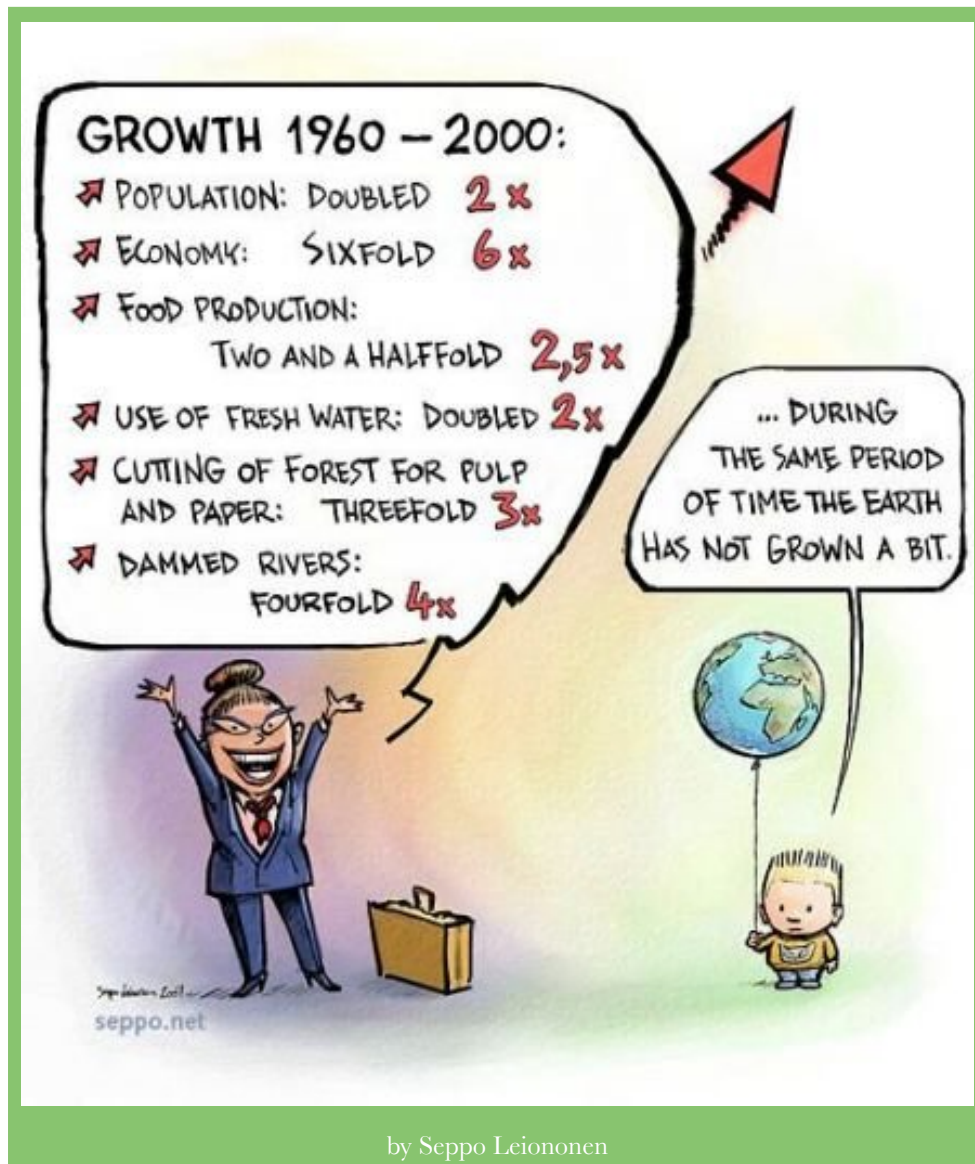


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# Effects of overpopulation over Energy, Environment and Economics



# Table of Contents

<b>The current population crisis</b>	<b>I</b>
<b>Roots to the problem</b>	<b>3</b>
Finite Planet	3
The exponential function and the doubling time	4
Economy envisioned to grow	6
Beliefs	8
<b>Effects over energy</b>	<b>12</b>
<b>Effects over economy</b>	<b>15</b>
<b>Effects over the environment</b>	<b>17</b>
<b>Solution to the problem</b>	<b>20</b>
Break the inequities of the world	21
Education towards sustainability	22
Activism	22
<b>Web-Reference</b>	<b>24</b>
<b>Bibliography</b>	<b>25</b>

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# The current population crisis

## An Introduction

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Climate change, destruction of the ecosystems, extinction of the species, depletion of the natural resources, loss in human well-being, growth of inequities between the rich and the poor. These are all the side-effects of one common problem, overpopulation.

Since millions of years ago, from when life first spread throughout the planet, diversity of species has been an attribute to describe the planet Earth. Although some have perished, the species of the Earth have unconsciously shared the resources the planet had to offer. However, slightly longer than a hundred years ago, one of them decided to start growing to numbers not reached by any of the other species. Fueled by energy, humans have drastically modified the environment and created unwanted consequences for their surroundings as well as for themselves.

Today, human population has reached 6.7 billion people<sup>1</sup>. Of these 6.7 billion, more than 5 billion were born in the last century. History can not tell us what to do in such a situation because this phenomenon has never happened before. Humans traditionally learn from older civilizations, which have left a legacy of knowledge that forms the base of our current governmental systems, science theories, engineering accomplishments, art creations, and beliefs. But overpopulation is new to us all. It has never happened before.

