doing the over-fishing" - right until, predictably, the fishery collapses.

Much is encapsulated in the sayings: "My car is my car – everyone else's car is traffic!" and:

"My extra baby is my right, (my own group's right, my religion's right) - everyone else's baby is over-population."

Hardin said the intervention to avoid this inevitable 'tragedy' was "*Mutual coercion, mutually agreed upon*", meaning everyone seeing their own contribution to the problem - and agreeing to be regulated whether by peer-pressure or fiscal "sticks and carrots". So in the fishery example, each fisher takes an agreed smaller quota, which is sustainable. But not every relevant thing that happens in the environmental 'Commons' can be so regulated: eg the multiple decisions made by each individual re cycling or walking rather than going by car; switching off lights; choosing to have a small family....When push comes to shove - especially when we see so much continuing gluttony in energy use by large corporations (office blocks with lights blazing all night etc) – it's easy to start thinking "Why do I bother to do the right (often inconvenient) things to help the environment, when seemingly no-one else does?" Friends of the Earth had a booklet "*I will – if you will*". It should have had a sub-title: "*But why should I bother? - if you don't bother*"! The many environmental 'cheats' tends to de-motivate potential "good guys" so they do the same, easier, things: at least sometimes.

A central question here is: given the fundamental problem that there will always be people reassured by lies (as in Figure 1 below) - *or in denial - or driven by self-interest regardless of others (now or in the future) - how can this mutually assured per-person reduction of environmental impact by everyone possibly work?*



All religions encourage *love for one's neighbour*. But how can we ever claim to be really 'loving our neighbour' if we leave out of consideration our neighbour overseas (who will suffer most from climate change) or, as Brundtland highlighted (above), our future neighbour (receiving from us a potentially trashed planet)? Besides the use of 'greener' technology and less consumption per-person, this surely means reducing growth in sheer numbers of persons (future 'neighbours') using the contraceptive parachute (see No 4 above); but always and only in Jonathon Porritt's words:

Figure 1

"wisely, democratically and compassionately".

See also my 2013 TEDx lecture: 'Sex and the Planet' www.youtube.com/watch?v=XjjLYUqnvTQ

MORE ON CLIMATE CHANGE - AND EDUCATION

What is the climate change impact of having one less child from an affluent setting?

A 2009 study [www.biologicaldiversity.org/programs/population_and_sustainability/pdfs/OSUCarbonStudy.pdf] estimated that by adopting available 'eco-friendly' actions, including meticulous recycling, an American couple could curb their lifetime carbon footprint by 486 tonnes. Simply by having one less child an American woman would reduce her 'carbon legacy' - ie the summed emissions of herself and her descendants weighted by relatedness - by 9,441 tonnes. This is c 20-fold (in the UK c 10-fold) more than saved by the other positive eco-actions. Moreover each new UK baby will ultimately be responsible for an estimated c 35 times more GHG emissions than one in Bangladesh.

Such calculations support, for affluent people in this world of (in 2017) 7,500 million, choosing a smaller instead of larger family, regardless of their ability to provide for the latter; or a *voluntary guideline* of a *maximum of two children* as advocated by www.populationmatters.org. Two facts are incontrovertible: our finite planet will not support unending growth, currently at c 90 million annually; and once a TFR of 2 (or slightly higher, 2.1 with current mortality rates) becomes the *mean* human family size population growth will certainly eventually cease. So why should it be controversial, to propose that this *parental replacement fertility* becomes the accepted upper-limit norm, with full 'ownership' by civil society, everywhere?

The obstacles are massive, not least that the starting-point in all settings, for probably most women and very many men, is a feeling – often reinforced by culture and religion - that they cannot satisfy their parental instincts by having just 2 children. These urges often trump, sadly, the altruism required to change one's preferences in the interests of posterity and the biosphere.

