

FEEDING MANKIND

After World War Two (WW II) famines and malnutrition have been recurring issues along with the assertion of the Third World.

Today, it's a fact there is enough food to feed the whole world population but famines and malnutrition remain topical subjects

How to guarantee food security to the whole world population?

First, let's point out the need to feed the growing world population.

Then, let's see how some countries have tried to meet this difficult challenge

I/ The need to feed a growing world population

A/ A higher and higher population increase

In the World, there are over 7 billion inhabitants. But the population keeps on increasing. There are different explanations to this phenomenon.

Indeed, before 1900, the population grew only slowly but in recent centuries it went from 1,5 to 6,1 billion. Therefore, it quadrupled in just 100 years. The birth rate and the death rate go down still nowadays. Medicine's progress improved living conditions and better hygiene helps decreasing diseases and child mortality. Better living conditions can also allow living longer.

The rise of the population is higher in the southern countries. We can see that in the LEDC's, people have more children than in the north. They don't have access to contraception or they don't know how to use it. Also children can work. An example of a high population is India because the fertility index is very high, it's the most populated country. However, in the developing countries, the death rate is high.

In fact, the northern countries also contribute to the increase of the population, but in a different way. In the MEDC's the population is aging because of the "Baby Boom" in the 60's, for example. Now the number of births is lower. It can be explained by the contraception or by government restrictions like in China in the past where people are limited to one child per family.

As a result of the population increase, there are different negative phenomena. At first, the growing number of births in the world causes overpopulation in some regions, like in Africa. Furthermore, the lack of resources will be a huge problem to feed the World population and to meet its needs. Moreover, people who live in southern countries are mostly poor. Then, there are also environmental consequences like global warming and the greenhouse effect because of pollution. Deforestation and intensive farming are also caused by human activities. However, some people are better educated and skilled and can try to find solution to all of these issues.

In conclusion, we can say that the population quadrupled in the 20th century and that number keeps going up in the 21st century. As we said before, the increase is higher in southern countries but the impact of population's rise is bad for our planet and we are all concerned.

B/ Evolution of food production

Since 1960, the population in the world continues to increase. Every 15 years, it rises by 1 billion because of the demographic transition. The population was 3 billion in 1960. In 2010, it's 7 billion so 4 billion more in 50 years. The sudden increase happened thanks to the advancement of hygiene, environment, the improvement of food production in the world and the progress of life expectancy.

Today, there are 5 billion hectares of agricultural lands, it was only 2 billion in 1960. The population leaves to the countryside to go to the city. It's the drift from the land. Indeed, machines are replacing men.

The drift from the land has an effect on people who moved to the countryside to go the city because there are fewer and fewer jobs in the countryside from year to year. As the result, cities grow.

Nowadays, there is enough food produced to feed the whole world population. So it's possible we lack food if we stop using technology. In 2050, food production will even lead to a surplus with technology. Moreover population increases and food production increases too but at the same pace.

In conclusion, for our future, it's necessary to have a good technology to increase food production and avoid a World food crisis. But technology is not present in all the countries. But, in the meantime, some people are still undernourished.

C/ But still so many are undernourished

Nowadays, many people are undernourished (they get under 2000 calories a day) , food is badly distributed and many areas have and will have a great need of food. We will see which areas lack food and need of food and why these ones are concerned.

First of all, in 2010, the areas who need food are Africa and Asia. More precisely, according to the statistics of food demand, we can see that Sub-Saharan Africa, Middle East and North Africa, and countries like India, will ask more and more food. Contrary to these Southern countries, areas like Europe, which is composed of Northern countries, are overnourished.

Secondly, these Southern countries do not have means of contraception; there is a high birth rate, so there are a lot of children to feed. Moreover, in these countries, there is a lack of money; so they cannot afford to buy food as we do in Northern countries where there is a huge waste of food.

In conclusion, in Southern countries, food demand is a combination of poverty and high fertility.

II/ Meeting the challenge of food security is hard

A/ Some modern solutions

1) Agribusiness

Agribusiness is divided into many parts. At first, it needs seeds and fertilizers to produce more and faster. Finally, there are research and banks which lend money to buy new seeds, pesticides and agricultural machinery.

It leads to production. Which is divided into two parts : harvest (vegetables, cereals) and farming (milk, eggs and livestock). The production is stored in barn and grains silos or sent (exportation) or processed by the food industry. Moreover, this food industry processes food (transform food into ready-to-eat). Then, it's distributed to supermarket and restaurant so people can eat this food. It's an efficient process which produces a lot of food.

2) The green revolution: principles and drawbacks

The green revolution is a large increase in crop production in developing countries achieved by the use of artificial fertilizers, pesticides and high-yield crop varieties.

The green revolution began in Mexico in the 1940s.

Because of its success in producing more agricultural products there, Green Revolution technologies spread worldwide in the 1950s and 1960s.

Principles of the Green Revolution

It combines 3 fields:

HYV= High Yield Varieties

Fertilizers
Irrigation

Drawbacks of the Green Revolution

They have been several criticisms of the Green Revolution: It can cause pests and weeds to develop hazards
And it employs mono-culturing

Moreover, the increased amount of food production has led to overpopulation worldwide.
That's to say the Green Revolution by producing more food helped to feed the population better.
So people could have more children could did not starve and die. But more children meant more mouths to feed!

The Green Revolution in India

The green revolution took place in India in the 1960s.
It changed India's status from a food deficient country to one of world's leading agricultural nations.
The Green Revolution in India is a period of high increase of the agricultural production due to the improvement of techniques and technologies.
But in India, not everybody, benefited from this Green Revolution.
The poorest farmers didn't.