The current governments of the world have been shaped to deal with the known problems which have happened in the past. In front of new issues they have to innovate and to undertake solutions with the best possible approach. However, because the problem of overpopulation has occurred suddenly in just a hundred years and its magnitude is not comparable to that of any obstacle experienced in the past, the governments of the world are not qualified to cope with the current overpopulation crisis.

The solution to this trend is clear and there is only one. A plan of action has started from small groups, but the success for such accomplishment requires the

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<sup>1</sup> World Bank, World Development Indicators

mobilization of every human being on Earth. Never before in history has a change in the structure of a civilization demanded the action of every citizen.

There is no one person or any thing to fight against.

There is not a group whom to oppose or to rebel.

Only the action of each and all

can accomplish such a feat.

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# Roots to the problem

Understanding is the beginning to start acting with common sense.

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## FINITE PLANET

If the world and its resources were infinite, there would not be any constraints to population growth. If the planet was infinite, the fact that economic growth was the first issue of state in the US and many of other countries would make sense, or at least it would be possible. Unfortunately, the planet is finite and because nothing inside a finite container can grow forever, not a single country can grow forever inside the planet Earth. The sentence can not be simpler:

Not a single country can grow forever inside our finite planet Earth.

Yet, the main purpose of our economies is to grow.

When people see stock exchange charts, they are happier if the charts are growing. That means they are getting money from their stocks. However, not a single company can grow forever inside our finite planet Earth.

Water is finite, there is a fixed amount of water in the world which has been useful to all the living organisms since life was created on Earth, but the amount of water is not growing at any rate.

Non-renewable resources need thousands or even millions of years to be produced. Once we deplete those non-renewable resources, every technology that makes use of them will not be useful any more during that period of time. Is it not more intelligent to create something designed to last? Solar and wind energy are ready to be used as an efficient source of energy. The decision to change to this source of energy is ours to make.

Renewable resources are not being able to regenerate with the current abusive use and elevated harvest rates. The Amazon forest has been deforested for years, and now the question is for how much longer it can survive. Every nation was rich in resources at some time in the past, but humans have transformed those resources into mega cities, where the resources are already nonexistent. The resources necessary to

fuel big cities come from other sides of the world. However, with the current growth, there are only a few years left until those resources are also depleted.

## THE EXPONENTIAL FUNCTION AND THE DOUBLING TIME

“The greatest shortcoming of the human race is our inability to understand the exponential function.”

(Albert A. Bartlett - Emeritus Professor of Physics at the University of Colorado)

Nowadays, technology has advanced to summits never thought on the past. In one hundred years the number of engineering feats accomplished are difficult to summarize even in the biggest book ever written. In this new millennium there are hybrid

cars, planes, missiles, green buildings, solar panels and wind energy turbines. Nanotechnology is being developed as well as biotechnology. Medicine is so advanced that it can lengthen our lives by many years. Yet, all these achievement do not have any relevance if population keeps growing. Governments and common people fail to understand the meaning of a formula which once understood, has the potential to solve the problems of climate change, hunger, poverty and scarcity of resources. What would people do if they did not have enough food to feed their children? What would people do if they did not have enough water to drink? Countries have fought for oil. Would they fight for water?

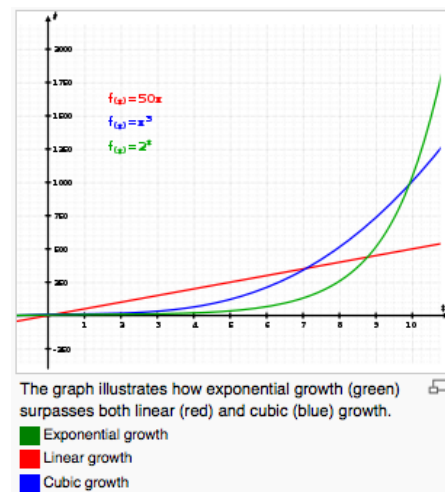
Through the exponential function we can deduce the formula of the doubling time. The doubling time ( $T_d$ ) can tell us the required time to double the size of the population, given the rate of growth ( $r$ ):

$$T_d = \frac{\ln 2}{\ln\left(1 + \frac{r}{100}\right)}$$

An approximation to the last formula can be expressed as:

$$T_d = \frac{70}{r}$$

Lets see an example of the application of this formula:



Source: Wikipedia. Web: [http://en.wikipedia.org/wiki/Exponential\\_growth](http://en.wikipedia.org/wiki/Exponential_growth)

The current rate of growth of the world population is 1.13% (2009 est.<sup>2</sup>) and the number of people is 6.7 billion people<sup>3</sup>. At this rate, the doubling time of the world population is:

$$Td = \frac{70}{1.13} = 62 \text{ years}$$

Following this estimation, by a growth rate of 1.13% each year, in 2072 there would be 13.4 billion people in the planet. Can you imagine this situation? I truly believe this size of population will not be reached and the rate of growth will decline as the years pass, either because families decide to reduce the number of children in each house or because nature will set the limits. Nonetheless, it is a good example to illustrate the dangerous situation we are living in. In the past, the growth rate has been much higher than 1.13%. Knowing that in 1900 the world population was 1.6 billion people, the average growth rate from 1900 to 2010 was:

$$\text{Growth rate (from 1900 to 2010)} = \frac{6.7 - 1.6}{1.6} = 3.2\%$$

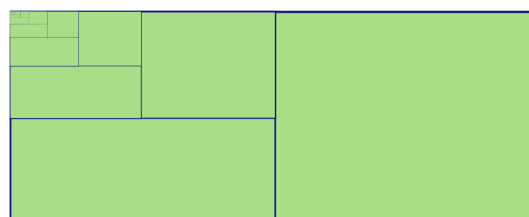
The lesson here is to learn to be cautious when listening about rates of growth, because a small 3.2% can duplicate the size of the population in just 22 years!

