



On the way to collapse?

In 1972, when the report of the Club of Rome (CDR) was published, the world population was 3.83 billion. In 2000, it had reached 6.13 billion while the CDR had planned 5.8 billion. 7.76 billion and 11.21 billion are forecasted in 2020 and 2100 respectively. A blazing population explosion.

In 1972, world GDP was \$ 3,767 billion (current US \$). In 2000, it was \$ 33'598 billion. In 2017, it amounted to \$ 80'738 billion. In 45 years, an exponential growth of 7% per year.

In 1970 China had 865 million inhabitants. In 2000, 1'283 and in 2015 1'397 million inhabitants. India had 554 million inhabitants in 1970. In 2000 the billion was exceeded to reach 1'053 million and in 2015 the population was 1'309 million. China's GDP in 1970 amounted to \$ 92.6 billion, in 2000 to \$ 1,211 billion and in 2017 to \$ 12,237 billion. It is close to that of the US, which amounts to \$19,391 billion.

In 1970, the GDP / head of China was \$ 113. In 2000, it was already at \$ 959 and \$ 8'827 in 2017. The CDR was far from imagining China's soaring growth.

Regarding oil, in 1972, the CDR had indicated reserves at 455 billion barrels and 31 the number of years they would be exhausted. Of course, we have not yet experienced shortages since new discoveries have been made. Since 1964, however, the trend in discovered volumes has been declining with some bursts due to the development of seismic prospecting methods and discoveries in deep water thanks to more efficient drilling methods.

As demand continues to increase, the discovery rate decreases. When the demand can no longer be met, the energy shortage will begin to be felt, only to become more acute over time. Renewable energies, whether hydraulic, solar, geothermal or derived from biomass, will therefore have to replace some of the missing fossil hydrocarbons. Experts predict that only a small part of fossil energy can be replaced by renewable ones.

At the end of 2015, so-called "proven" reserves were estimated around the world at nearly 1,698 billion barrels (1 barrel = 159 liters). Current world consumption is around 100 million barrels a day. At this rate, the reserves will be exhausted in 46 years. Since there is some opacity about the declarations of reserves of the producing countries, this duration could be shortened. As the population increases sharply in Asia, India and Africa, the daily consumption will necessarily increase and the reserves will be exhausted even more quickly. The IEA estimates that the global energy mix in 2040 will still be around 75% of fossil fuels (compared to 81.4% in 2013). As oil becomes scarce, prices will rise to become prohibitive. As a result, the flow of people and goods by air will decrease to zero. The last aircraft that will still fly will probably be fighter planes whose registration is hard to imagine today as the geopolitical future is uncertain. Perhaps we will see in the near future roads destroyed by bulldozers to extract the last oil drops from tar. In such a world, the globalized agro-food industry will collapse and the survival food production will become local. No more avocados imported from Chile, Kenya beans or grapes from South Africa. However, will it be possible for the remaining humans to live in such a world?

Perpetual growth is an aberration. And yet every day we hear this repeated credo again and again to measure the degree of success or failure of such and such

government or company. If world GDP increases by 2% a year, it will double in 35 years. If it increases by 5% per year, the doubling period will be 14 years. Do we have the resources to respond to such a doubling? Population, pollution, food production and industrialization have increased exponentially.

Let's take an example to illustrate the exponential function in a finite domain (soil, oil, non-renewable raw materials, agricultural production, etc.). According to an old Persian legend, a clever grain-rice merchant offered his king a magnificent chessboard (finite domain). In exchange for this present, he only asked for the following: a grain of rice on the first box, two on the second, four on the third, and so on. The King immediately agreed and gave orders for rice to be brought from his reserves: in the fifteenth box it was necessary to count 16'384 grains, in the 64th box the number of grains was astronomical (9'223'372'036'854'780'000). All the rice reserves were exhausted long before the chessboard had been paid. Where are we today? Maybe the 59th? Can we avoid the worst?

The great misfortune of the political and economic world is that it reasons too often in the short term. The CDR wrote in its 1972 report: *"Men are interested in events more or less far in space or time. Only a few have a long-term global perspective."* Confucius said, *"He who does not see further than the tip of his nose, will see the trouble closely."*

In 2012 the Club of Rome celebrated the 40th anniversary of its famous report (named "Stop Growth" or "The Limits to Growth"), also known as the Meadows Report, named after its chief editor. This celebration gave rise to a symposium on March 1, 2012. A second report came out using the same methodology as in 1972 but with modernized analytical tools. The 2012 report confirms the one from 1972. **"Everything is going as planned to make the disaster happen"**. In short, we are close to collapse. Only radical reforms of the system could delay the deadline. We have the tools, we know what to do, but we do not dare to implement them.

The Earth is warming up dangerously. Animal species are disappearing massively. We no longer see bees, nor swallows, nor insects, nor chafer. The sea is empty of his life. Extreme weather phenomena are more frequent here and there. Glaciers are melting, sea levels are rising, north and south poles are melting and, in the Alps, ;

whole sections of mountains are at risk of collapsing and swallowing up their villages and inhabitants.

Every pilot knows that hot air expands. This means that less air is contained in a given volume. This situation will cause breathing difficulties for millions of people.

Warming could also lead to the disappearance of low clouds (stratocumulus) and to a dramatic temperature rise (+ 8 degrees) in the event of a tripling of the CO₂ concentration in the atmosphere (NASA).

Take the time to observe our beautiful planet from the ISS Space Station (<https://iss.destination-orbite.net/live.php>). You will notice this fine line of light that surrounds it: it is our atmosphere that allows us to breathe and live. Its thickness is the equivalent of a single layer of paint on a tennis ball. What are we doing? We destroy it. Millions of lives are in danger. And who knows, the atmosphere could well escape in the space vacuum. The earth would then become similar to the planet Mars: a dead and hostile object.

Before reaching this definitive stage without return, the few remaining humans will end up feeding with "green sun" (or "Soylent Green").

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Sources :

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