

The unsustainability of sustainability

Giorgio Nebbia, Professor Emeritus, University of Bari, nebbia@quipo.it

The 20th century has been one of hopes and disappointments. The population of the world has increased almost fivefold, which has entailed a tenfold increase in the demand for food, energy, metals, space, housing and water, and a tenfold increase in the number of people living in urban agglomerations. How long can this last? The early doubts on the continuous growth of the population and of the goods and services may be found in the works of Malthus, who in 1798 published what was known as the “first essay” on population (1), arguing that no matter what technical efforts are made, planet Earth cannot provide the natural resources from which “food” (and by extension water, energy, paper, etc.) can be extracted in sufficient quantities to support the continuous growth of the world population.

This position --- though Malthus had no way of knowing it --- derives from an ecological knowledge that recognizes the existence of physical and biological *limits* to the resources of nature. The relentless removal of natural resources --- water, minerals, fossil fuels, agricultural products and animals --- from physically limited reserves and spaces means that the extent of these resources not only does not grow as the population, but that it actually decreases as the population grows. In addition, the transformation of natural resources into goods and objects entails the production of residuals and wastes whose emission into natural bodies --- water, the soil and the air --- degrades the quality of such bodies and makes them less usable for human purposes. As far back as 1865 the British economist Jevons (2) asked himself how long his country’s coal reserves could last if they continued to be exploited at the rate he observed. The subsequent discovery of extensive petroleum deposits obviated the problem of the exhaustion of coal reserves feared by Jevons. Most British coal mines were gradually closed before even being fully exploited.

In the last century ecologists and biologists have recognised that each territory of the biosphere has limited resources and a limited capacity to sustain life. In the mid-19th century Justus von Liebig explained that in a given area of land the scarcity of even a single nutritional element for a crop was sufficient to cause a fall in harvests. The early decades of the 19th century saw an increase in the knowledge of biological cycles and equilibria. It was realized that the number of individual animals that can live in a pasture or lake depends on the amount of space and food available. As the animal population grows and the availability of space and food consequently decreases, self-limitation mechanisms come into play and the populations slow their growth until they reach a “limit”, which is the carrying capacity of the territory in question. Possibly, the intoxication of the environment by metabolic wastes can lead to population decline.

In the 1930s, in what has been called the golden age of ecology, various scientists --- the American Alfred Lotka, the Italian Vito Volterra, the Soviet Georgi Gause, the French-Russian A. Kostitzin, and others --- elaborated mathematical treatments of the “laws” that describe population growth and decline in confined spaces and with a limited availability of resources and competition among populations living in the same environment. The books of the biologists D’Ancona (3) and Hutchinson (4) offer excellent reviews of the early reconnaissance of the limited carrying capacity of the Earth. In the same decades human society experienced an unexpected increase of technological innovations and of available sources of energy and resources, and a corresponding increase of available commodities that could have dismissed any pessimistic view of the future.

The cornucopians --- the great-grandchildren of Condorcet and Godwin, the authors against whom Malthus wrote his essay --- hold that adequate political structures and inventions are

able to make available a growing quantity of goods for a growing population, which can look forward to a future of plenty and affluence. Major optimistic writings include those produced in the 1920s in the series *Today and Tomorrow*, published by Kegan Paul in London and Dutton in New York, and in the 1950's various forecasts of the use of natural and energy resources were published in the volumes *Resources for Freedom* (5), and in other various books and essays (6)(7)(8)(9)(10)(11).