Lets give another example of the consequences of exponential growth:

Imagine a field of grass of 1000km<sup>2</sup>, which is a piece of land bigger than the city of Chicago (~600km<sup>2</sup>). Imagine that inside it we put a small organism of 1mm<sup>2</sup>. This organism has the capacity to double in time each minute. How long would it take before the field is completely filled with the organism? The answer is that it would take only 50 minutes:

$$2^{50} = 1\,125\,899\,906\,842\,624\text{mm}^2 \approx 1\,000\text{km}^2$$

The most surprisingly fact is that 3/4 of the field are free at minute 48, and half of the field is free at minute 49. Then, in just one minute the organism doubles its size and fills the whole field of grass.



<sup>2</sup> Source: CIA World Factbook 2010. Web: <https://www.cia.gov/library/publications/the-world-factbook>

<sup>3</sup> World Bank. Web: <http://datafinder.worldbank.org/about-world-development-indicators>

Then, why are citizens, companies and governments so worried about developing new technology, if that which is most simple has not yet been understood? Human beings shall stop the current exponential growth of the population in order to live in a sustainable way with the available resources and space of the planet Earth.

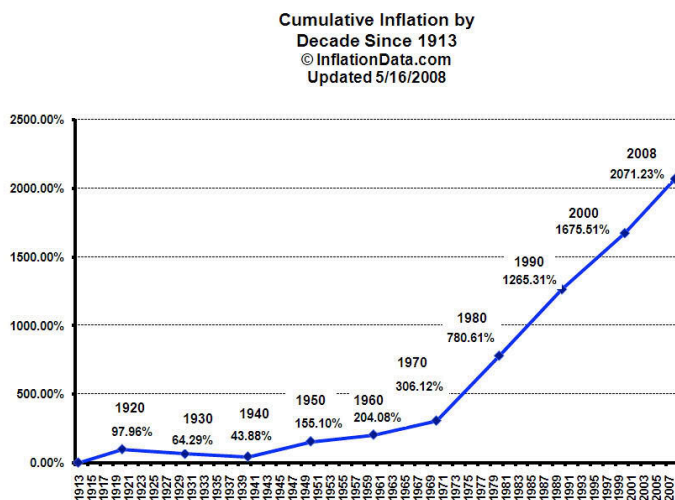
## ECONOMY ENVISIONED TO GROW

The US has been the world leader in the field of economy for more than a hundred years. Yet, how economy works is a mystery for the big majority of the US citizens. I was not born in the US. However, in my lifetime I have realized that what affects the US, affects the rest of the nations. For this reason, I became interested in knowing more about how the American economy works.

In 1913 the Congress of the US created the Federal Reserve System, which became the central banking system of the US. There are several controversies related with the Federal Reserve, but here we will only focus on the visible details of the historical data for the inflation and the debt of the US, which will lead us to the conclusion that the main purpose of the current economy of the US is growing and, by extension, the rest of the economies of the world have adopted the same objective.

Before 1971, the value of a dollar was convertible by a quantity of gold. However, since that year, the liability of each dollar comes simply from the Federal

Reserve, and its value is not equal to anything tangible like silver or gold. Nowadays, a dollar is just paper, and as history tells us, the value of money has been decreasing rapidly since the gold window was closed. Then, if this is true, there are more dollars on the world nowadays than in the past. How can this be possible? Who has the power to create money? In the

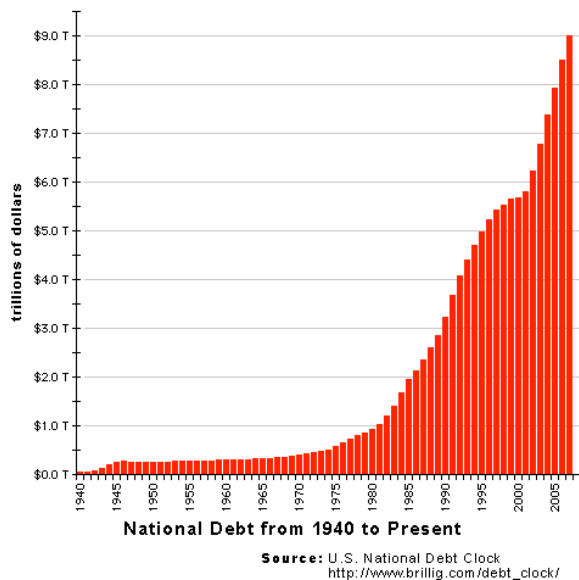


book “Putting it Simply” by the Federal Reserve, it is stated:

“...When the Federal Reserve writes a check, it is creating money.”



This topic can be studied in depth through the Crash Course given online and free of charge by Chris Martenson<sup>4</sup>. However, here there is one important concept to take into account in order to understand why the current economy has been conceived to grow, and this is that money is borrowed into existence and in the future it will be



necessary to pay the debt being created today.

Analyzing the situation of the debt of the US, it is clearly visible that the amount of debt has been growing exponentially since the dollar stopped to be convertible to gold in 1971. Today, the debt has already reached \$12.6 trillions and keeps growing<sup>5</sup>. This is the reason which makes me state that “the economy has been conceived to grow”. If new money is being created making the assumption that in the future the debt can be payed, it is assuming that the future will be wealthier than the present.