Environmental and reproductive health education via the media

- *Sexual and reproductive health has been successfully promoted in many countries through radio and TV 'soap operas', as described at www.populationmedia.org.*
- *These long-running culturally-embedded dramas educate through their popular characters who are torn between good and bad influences.*
- *Studies show demeaning attitudes and behaviour towards women are thereby changed and the listening audience discovers *inter alia* the benefits of family planning and small family norms.*
- *This "Sabido methodology" utilising "info-tainment" can also be used similarly, as in Rwanda, to promote environmental conservation and sustainable agriculture.*

The obstacles are not insuperable: education is key, including *population & environmental education*

Despite having - commonly - higher education, many affluent couples - in **all** countries - have no concept of finitude of the planet nor of the unsustainability of unremitting growth of population. However it is patronising to suggest that less prosperous and less educated people lack the intelligence to acquire it, if given the opportunity by education and the media, as indeed was demonstrated by interviews about adaptation to climate change in Ethiopia

[\[www.bmj.com/content/bmj/353/bmj.i2102.full.pdf\]](http://www.bmj.com/content/bmj/353/bmj.i2102.full.pdf).

The affluent do at least have the means to be able to *access* contraceptives, unlike many in Africa, the continent of my birth. However the incidence of unplanned conceptions in both teenagers and adults - 40% in the world (annual total c80 million) and 49% in the affluent US - shows there is more to it than access. Any contraceptive may fail. A voluntary guideline must never penalise large families where child poverty is commonest, there must be a good safety net for unintended/late-order births. Crucially, to criticise let alone demonise parents at any level of affluence, anywhere, who have already had larger families is decidedly unfair if, as so commonly, this environmental dimension was not remotely in their mindset, having never previously been brought to their attention (however well-informed some of them are about almost everything else!)

Back in 1992 James Grant of UNICEF said in their Annual Report:

Family planning “could bring more benefits to more people at less cost than any other single technology now available to the human race” (The State of the World’s Children, 1992)

But, he went on to say: “*it is not appreciated widely enough that this would still be true if there were no such thing as a population problem.*” This is because it is also wonderful ***preventive medicine***, a directly humanitarian intervention: people – mostly women and children – suffer if family planning is inaccessible. A UK All-Party parliamentary report www.appg-popdevrh.org.uk/Return%20of%20the%20Population%20Growth%20Factor.pdf has a Table which shows exactly that, how all of the Millennium Development Goals that in 2000 were deemed essential to improve the lives of individuals are adversely impacted by population growth. For example: *Goal 2 to achieve universal primary education* required two million extra teachers per year just to maintain existing standards of education; *Goal 4 to reduce child mortality* necessitated - *inter alia* - fewer, wider-spaced births which can reduce infant mortality by over 60%; and *Goal 5 (Target 5A) reducing by three quarters the maternal mortality ratio* must require the elimination of unwanted pregnancies estimated then as c 41% of the global total conceptions. People rightly worry about *coercive contraception*, but it is also possible for there to be *coerced conceptions*: forcing women to conceive, through not allowing them to exercise their modern-day human right to control their fertility, as they may choose. Without those conceptions the outrageous avoidable mortality of 800 mothers every 24 hours could reduce by 35%. In sum, *you cannot die of a pregnancy you don’t have* (and would have avoided if you had had fully accessible family planning).

These facts make this a win-win intervention, indeed a moral imperative: but over the years cost-benefit analyses have never failed to show how it also *always* saves money. They differ only in how much it saves: a recent estimate (2006) is that for every dollar spent in family planning, between 2 and 6 US dollars can be saved in interventions aimed at achieving other development goals. This is without consideration of the avoided environmental damage, which would be a far greater sum.

Conclusion: How many wake-up calls does humanity need?