A deeper insight of the relations between "technical" activities and the surrounding environment began in the 1950s with the protest movements against the explosion of atomic bombs in the atmosphere which released large quantities of long-lasting radioactive atoms in the earth's atmosphere and thence into living systems --- soil, vegetables, animals and humans --- and against the use and abuse of synthetic chlorinated pesticides, also a source of poisoning of the planetary biosphere, denounced by Carson's *Silent Spring* in 1962 (12). In reaction to these acts of violence against nature, part of public opinion in the industrialized countries, in a situation of satisfied needs, demanded an end or limitation to actions which could damage the health of the present and future generations. Their pressure led to the nuclear test ban treaties, the prohibition of the use of DDT, the various antipollution acts, etc. At the same time such economists and intellectuals as Galbraith (13), Marcuse (14), Kapp (15), Boulding (16), Commoner (17), Hardin (18), Ehrlich (19) Georgescu-Roegen (20) --- recognized the very root of the ecological crisis in the myth of economic "growth" and the endless increase of its only form of measurement, the individual money income or the national GDP.

In this climate a protest movement grew involving students and workers, starting in Berkeley in 1964 and then spreading to Germany, France and Italy. In Europe it is often belittlingly labelled the "'68 movement". The "movement" protested against, among other things, the devastating effects that economic growth in industrialised countries had on the rights of individuals and poor classes and peoples and on the natural environment, continuously contaminated and depleted by the destruction of forests, the expansion of cities, traffic, polluting industries, goods and machineries (21). As far as I know, the first use of the word "degrowth", as an invitation to stop such crises, was used by Paul Ehrlich in an article in the journal *Chemical and Engineering News* in early 1970.

The ferment of this climate was clearly understood by the Italian intellectual and entrepreneur Aurelio Peccei (22), who invited a group of engineers to investigate the possible future of humanity and commissioned Jay Forrester, an American specialist of systems analysis, and his colleagues, the Meadows, to formulate a forecasting model. They essentially rewrote and numerically solved some of Lotka and Volterra's differential equations, introducing factors of slowdown and decline in population growth, which in their case was human, under the effect of the production of commodities and resulting pollution. In early 1971, their first results began to circulate and were analyzed also by a special ecological commission of the Italian Senate (23), and were made publicly available in advance through a special issue of the journal *The Ecologist*, in January 1972 (24). The final results were set out in *The Limits to Growth*, published in May 1972 (25), to coincide with the United Nations conference on the human environment, held in Stockholm. The book --- substantially a manifesto of what would have been known subsequently as "degrowth" --- contains economic and social forecasts projected to an unspecified date in the 21st century. It did not, and does not, say what will happen, but what could happen *in the case of* a concatenation of events affecting the whole of the Earth's population:

- *if* the population grows, so will demand for food, materials and goods;
- *if* the demand for food grows, agricultural production will have to increase;

- *if* the agricultural production increases, the use of fertilisers and pesticides will have to increase also and the depletion and erosion of arable land will in turn increase;
- *if* the depletion of land increases, agricultural production will decrease and with it the supply of food;
- *if* the supply of food falls, the number of under-nourished or starved people will increase;
- *if* the demand for materials, energy and goods increases, industrial production and the extraction of minerals, water and fuels from natural reserves will increase;
- *if* the depletion of reserves of natural economic resources increases, there will be an increase in wars and conflicts for the conquest of scarce resources;
- *if* the industrial production increases, environmental pollution and contamination will increase;
- *if* the environmental contamination increases, human health will be impaired.

In short, *if* the population continues to increase (in 1970 the world population was 3,700 million and increasing at the rate of 70 million a year; in 2010 is little less than 7,000 million, still increasing at the rate of 70 million a year), there will be an increase in the conditions --- disease, epidemics, hunger, wars and conflicts --- that lead to a decrease, perhaps a traumatic decrease, in the rate of growth of the human population and economies. If traumatic situations are to be avoided, the solution should be sought in a rapid decrease of the growth rate of the population (with a consequent slowing in agricultural and industrial production and environmental degradation) and, therefore, in decisions to place “limits to growth” of the human population and of goods; that is, in a degrowth of production, consumption and “population”, towards achieving a stationary society, as early suggested by economists like Mills (26) and Pigou (27).