However, the economies of the world have been able to grow thanks to the surplus of energy provided by the fossil fuels which have almost been depleted. Therefore, under this illusion, rich countries are growing, and their goal is to keep rising their GDP, but for this purpose, they need labor, they need people in an overpopulated world.

In my country, Spain, one of the nations with the lowest birth rate (1.3 children born/woman<sup>6</sup>), the government has decided in several occasions to give economical helps to women having children, with the aim to increase the rate of birth. Therefore, I can assume, that the government wants to increase the population in order to grow in GDP. The government wants to make the economy grow. However, the planet Earth will not grow in the future and those debts being created today will not be payed, unless our society stops growing and allows the renewable resources to grow abundantly again. For this, we need an economy which has not been conceived to grow.

<sup>4</sup> The Crash Course by Chris Martenson: <http://www.chrismartenson.com/crashcourse>

<sup>5</sup> Source: US Debt Clock. Web: <http://www.usdebtclock.org/>

<sup>6</sup> Source: CIA World Factbook 2010. Web: <https://www.cia.gov/library/publications/the-world-factbook/fields/2127.html>

## BELIEFS

One of the controversies of overpopulation comes from the opposition of Catholicism to the use of condoms as the pope Benedict XVI declared on his trip to Africa in 2009. The reason for this declaration comes from the catholic point of view that sex is only allowed with the purpose of having children. Nonetheless, the mayor reason of the polemic comes because in Africa there is a well known problem of HIV/AIDS, where there is an estimation of 22.4 million people being affected<sup>7</sup>, and referring to this topic the pope added “you can't resolve it with the distribution of condoms. On the contrary, it increases the problem”<sup>8</sup>.

In Africa are found some of the countries with the highest birth rate which at the same time, are the poorest and most undeveloped counties of the world. The combination of both factors jeopardizes their capacity to start to advance as nations and, the more time they keep being undeveloped countries, the more time injustices will ensue.

To present a comparison, the total fertility rate of the US is 2.05 and the GDP Per Person \$46 400, while in Africa there are 25 countries with a fertility rate over 5 children per woman and the GDP Per Person rarely overpasses \$2000:

Country	Total fertility rate (children born per woman)	GDP Per Person
Niger	7.75	\$700
Uganda	6.77	\$1300
Mali	6.62	\$1100
Somalia	6.52	\$600
Burundi	6.33	\$300
Burkina Faso	6.28	\$1200
Democratic Republic of the Congo	6.2	\$300
Angola	6.12	\$8800
Ethiopia	6.12	\$900
Republic of the Congo	5.84	\$4200
Liberia	5.79	\$500

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<sup>7</sup> Source: Avert. Web: <http://www.avert.org/hiv-aids-africa.htm>

<sup>8</sup> Source: CNN. Web: <http://www.cnn.com/2009/POLITICS/03/18/martin.condoms/index.html>

Country	Total fertility rate (children born per woman)	GDP Per Person
Western Sahara	5.61	\$2500
Malawi	5.59	\$900
Mayotte	5.5	\$4900
Benin	5.49	\$1500
Sao Tome and Principe	5.33	\$1400
Chad	5.31	\$1500
Guinea	5.2	\$1100
Mozambique	5.18	\$900
Zambia	5.15	\$1500
Madagascar	5.14	\$1000
Rwanda	5.12	\$1000
Equatorial Guinea	5.08	\$36600
The Gambia	5.04	\$1300
Sierra Leone	5	\$900

(Source of the data: CIA World Factbook 2010. Web: <https://www.cia.gov/library/publications/the-world-factbook>)

The core beliefs of any group need to be respected. This value of respect is essential to achieve tolerance in a world where innumerable beliefs coexist. At the same time, the members of every belief need to think about the consequences of their actions.

Many African nations are suffering from poverty, lack of resources and education and clearly, they are facing an expansion of HIV/AIDS which could be controlled with the use of condoms. Therefore, their use is not only advisable for Africans, but also an obligation for their own safety and the safety of their own countryman. Pope Benedict XVI should have considered this fact before asking African people not to use condoms.

Referring to other religions of the world, Hinduism does not oppose the use of contraception methods as there is not evidence of their disapproval in the old Hindu texts. Some of the most important scripts in Hinduism are: The Vedas, The Upanishads and The Ramayana<sup>9</sup>. Between these texts, it is possible to find some

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<sup>9</sup> Source: About.com. Web: [http://contraception.about.com/od/additionalresources/ss/religion\\_6.htm](http://contraception.about.com/od/additionalresources/ss/religion_6.htm)

scriptures that encourage large families and others that do the contrary, but altogether family planing is well accepted and seen as positive for the society.

In Buddhism there is not an opposition to contraceptive methods except if they involve to kill a living being, as for buddhism life starts when the sperm fertilizes the egg. Therefore, abortion is viewed as immoral. Contemporarily, the Dalai Lama added that “abortion should be judged depending on the circumstances”<sup>10</sup>.

One of the big differences between Buddhism and other religions is that it does not actively encourage the creation of families with numerous children<sup>11</sup>.

Regarding Islam, between some of its branches the use of birth control is permitted when the health of the mother or the well-being of the family could be compromised. Excluding this fact, contraception methods are not broadly accepted.

Islamic traditions encourage the creation of numerous families. This habit could come from the sentence recorded in the The Qur'an “procreate and abound in number”. However, customs change, and nowadays some Islamic traditions believe that through having less children, the mother will be more attentive as she would have more time and resources for her infants<sup>12</sup>.

In Judaism, there is also support for big families where the man has the obligation to procreate and have at least two sons (depending on the rabbi)<sup>13</sup>. Other characteristic of Judaism is that the voluntary waste of sperm is not permitted and therefore, preservatives are not an acceptable contraceptive method.