They come almost daily now, and not only from the 99% of climate scientists who appear collectively more frantic with each IPCC report, showing global warming increasing inexorably to or above 2 degrees Celsius, the level which poses an “existential threat to the human race”. Scary words, yet – despite the tweets of Donald Trump – disregarded they cannot be. They are evidence-based. The most authoritative, most scary, of all alarms was sounded or rather re-sounded in 2017:

A. World Scientists’ Warning to Humanity - A Second Notice (1992 repeated at +25 in 2017)

In 1992 the following (and more) was signed by over half of all living Nobel Laureates:

The earth is finite. Its ability to absorb wastes and destructive effluent is finite. Its ability to provide food and energy is finite....Pressures resulting from unrestrained population growth [Then: 5.4 billion. In 2017 at +25: 7.6 billion] put demands on the natural world that can overwhelm any efforts to achieve a sustainable future. If we are to halt the destruction of our environment, we must accept limits to that growth....No more than one or a few decades remain before the chance to avert the threats we now confront will be lost and the prospects for humanity immeasurably diminished.

In 2017 in excess of 15,000 scientists worldwide signed off with:

To prevent widespread misery and catastrophic biodiversity loss, humanity must practice a more environmentally sustainable alternative to BAU ‘business as usual’. This prescription was well articulated by the world’s leading scientists 25 years ago, but in most respects, we have not heeded their warning. Soon it will be too late to shift course away from

our failing trajectory, and time is running out. We must recognize, in our day-to-day lives and in our governing institutions, that Earth with all its life is our only home. <https://academic.oup.com/bioscience/article/67/12/1026/4605229>

B. Now this, received on November 15 2018, from Professor Paul Ehrlich (he of the Population Bomb 1970): To my fellow humanity,

The press is full of stories about problems caused, at least in part, by the conjoined but unmentionable 'twin elephants' of population growth and overconsumption. Yet, spiking food and energy prices, water shortages, increasingly severe weather, melting ice caps, dying coral reefs, worldwide toxification, disappearing polar bears, collapsing infrastructures, terrorism, the rise of fascistic leaders, and novel epidemics are almost never connected, to these seemingly invisible 'elephants'. And while science has long proven there are limits to sustainable human numbers, and to humanity's aggregate consumption, those limits are never discussed, and politicians believe in the oxymoronic "sustainable growth".

Will technology save us? It can help, but its record is generally dismal. When *The Population Bomb* was published 50 years ago, there were 3.5 billion people, and we were called alarmist – the glib response was technology could feed, house, clothe, educate, and provide great lives to 'even' 5 billion people. Nuclear agro-industrial complexes or growing algae on sewage would feed everyone. Well, they didn't. Instead, the roughly half-billion hungry people then have increased to about two billion hungry or micronutrient malnourished today...a couple billion more are living in misery.