The book published by the Pecei Club of Rome met with contrasting reactions. One was positive to the point of enthusiasm. The book seemed to indicate one way of achieving an ecological and economic balance, and its recipe might provide a response to the ferment of student protest, ecological protest and the claims of workers and underdeveloped countries, and also to the apparently irresistible increase in the prices of raw materials and commodities that had begun in autumn 1973. Authoritative figures, enchanted by the publicity received by the book, argued that the “limits” could become government programmes. Sicco Mansholt made them into a manifesto that attracted some public support.

Otherwise, attacks came on various fronts. The first and most authoritative was that of vested economic interests, which saw the call for a slowdown in economic growth as a form of subversion that would threaten business, products, industry and technological development. It mattered little that the call came from a group that comprised also authoritative representatives of the industrial and financial establishment. At that time they appeared as class traitors, spellbound and taken in by the tall tales of ecologists, or even communist infiltrators who preached a halt to the growth of capitalist countries so as to open the gates to the bolshevisation of the world.

Another barrage of attacks came from professional economists, who accused the book’s authors of ignorance. The economy was able to cope, and had always coped, with the problems of scarcity of resources and money --- indeed economics was by definition the science of facing scarcity. Problems had always been and would always be overcome by market providence, which had been invented for the precise purpose of leading us towards the alternative materials and technologies that ensure continuous economic growth, humanity’s only real value and virtue. In an interesting and ironic article, the British scholar Wilfred Beckerman wrote, in November 1972 (28): “So you can now all go home and sleep peacefully

in your beds tonight secure in the knowledge that in the sober and considered opinion of the latest occupant of the second oldest Chair in Political Economy in this country, although life on this Earth is very far from perfect there is no reason to think that continued economic growth will make it any worse”.

The third source of criticism was the Catholic Church, which had been torn apart by internal divisions on the question of birth control. The Encyclical of Pope Paul VI, *Humanae vitae* (1968), while recognising the right to responsible procreation, was still opposed to the means of limiting births --- abortion, the pill, contraceptives and others --- a position substantiated, for instance, by the catholic economist Colin Clark (29) who argued that the Earth could provide enough water, food and material goods to support 40 or 45 billion people. The debate on the limits to population growth and the means to achieve this objective deepened the divisions among Catholic women who were sensitive to the burgeoning women’s liberation movements and the new issue of women’s employment, which was hard to reconcile with a high number of pregnancies, and also within the Catholic female community in Protestant countries and in Third World and poor countries. Doubts about fidelity to the dictates of the Church of Rome were becoming more serious now that a book explained that an “excessive” increase of the population did not solely concern the private lives of couples, but threw up the danger of exhausting the gifts of nature and threatened the future generations.

The fourth front of criticism was the left, both the communist parties and the non-parliamentary left that in Italy at that time spoke through a number of newspapers and journals --- in Italy *Il manifesto*, *Aut aut*, *Bandiera rossa*, *Potere operaio*, *Quaderni piacentini*, *Quaderni rossi*, etc. Perhaps the most interesting voice from this part of the political spectrum was that of the Italian writer Dario Paccino who wrote a book *L’imbroglio ecologico* (Ecological Fraud), published in 1973 (30). A best seller in 1973-5, this work gave rise to numerous debates and university seminars. Paccino argued that the call for limits to growth was yet another bourgeois trick designed to preserve the privileged position of the ruling class, whose needs were amply satisfied, and keep the working class in subjection and poverty, both in industrialised countries and in the Third World. The French writer Braillard also wrote a pamphlet against the Club of Rome and its conclusions (31).

A rather crude reaction came from the communist countries, where *Limits* was subjected to fairly close scrutiny. Their basic position was that the disasters foretold in the book were to be expected in capitalistic countries, dominated as they were by the perverse laws of individual profit. In a planned socialist society the extent of production, the pressure of the population on natural resources and environmental degradation could be regulated by central authorities, that is, by the people, without any danger of disaster or crisis. The marxists asserted also that the problem of rising populations affected capitalistic countries more than the communist world. These strictures were naive. By the end of the 1960s in the socialist countries there were already clear signs of environmental disasters caused by reckless economic planning, such as the impoverishment of soil fertility as a result of excess production, and environmental pollution.