From my point of view, I would say that religions are a beautiful part of the history of human beings. There are religions in every culture, in every nation and they have existed far before history started. However, those that formed the religions lived in a world completely different to the one we are living in today, and in those days to have numerous children did not compromise the well being of society. Today, numerous families increase the problem of overpopulation in a finite world.

To have children is seen as a blessing for religious and non-religious parents except in unusual circumstances. In order to make more out of this beautiful

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<sup>10</sup> Source: New York Times. Web: <http://www.sacred-texts.com/bud/tib/nytimes.htm>

<sup>11</sup> Source: BBC. Web: <http://www.bbc.co.uk/religion/religions/buddhism/buddhistethics/contraception.shtml>

<sup>12</sup> Source: About.com. Web: [http://contraception.about.com/od/additionalresources/ss/religion\\_6.htm](http://contraception.about.com/od/additionalresources/ss/religion_6.htm)

<sup>13</sup> Source: BBC. Web: <http://www.bbc.co.uk/religion/religions/judaism/jewishethics/contraception.shtml>

experience, family planning can greatly help to avoid unwanted experiences for both parents and children.

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# Effects over energy

It is not a very good idea to invest into a piece of cake when there are 6.7 billion guests sitting on the table.

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Yes, it is true, society has invested years of work to the development of complicated methods to obtain, transport, and make use of non-renewable resources, which once depleted, they will not be produced again until millions of years from now. Would it have not been better to invest that time and effort in the development of the methods to obtain, transport, and make use of a source of energy which could last forever? Think about that. Is it not more rewarding? Yes, it is, and in fact, it is also possible. Are there any inconveniences? Yes, there are. At the moment it is not easy to run a Formula One car at 400 km/h with solar energy. It is more attractive to light all the city of Las Vegas day and night to make consumers spend more money, than to save energy and turn off the lights when they are not strictly necessary. It is not possible to provide to all the citizens of the world with the same amount of energy than the average american citizen is consuming every day. But in fact, if energy was rationalized, solar, wind and other renewable energies could very well sustain the needs of energy of the world, with some help of the non-renewable energies, until an efficient method to store the energy produced from renewables was developed.

Why is the human race so dependent on energy? Is it so essential that societies want to use it abundantly in a daily basis even if they are aware of the consequences it brings? The US is the country most dependent on energy, with an energy use of 3.9 trillions of KWH per year (2008 est.). Second in the rank is China with 3.4 trillions of KWH per year (2008 est.)<sup>14</sup>. Citizens usually blame their governments of not helping to reduce the energy dependency of the country, but in fact, it is the people that is making the use of this energy. With a population of 300 million people, who is used to an abusive use of energy, the US government can put some measures, but the last word is on the citizens. However, it is easier to make a decision being an american citizen who can enjoy of an average of 13 000 KWH of energy use per year, than being a chinese citizen who has only 2 615 KWH per year. Here, the words stated by Asimov “democracy can not survive overpopulation” are simple enough to understand. As the population of the world grows, each citizen loses a portion of

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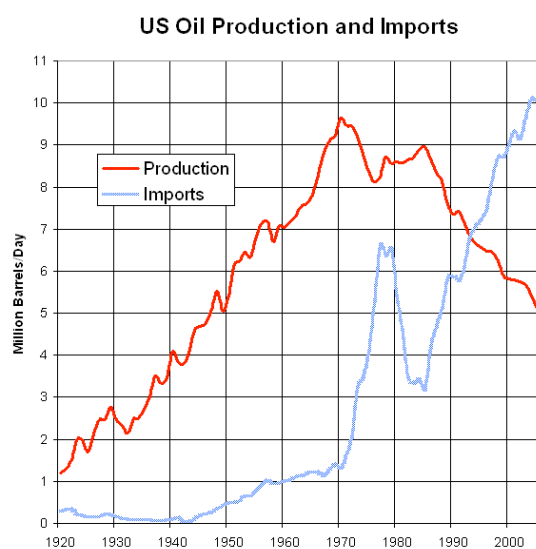
<sup>14</sup> Source: CIA Factbook. Web: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2042rank.html>

democracy and freedom. If there are resources for every human being, democracy can be achieved, but once there are not resources nor energy available for every human being, some individuals do not have the option to chose, but rather they are imposed not to consume.

The pollution of the air is one of the worst consequences of the intense use of fossil fuels. This is not a problem anyone can evade because the air of the world is common to all of the living organisms of the planet Earth. Humans are destroying the option to chose for a cleaner air and nowadays, toxic particles are imposed to us all, thence, destroying a piece of democracy. This is just an example of the many unjust situations that the world and its inhabitants are facing today.

Next, I will overview some of the situations caused by the use of the most popular sources of energy used nowadays.

Between the conventional methods used to obtain energy, burning coal is probably the dirtiest process of all. Coal has a high concentration on Sulphur dioxide which leads to acid rain, and despite of the fact that governments know of this consequence from long time ago, the use of coal is still well spread all around the world. The Independent reported on August 2006<sup>15</sup> that one third of China's land mass was affected by acid rain. I think this is a price too high to pay in order to obtain energy.



Source: Wikipedia. Web: [http://en.wikipedia.org/wiki/Hubbert\\_peak\\_theory](http://en.wikipedia.org/wiki/Hubbert_peak_theory)

Oil is the most exploited non-renewable source of energy, but it took a hundred years until oil surpassed coal as the most used source of energy in the mid 1960's<sup>16</sup>. This happened because oil was more suitable to produce energy than coal, and not because the reserves of coal had been exhausted. However, it is probable that humans finish with all of the resources of oil unless the use renewables starts to grow rapidly.