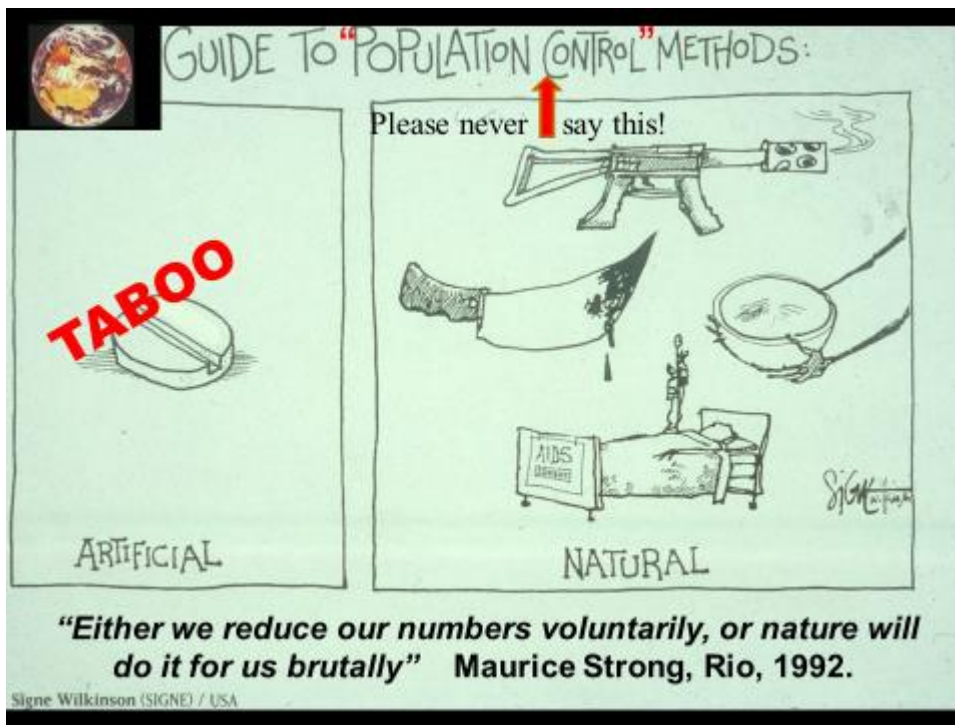
Why don't the growth maniacs stop asserting how many billions more people we could care for and focus first on stopping population growth and giving decent lives to all the people already here? And spare us that old bromide about how the next kid may turn out to be the Einstein who saves us; considering the rich-poor gap, it's more likely to be an Osama Bin Laden bent on destroying us or a Donald Trump fuelling them with hatred....

Can we save the world?

Look, we are facing millions of years of evolution where 'survival of the fittest' defined our evolutionary progress was dependent on outbreeding others. In light of that, can we turn things around without a cataclysmic event? I don't know, but like me, I hope you'll agree that we can't give up.

Finally, a personal statement

1. **First**, my apologies: that the foregoing is "not exactly a bundle of laughs". That's because I feel I can only "tell it how it is", based on scientific **evidence** and ultimately laws: **the laws of maths, physics and biology**. This is already



self-evident to the informed reader who is also an objective observer. 2. Following decades of my vigorously advocating for voluntary contraception, as the neglected "upstream" intervention to stabilise and eventually even to **reduce** human numbers: with much trepidation I have concluded that **it may now be too late**. I see continuing inaction on all 3 factors in that I=PAT equation *on anything like the necessary scale*. Consequently there are more than enough humans already born and here to comprehensively trash this fragile and beautiful planet before the end of this century - through habitat destruction, climate chaos, much violence and more. What is totally unavoidable and indeed certain is an eventual return to

sustainability. See above **Figure 2** - and the Maurice Strong quote. The planet is finite (and 70% is salt water).

3. That said, one's understandable feelings of utter helplessness can, even so, still be resisted. In all the worst-case "perfect storms", advocacy for birth reduction through access to contraception does not cease to be crucial, it just then has to become a last-resort measure primarily to reduce suffering. How? Through lowering possibly by billions the number of humans to suffer and to die prematurely, along with much non-human life, through the expected floods, fires, starvation, disease and violence of the later decades of this century. Even in that ghastly and truly dystopian scenario, is it not better for ultimate sustainability to be achieved by as much birth reduction as possible? Rather than leaving it, by default and 'BAU', to unprecedented death increases??

4. Yet, as one of my heroes Paul Ehrlich says above, we can't give up. While I have breath I shall work with him and others, in "Last Chance Saloon", where there is still that, a last chance: to prevent the avoidable and to mitigate the unavoidable. Please join us. See the **Warning, Apology** and the **Promise**, as in Chris's song, at www.ecotimecapsule.com

PS: Removal of the *barriers* to an individual's control of her own fertility

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[An updated summary, first presented in 2007 to Dr Damascene, Minister of Health of Rwanda, the country of my childhood].

Costa Rica, Cuba, Iran, Korea, Mexico, Sri Lanka, Taiwan, Thailand and SOUTH India (even) have reduced their Total Fertility Rate (TFR or “average family size”) to close to 2 which is replacement - **as quickly as China**, but primarily through a rights-based approach and *without* the coercion that has featured in China.