All on its own was the critique formulated by the Romanian-American economist Nicholas Georgescu-Roegen (20) in a number of essays beginning in 1971. To him it was illusory to suggest, as *Limits* did, to strive for ecological salvation in the achievement of limits to growth. Even a “stationary-state” society with a stable population and stable production of material goods (however distributed) and use of natural resources is bound to cause an ecological disaster because *entropic* depletion is intrinsic not only to the use of energy resources but to the use of materials extracted from nature. A feasible salvation for humanity was to be found

only in “degrowth”, “*la décroissance*”, which was the title of a collection of essays by Georgescu-Roegen, published in Switzerland in 1979.

The rapid rise in crude oil prices that started in 1973 and went on until 1985, the long Iran-Iraq war and the local wars over raw materials that punctuated the 1970s and 1980s seemed to corroborate the predictions advanced by the Club of Rome. The same proposal of “halting growth” was reached by a book commissioned by US President Carter and published at the end of his term of office in 1980 under the title *Global 2000* (32). Although the book was rich in data that are still worth reading today, the reaction that greeted it was much more lukewarm than that aroused by *Limits* because it presented prospects that ran counter to the intentions of Reagan’s new Republican administration, which was bent on launching a new era of economic growth.

Almost as if to erase any memory of *Global 2000*, Simon and Kahn, two typical cornucopians, wrote a book (33) which was distributed on a massive scale through the commercial publishing circuit. Its deliberate aim was to demolish the forecasts of *Global 2000* and explain that the earth’s resources were available in abundance and in no way hindered the new political design of economic and trade growth that was to be remembered as “the 1980s”. One essay by Marchetti (34) examined the possibility of an Earth inhabited by one thousand billion people! To calm down the economic establishment a Commission on Environment and Development published in 1987 a reassuring report (35) suggesting that it is possible to build a society through “sustainable development” such as “to meet the needs of the present without compromising the ability of future generations to meet their own needs”. The idea of sustainability has become a myth and a fashion and the adjective “sustainable” has been attached to many political activities, without investigating the very meaning of an improbable idea that a popular proverb summarizes as “you can’t eat a pie and have it”.

When the first proposals of “degrowth” were presented, the geopolitics of the world and of natural resources was very different from the present one. In the 1970’s the world was conventionally divided, following a suggestion of the French demographer Sauvy, into three parts. The First World was made up of industrialised capitalistic countries, basically the American empire and its satellites. The Second World included the communist or socialist countries, industrialised to varying degrees, basically the Soviet Union and its European satellites. The Third World comprised a large number of other countries, some gravitating around the first or the second world, some non-aligned, some industrialised, others industrialising, others poor, still others extremely poor.

Among these three groups there was anyway a brisk interchange of raw materials, goods and technology. Some exported raw materials taken from their stock of natural resources (forestry products, livestock, minerals, energy sources). Others exported or sold labour and still others exported technology or machinery or manufactured goods. The capitalist countries thought that the satisfaction of their citizens’ needs could be assured by private property and its obedience to the “market”, an entity based on the concept that from work and raw materials each individual must gain the maximum amount of money that will enable her/him to purchase the maximum possible amount of goods and services. By their own intrinsic laws, capitalist societies can survive only through a continuous growth in the production and consumption of goods, at the cost of a growing removal and contamination of the planet’s natural resources. The socialist countries thought that the human needs of their citizens could be satisfied by the state, which was the owner of the material assets of the land and the means of production and was able to plan the use and distribution of those assets and how human labour was to be employed. A society with a planned economy would in principle be able to extract and use its natural resources parsimoniously and ensure the satisfaction of its citizens’

needs with goods and services planned by the government in such a way as to diminish or slow down the depletion of its natural resources. What actually happened was a race by the Soviet Union to reach and overtake the United States in the production of goods, coupled with widespread ecological ignorance or underestimation that led to environmental devastation and poverty for society and the individuals living in it. For their part, the countries of the Third World correctly recognised that freedom from poverty could be achieved by the growth of production and the supply of goods and services. On their part the mass media, especially television, artfully propagandised in the developing countries the capitalistic creed that the greatest happiness was to be found in the possession of goods similar to those which the television portrayed as filling the homes of the industrialised West.