Marion King Hubbert predicted

<sup>15</sup> Source: The Independent. Web: <http://www.independent.co.uk/news/world/asia/acid-rain-polluting-onethird-of-china-413488.html>

<sup>16</sup> Source: Peter A. Victor. "Managing without growth 2008": Edward Elgar, 2008

a “peak oil” in 40 states of the US by 1970 and he was right as it is visible on the figure. He understood that not a single source of energy which is non-renewable can last forever. Nowadays, there is much debate about if peak oil in the world has already been reached or not, but there is not doubt that peak oil is a fact. The influence of the population in this matter is only of speed. The more inhabitants on the world the faster the reserves of oil will be depleted.

As oil, nuclear power is a non-renewable energy. Its use is highly polemic. Some say that the proximities to a nuclear power plant are in danger of being exposed to radiation. In my opinion, there is a risk, but not higher to the risk to contract an illness like cancer from polluted air or water. However, there is a factuality that is indisputable, and this is that nuclear power is a non-renewable resource as coal and oil and therefore, if humans decided to use nuclear power as the main source of energy, there will be a time to start to be concerned about a peak in nuclear power. The time until this happens can take many years, but it will come. Then, why to use so much effort in making use of an energy with an expiration time? If all the effort spent in developing nuclear power was invested in developing wind and solar energy the results could last forever. Besides, the effects of the exponential function can not be forgotten and if humans started to make use of nuclear power with all the countries of the world demanding a piece of cake of equal size and ever increasing by a factor, we can now foresee the results. A peak in nuclear power.

In conclusion, the growth of the population is making that our non-renewable sources of energy are being exhausted at increasing quantities each year, which brings forward the date of depletion of those resources. Renewables are the solution to find a possible source of energy without expiration date.



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# Effects over economy

Is this that is happening good for your economy? is it development?

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Economy is one of the pillars of our society. It is essential to have a strong economy to be able to support a developed society and make its members wealthier, less worried about labour and in more disposition of free time to use in their own personal projects. However, our economy is not strong and its theory is not solid. I can be very criticized for this statement, nonetheless, the facts are clear, it is not working. I am not an specialist in economy, but I see the facts.

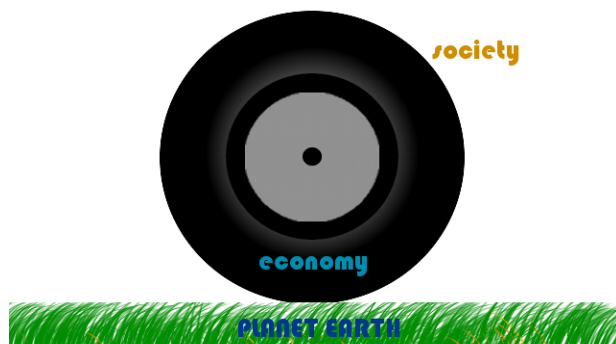
To my knowledge, one of the worst weakness of the current economy system is the process of creation of money. Besides, this process is not democratic as we have already seen. Because of this reason, I think that economy is very sensible to mistakes made by small groups of individuals, like bank members. I am not saying the process of creation of money should be democratic, in fact, I believe it does not make any sense to create more fiat money if resources are not more abundant but just the contrary. What I am saying is that the process of creation of money is weak, and the fact that it is not democratic makes it even weaker.

During periods of wealthiness, people do not worry about complicated political or economical topics, thinking that everything is working well. However, because of the nature of the exponential function, crisis comes quickly, suddenly uncovering those mistakes made in the past.

One of the claims of many economist is that technology will improve in the future and it will make possible to get more productivity out of less resources. However, the rate of growth and destruction of the environment is growing faster than the improvements in technology (Jevons paradox).

By now, we know that a strong society is dependent on a strong economy. Next concept to have into account, is that the economy is limited by the environment and the resources that can be found within the ecosystem in which the society is being developed. Deriving from the visualization of the relationship between society, economy and environment conceived by Peter A. Victor and represented in the book “Managing without growth”, I like to visualize the relationship between these three systems as if the society was a wheel wheeling through the planet Earth. This is a very

special wheel because it can eat and use resources from the Earth to grow itself. This wheel is independent of the environment and if it disappeared, the environment would still comfortably exist.



However, if the wheel grows too much it is in danger of growing bigger than the environment.

The wheel of a bike needs that air is pumped into the air chamber in order to be inflated. Our wheel needs that resources are

pumped inside the economy chamber in order to grow. Furthermore, because there is not air inside the wheel but solid resources instead, our wheel can not be easily



punctuated and it can grow as long as there are resources on the planet. Nevertheless, the Achilles' heel of our wheel is that if it grows beyond the planet Earth is ready to sustain, there will not be enough resources to sustain it any longer. In fact, this is the situation we are living in today. It

is simple, the population of the world has grown to 6.7 billion people<sup>17</sup> and this people need an stable economy to keep wheeling. Unfortunately, resources are being exhausted and they are not abundant any more. Our economy is facing a crisis to which some countries are still looking for the reason. There is nothing to predict, the facts are already in front of us. Population has grown disproportionately to the size of the Earth and the resources available. Therefore, this will have consequences on the economy until society decides to decrease the population of the people living on Earth by means of having less children per family.