How? What do these vastly different developing countries have in common? Their governments recognized the population-poverty connection and *removed the barriers to family planning (FP)*. Vanishingly few women desire the biological maximum of children (> 8). Most want far fewer. So there is always some perceived *unmet need* (varied, often >25 % acc to Demographic Health Surveys). We need to push at that open door...

Some barriers to optimal Reproductive Health (RH) plus FP provision (not a complete list!)

- **Pronatalism:** operating at a deep level through culture and increased by competition between tribal or religious groupings (“numbers give power”) or enlarging markets – affecting both genders but esp male.
- **Gender inequality and abuse. Also double standards:** “if my wife has contraception I won't be able to trust her not to go with other men” (Fact that he often goes with other women not seen as relevant!)
- **Religion:** mainly but not only Roman Catholic (RC), with Vatican prohibiting all but Natural Family Planning (NFP) which fails ++ because requires MUCH abstinence to work. [Yet another “double standard” here: in ALL developed nations use of all non-NFP methods by RCs who have money is *same* as by non-RCs!]
- **Misinformation:** eg the Pill or injection permanently harm future fertility; or are adulterated (understandable as indeed reported in Sub-Saharan Africa (SSA) for *other* drugs); FP more dangerous than being ‘natural’ [yet life-time risk of dying from pregnancy is between 1:10 and 1:20 in SSA whereas is 1: 30,000 in Sweden where contraceptives are universally used!]
- **Deliberate disinformation:** eg condoms have tiny holes to transmit HIV.
- **Lack of supplies of contraceptives:** eg not available (or only condoms and sterilization), not accessible (husband or priest stopping use), not affordable (eg Implant, needs subsidy), and not predictably obtainable (supplies run out but sex continues!).
- **Perception that using condoms within marriage must mean “either you have HIV or you think I'm a risk to you”** [argues for availability of more effective FP like injections to be used AS WELL]

Removal of barriers

1. Benign government endorsement measures + education + the varied appropriate use of all Media

- **Women's education** helps much; but many **MEN need sex & gender RE-education** too! And **every human needs better ecological education**, to accept the imumfiniteness of the planet and hence the eco-concept of replacement fertility (= a norm that family size should be no more than 2).
- **Media crucial:** both direct and indirect promotion, best using humour (eg Mechai's weekly radio chat-show in 1970s Thailand) and health-promoting radio ‘Soaps’. These info-tainments inform and *correct misinformation*, as popular characters discuss taboo issues (see www.populationmedia.org). The ‘morning-after pill’ can be discussed (even how to make it yourself from widely-available FP pills).
- Using **text-messaging** to give correct information, eg to counter rumours about FP side effects. Endorsement by “celebs” like football stars and TV personalities, and by peers – esp for the young
- Endorsement by religious leaders, re-examining the issues (eg in Iran they issued edicts that FP is NOT against the Koran): and saying in public that God wants us to have only the children we can properly care for so FP is truly a good thing *not* sinful.
- As in Iran, *requiring couples to learn about family planning before obtaining a marriage licence*.

2. Resourcing of supplies – making a wider choice available, accessible and affordable.

- Removal of the “medical barrier” by direct social marketing of Pill and injections through dukas (small local shops). This IS good practice especially when combined with simple check-lists - and works!
- Means less reliance on sterilization, so people accept 'strong' long-acting FP methods (including IUDs *as appropriate*) at lower parity than they are bound to do when sterilization is so final.
- Vasectomy – can be a relevant option in Africa. Even back in 1987 ONAPO in Rwanda reported to the IPPF that more than 50 Rwandans had accepted this and were beginning to tell their friends about it.... For more, visit:

www.ecotimecapsule.com www.populationandsustainability.org www.populationmatters.org
www.bmj.com/content/bmj/353/bmj.i2102.full.pdf

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