The deification of the market, private property and the conquest of goods contributed, in the 1980s, also to the gradual destruction not of realized “communism” (it was never “accomplished”, what fell apart was a virtually deformed version of socialism), but of any ideal of a different relationship between human beings, objects and natural resources. The result was unbridled competition between individuals, social groups, companies and states on a terrain which was never ideal but only commercial. It was the acceptance of any form of violence as a means to increase money, and therefore goods, in one’s possession and the use of Gross National Product and its continuous increase as the only index of well-being, happiness and the prestige of one country over another, of an individual over another. “Globalisation” has so become the realisation of the grand commercial ideal of capital, the spread of needs and of the ideal of consumption and *therefore* the accelerating exploitation of nature and labour in all countries. To conquer growing quantities of goods, poor people have to exploit their own bodies, sell their labour at low cost, sell space, water, forests. The increase of monetary wealth in circulation so achieves the impoverishment of the majority of the Earth’s individuals (John Paul II did in various occasions denounce the scandal whereby in this global society “the rich grow richer and the poor poorer”) and the depletion and growing contamination of nature. In this social and economic context, characterized by the economic crisis of recent decades, the philosophy of “degrowth” has obtained some acceptance, especially in the middle classes of industrialised countries, leaving unresolved the main question: degrowth of what and whose?

The welfare, but also the survival of people living in the planet depends on the availability of food and water, energy sources, machines, domestic appliances, buildings and means of transport and communication, education and sanitation. Apparently intangible needs also require material goods: health, dignity and freedom are not possible living from hand to mouth, with no home or food, surrounded by dirty water. Knowledge is not possible without paper and the material means of long-distance communication, be they the skins on the drums of the jungle telegraph or the silicon in computers. Material goods can be obtained only through the human activity of extracting minerals, stones, fuels, vegetable matter, animals, water, air --- all assets provided by nature --- from the *biosphere* and transforming them into the goods, objects and machines that go to make up the *technosphere*: the universe of manufactured objects. After varying lengths of time, the objects used in the technosphere are inevitably transformed into waste and refuse which return, in one form or another, to the biosphere, causing decreases in the availability of natural resources not because of pollution and depletion.

Humanity survives by maintaining in motion a continuous circulation of matter and energy from the biosphere to the technosphere and back to the biosphere (nature-commodities-nature). Commodities are produced not by means of money, or by means of commodities, but by means of nature. Since the resources of the biosphere are limited, even when they seem enormous, and because of the ineluctable principle of the “entropic” depletion of energy and

also of matter --- “matter matters too”, as explained by Georgescu-Roegen (20) --- passing through the technosphere, the *functioning* of the technosphere entails a depletion of the reserves of natural resources and a deterioration of the “natural” quality of the reserves left for present and future generations. Technology may reduce the mass of materials required per unit of service provided, but the advent of an intangible or dematerialised society is a myth. Irrespective of the rate of population growth and increased demand for material goods, and whatever the cornucopians might say, a steady-state society is neither conceivable nor achievable, and the same applies to a “sustainable” society and development. The current rates of extraction of material resources and contamination of the remainder are *unsustainable* --- all we can do is to envisage a system of human and international relations which are *less unsustainable*.