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<sup>17</sup> World Bank, World Development Indicators

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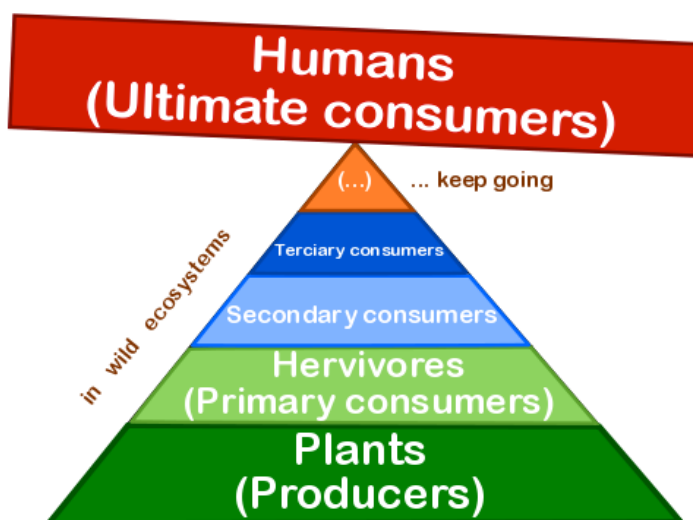
# Effects over the environment

The choice is ours to make, quality or quantity, that is the dilemma.

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The Earth has a mass of  $5.97 \times 10^{24}$ kg, which is not growing. Its volume is  $108.32 \times 10^{10}$  km<sup>3</sup> and is not growing. The resources of the Earth are not growing either, instead they are continually decreasing because of the current consumption levels set by humans. On the other side, population is growing at a rate of 1.13% per year (2009 est.<sup>18</sup>) and as we already know, this leads to double the population in only 62 years. Because the surface of the Earth is limited in space and the number of humans is increasing, therefore the number of other species of animals and plants is decreasing. This has generated an imbalance on the ecosystems which consequences are already irremediable in many cases.

Between plants and animals, the number of endangered species on the planet is 15 258 as listed in "Earth's Endangered Creatures"<sup>19</sup>. These species live in delicate ecosystems where any subtle change creates an imbalance that affects to all the living beings. This is largely taught at schools, at least in the developed countries. I learned it when I was around 10 years old, but what they did not teach me is that humans are also part of the ecosystems, and that any imbalance affects also to all the human beings on Earth. It seems most humans think they are not part of the ecosystems and



nothing can affect them. This is nonsense. Humans, as the rest of the animals and plants of the Earth, are part of an ecosystem which is delicate and serves as the net that interconnects all the living creatures inhabiting on it. I also learned at school that a food chain is the representation of the relationship between the producers (or autotrophs), that can

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<sup>18</sup> Source: CIA World Factbook 2010. Web: <https://www.cia.gov/library/publications/the-world-factbook>

<sup>19</sup> Source: "Earth's Endangered Creatures". Web: Accessed 4/1/2010 at <http://earthsendangered.com>

create their own food, the consumers of the producers, and the successive consumers of the former levels on the food chain. This food chain is usually represented as a pyramid to make clear that the species at the bottom are the most numerous and serve as food to the superior levels. It is very important that the species at the inferior levels are more numerous because if not, the superior levels would not have enough food, resulting in an imbalance of the ecosystems. This is exactly what is happening today. Through agriculture and farming humans have made use of a few species that were a good source of food, disregarding the rest of the species and creating a disparity in the abundant diversity of the ecosystems. This ability has consequences.

The Millennium Ecosystem Assessment called for by the United Nations Secretary-General in 2000, reported in 2005 that approximately 60% of the ecosystem services examined were being degraded or used

*The changes that have been made to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been achieved at growing costs in the form of the degradation of many ecosystem services, increased risks of nonlinear changes, and the exacerbation of poverty for some groups of people. These problems, unless addressed, will substantially diminish the benefits that future generations obtain from ecosystems.*

Source: Millennium Ecosystem Assessment. "Ecosystems and human well being: Synthesis".

unsustainably. It also reported that the consequences of the degradation are largely irreversible and they will have an effect for human well-being. Hence the inability for humans to adequately use our superior intelligence and in doing so, we have provoked the destruction of what is more valuable to us, our ecosystems. Ecosystems provide us with food, medicines, sources of energy, materials for construction and everything that

*Over the past 50 years, humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber, and fuel. This has resulted in a substantial and largely irreversible loss in the diversity of life on Earth.*

Source: Millennium Ecosystem Assessment. "Ecosystems and human well being: Synthesis".

humans have used for thousands of years. This situation will affect more likely to the poor than to the rich and will create political

tensions, resulting in an unfriendly environment between the countries whose interests are different.

These are some of the consequences of overpopulation over the environment. I believe that there is not an entity or individual that is degrading our environment by itself, but the conjunction of all the population of the world and our need for resources that creates the situation of imbalance. It is true that some individuals pollute and consume more resources than others, and the same happens at the enterprise, city and country level, but all of us are contributing with a part.

Many of us have blamed the governments at least once saying they should put an stop to the pollution of the environment, but in fact, now I believe they lack of the power to achieve such result. It is very easy to blame the governments and say they have to do something to solve the problem of pollution, when at the same time billions of people want access to food, cloths, a house, light, education, etc. Cities are already too big and resources have long ago being depleted in the area where big cities have been established. Governments do not have the power to decrease the population of a country and at the same time to rule with democracy. The solution to this problem has to come from every human on Earth.

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# Solution to the problem

Will you decide to solve a problem for which only you have the solution?

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The solution to overpopulation is short and simple, and there is only one non-dramatical viable solution. This solution is composed of two points:

- 1) To have less children.
- 2) To have them at a reasonable age, not too early.

Each citizen has a role to play in order to reduce the population of the planet. Never before on history a change in the structure of our society required the actuation of every human on Earth. If a group of citizens or countries decide to act but not the rest, the solution can not be reached. However, if the action comes promptly so will the solution. As Alan Weisman states, if each couple had only one children, the population could be reduced by half by 2075<sup>20</sup>. On the other side, if families have more than two children, the growth of the population will continue.

Which would be the benefits of living in a world with less than 3.3 billion people? What about 2 or 1 billion people? Some of the benefits would be abundance of resources, protection of the endangered species, conservation of the ecosystems, decontamination of the atmosphere, rivers, lakes, oceans and by extension, a gain in human well-being. It will also be possible to achieve a sustainable economy, which would be able to make use of the resources of the Earth at a lower rate to the rate the environment needs to replenish such resources.

A beautiful vision of a sustainable economy is what Herman Daly calls a green economy and describes as follows:

“A green economy is an economy that imitates green plants as far as possible. Plants use scarce terrestrial materials to capture abundant solar energy, and are careful to recycle the materials for reuse...

...In spite of the fact that green plants have no brains, they have managed to avoid the error of becoming dependent on the less abundant source of available energy.

A green economy must do likewise – seek to maximize use of the abundant flow of solar low entropy and economize on the scarce stock of terrestrial low entropy. Specifically, a green economy would invest scarce terrestrial minerals in things like windmills, photovoltaic cells, and plows (or seed drills) – not squander them on armaments, Cadillacs, and manned space stunts. A green economy can be sufficient, sustainable, and even wealthy, but it cannot be a

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<sup>20</sup> Source: The Guardian Newspaper. Web: <http://www.guardian.co.uk/environment/2010/feb/13/climate-change-family-size-babies>

growth-based economy. A green economy must seek to develop qualitatively without growing quantitatively – to get better without getting bigger.”<sup>21</sup>

(Herman Daly 2010)

This is a beautiful vision, but a green economy needs a small population, it needs space and it needs that we reduce the current harvest rate of the renewable resources.

Before, I have stated that “the solution to overpopulation is short and simple”, and by saying that it is short and simple I mean, that the solution can be explained in a few number of words and it is at the same time easy to understand. However, the way to reach such solution is not so short nor so simple. As I said, it requires of the collaboration of every human being in the world.

Next, I will provide what I think are some of the keys to reach the people and make them realize that only they have the keys to solve the trend of overpopulation.

## BREAK THE INEQUITIES OF THE WORLD

Rich countries of the world have reached their current level of development making use of the non-renewable resources of the Earth. Many of those resources are already gone and they will not be available until thousands of years from now, and as a consequence, poor countries have been deprived from a part of the wealth of the world. Now, it is the time when rich countries must help poor countries to develop, to be sustainable and elude the mistakes made in the past by the now wealthy nations.

From the 2009 Human Development Report it is possible to observe that the 27.5% of the population control the 86% of the economy:

	Total population in millions (2007)	GDP in US\$ billions (2007)
Very high human development	986 (14.8%)	39 079 (71.5%)
High human development	917 (13.7%)	7 929 (14.5%)
Medium human development	4 381 (64.7%)	7 517 (13.7%)
Low human development	385 (5.8%)	147 (0.3%)
Total	6 670 (100%)	54 672 (100%)

(Source of the data: Human Development Report. Web: <http://hdr.undp.org/en/reports/global/hdr2009/>)

This is not a fair scenery and we must change the situation. A practicable way of doing this breakthrough is to move a massive force of educators, subsidized by the rich

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<sup>21</sup> Source: Steady State Economy. Web: <http://steadystate.org/learn/blog/>

nations, to those undeveloped countries, with the purpose of teaching them how to create a developed and sustainable society, and at the same time, without getting involved in their own political matters. Poor countries have to learn by themselves how to solve their own problems but a help in this direction can reduce the period of time they would need otherwise to become developed.

## EDUCATION TOWARDS SUSTAINABILITY

The universities of the world have a wide range of degrees in different disciplines such as finances, arts, sciences, engineerings, humanities, etc. Yet, only a few of the degrees are focused on the topic of sustainability or overpopulation. How is it possible that the major trend humans are being exposed to is almost not being studied in the most famous universities of the world?

Technology is well studied nowadays, but through years of experience we can see that as we use more technology, the rate of consumption of the resources is increasing (Jevons paradox). As Herman Daly said, some technology can help us to extract more efficiently from nature those resources human need to live, nonetheless, other kind of technology is only helping us to waste the valuable resources of the Earth. If we want to break the inequities of the world, it is mandatory that humans reduce the quantity of resources and energy being demanded in the developed countries, because in a world with 6.7 billion people, there is no chance that all of us can consume such large amount of resources.

I believe that only once education has reached undeveloped countries, the people living within will by free will stop the high rates of birth and therefore, stop the problem of overpopulation. In order to obtain those results, countries have to collaborate and give the maximum from their side, and not just a 0.7%. Because even if there are not any perspectives of receiving a payment in the future, it will finally come when sustainability has been accomplished.

## ACTIVISM

Finally, I conclude with the thought that the words printed in this paper are just that, words. To make them real it is necessary to act. My contribution to the problem of overpopulation will be to have no more than one child. At the same time I will dedicate as much effort as my body and mind allow me to present this problem in



front of other people. I know that neither I nor any other person in the world can solve this problem alone. Just let me repeat a sentence once more:

To solve the problem of overpopulation it is required the action of every human being on Earth.

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