Let’s begin with population, whose degrowth cannot be reasonably foreseen before the second half of the 21st century. The population in 2010 is about 7,000 million persons, increasing at the rate of about 70-80 million per year. The population of the first 1,500 million inhabitants in the industrialized countries is in fact, with a strong increase of elderly (65 and older) and an increase of immigrants essentially from poor countries. Some slowing of the increase of population is observed in the about 3,000 million inhabiting the rapidly industrializing countries and all the main increase is observed among the about 2,500 million inhabitants of the poor and very poor countries. Let’s assume that the world population may be divided into three classes that may be called the “emerged countries” (those that have achieved a relative high level of consumption and satisfaction of their needs), the “emerging countries”, those involved in a rapid industrialization and increase of consumption, at least for a fraction of the population, and the “submerged” countries, those that are below a reasonable (whatever this word may mean) standard of living, availability of food, shelter, energy, education, sanitation, work --- and human rights, which can only be achieved through freedom from misery. Let’s assume a distribution of the world population among such three classes and let’s assume that their needs, both physical goods and services, may be expressed in an arbitrary unit called the amount of “energy” available to the persons of the countries of each “class”. Let’s also assume that the availability of global “energy” corresponds to about 500 EJ/year (1 EJ = 1,000,000 GJ), similar to current consumption levels (Table 1).

Table 1. Consumption and distribution of “energy” (physical goods and services) at current levels

	Population (millions)	“Energy” per capita (GJ/person/year)	Total “energy” (EJ/year)
Emerg countries	1,500	180	270
Emerging countries	3,000	50	180
Submerged countries	2,500	20	50
Total	7,000	--	500

Now let’s imagine a situation in some year between 2020 and 2025 in which the world population has grown according to present trends, and let’s imagine that the “goods” to satisfy the total needs remain steady, according the “official” definition of “sustainable development” (Table 2). The situation is far from any “degrowth” project and far from any demand for equity. The per capita availability of “goods” for poor countries slightly increases. The availability of goods for emerging countries also would have a slight increase and the availability of goods for the steady-state population of emerged countries “decreases” from 180 to 110 GJ/person/year. So “degrowth” would be possible, allowing for only a small decrease in the misery of the poor, but at the expenses of goods and services available in industrialized countries. And such degrowth of the rich would mean, in the industrialized

countries, a decrease of 30 to 40% (compared to current values) of cars, electricity, housing, winter heating, summer refrigeration, food, furniture, clothing, and so on.

Table 2. Consumption and distribution of “energy” (physical goods and services) with a steady-state economy and population growth

	Population (millions)	“Energy” per capita (GJ/person/year)	Total “energy” (EJ/year)
Emergenced countries	1,500	110	170
Emerging countries	3,500	70	240
Submerged countries	3,000	30	90
Total	8,000	--	500

A less drastic situation (Table 3), assuming an increase of total “energy” consumption from 500 to 600 EJ/year, would at most leave a small reduction in poverty for the poor, leaving unchanged current levels the per capita energy consumption for industrialized countries. This, or any other similar scenario, would necessitate an increase in the extraction of natural resources from natural bodies or the emission of gases and other wastes in natural sinks. Furthermore, it would alleviate only a little of the misery for many people in the increasing population of the non-industrialized countries.

Table 3. Consumption and distribution of “energy” (physical goods and services) with a rise in world consumption and steady-state population

	Population (millions)	“Energy” per capita (GJ/person/year)	Total “energy” (EJ/year)
Emergenced countries	1,500	180	270
Emerging countries	3,000	70	240
Submerged countries	2,500	30	90
Total	7,000	--	600

The suggested scenarios, though spelling a deep crisis for industrialized countries, cannot decrease global demand for work and production, should they be so directed, for making food, machinery, housing, completely different from the present ones, using different raw materials and technical solutions. These thought experiments suggest that a “degrowth” project may be well and good for individual changes of attitudes and consumption by part of a small happy fraction of relatively wealthy people in industrialized countries. It does not seem acceptable towards a real decrease in pressure on the planet as whole. Any relief in pressure on natural resources requires severe changes in the economic rules of the present society. It implies limits and curtailment of individual freedom and avidity. It would involve severe changes in the consumption patterns of the rich to alleviate just a little the misery of the poor. Such changes seem necessary if nothing else, and apart from caring about the destiny of the planet and its ecological equilibrium, for an egotistical motive, from the perspective of the powerful: to decrease the rebellion and violence of the poor that may lead to a scenario of fear and instability for the rich.

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