To conclude we can say that in a long term we can't maintain green revolution.
That's why India doesn't starve anymore but has to face pollution of water and soils due to the use of chemicals.
Indian people have to find a new strategy to meet sustainable development.

3) GM food

GMO or Genetically Modified Organisms can be defined as plants, animals or microorganisms in which the genetic code (DNA) has been artificially altered, generally to improve their properties or to treat pathology.

There are many advantages for producers and consumers. For the producer, seeds are more costly whereas yields are more important, because GM food improves crop protection and allows plants to resist against decreases caused by insects or viruses. So they offset largely the seeds' price. For the consumer, GM food is cheaper than normal food.

With all those elements, we can think that GM Food can be the future for global agriculture, and we will be able to help countries which are currently lacking food. But a group of scientists think that this isn't the best solution.

Some Zambian scientists said that using GM seeds can be harmful. Indeed, they are also a lot of issues with GMO.

GM food can affect human health like allergic reactions and gene transfer. The gene's dispersion in the environment around GM fields can modify the biodiversity by infecting non-target organisms.

Moreover, many countries disagree with this type of culture. African countries don't want to develop it because of high cost of genetically modified seeds and they choose safety rather than yield.

Genetically modified food has the potential to solve many of the world's hunger and malnutrition problems, and to preserve the environment by increasing yield and reducing dependence upon chemical pesticides and herbicides. Many people think genetic agriculture is the inevitable future and that we cannot miss out on this technology which has so many benefits. However, we must focus on preserving environment and human health to insure the survival of our blue planet.

B) Some currents debates

1) The mad cow disease

There are some current debates about how to meet the challenge of food security, and in aiming at reducing the cost of the cattle's food. Some not very scrupulous means are used, which is causing problems, such as the mad cow disease, which appeared in the United Kingdom in 1986. First, we will identify the disease, its spread and the threat it represents for humans and cattle. In the second part, we will analyse the different steps of the crisis and how people fought against it. Finally, we will see the end of the crisis and the measures taken after the disease to avoid a new one.

The mad cow disease, also known as the BSE (Bovine Spongiform Encephalopathy) is caused by eating unwittingly animals of the same species : farmer used bonemeal (farine animale) to fed cattle. The main symptoms include aggressiveness and a lack of coordination by attacking their central nervous system, and it's usually fatal. Later, we discovered that BSE can also infect human: the contamination is due to the ingestion of contaminated meat. It's called the Variant Creutzfeldt-Jakob disease and it attacks the brain too, causing death.

The main epidemic broke out in England in the late 1980's. At this time, there was no evidence it could be transmitted to human. The epidemic reached a peak in 1992/1993. Around 200,000 cattle were affected and to try to stop the disease, 4.4 million were slaughtered. The CJD (Creutzfeldt-Jakob disease) has been discovered in 1995, and since this date, 178 human deaths have been attributed to it. Moreover, it's thought that one in 2,000 people in the United Kingdom is a carrier of the disease. During the crisis, people feared eating things which contained cow meat.

After the crisis, many strict controls were created to protect people, like the ban of certain cuts of beef, like the beef-on-the-bone. Furthermore, many countries stopped importing beef from the United Kingdom.

The mad cow disease is a major crisis for the British agri-business and it is also a huge warning for world health. The mad cow disease is one of the consequences of the mass production of food, which is linked with the increasing world population. So the question is : how to produce more and avoid this type of crisis at the same time ?

2) Food waste

Nowadays, we waste about 1, 3 billion tons of food a year. It represents a third of all the food that we grow. Indeed, there is a huge inequality between northern countries and southern countries which comes from the way they waste.

In southern countries, mainly in Asia, unfortunately, waste they food but they can't help it. First, because they don't have enough means of preserving food, then in markets the food get squished. Food isn't wasted by people though. Whereas in northern countries, it's thrown out by the consumer: this waste represents around 40% of the food they buy. This difference is due to the high cost of food because in developing countries food is expensive; so it's precious.

IMPACT OF WASTE IN THE ENVIRONMENT

Wasting is a huge problem in our society and has a big impact in the environment. More than 1MM tons of food is wasted each year and its worth 750 MM \$, more than the GDP of some countries.

Wasting that much, wastes a lot of water as well. According to the Food Agriculture and Organization (FAO), 250 km³ of water has been wasted in 2014, the equivalent of 3 times the lake of Geneva.

Wasting has a huge carbon footprint 3,3 billion tons of carbon is released in the air (Co2) greenhouse gases, because of food production. Food waste is a big problem for the environment; it's the 3rd polluter in our planet as much as the USA and China. Food loss and waste corresponds to 1,4 billion hectares of fields which leads to the disappearance of animals

REDUCING FOOD WASTE

The FAO said that metal silos can help against fungus ruining grain stocks in Africa's countries. In India, the FAO is encouraging farmers to collect tomatoes in plastic boxes rather than big sacks.

There are also a lot of different ways to reduce food waste in the daily life in rich countries :

- People could make a list of what they need to buy to avoid food surplus, buying useless items.
- Cleaning the fridge once a month is a good idea, in order to prevent the development of bacteria.
- We should value the doggy bag in restaurants. It means taking home leftovers.
- It's important to give a second chance to less aesthetic food and veggies.

3/ Biofuels

Biofuels have been around as long as cars have. Indeed, Henry Ford planned to fuel one of his cars with ethanol. Gasoline and diesel are actually ancient biofuels. But they are known as fossil fuels because they are made of decomposed plants and animals that have been buried in the ground for millions of years whereas biofuels are made from plants grown today.

Countries around the world are using various kinds of biofuels. Indeed, much of the gasoline in the United States is blended with a biofuel, ethanol. Moreover, Brazil turns sugarcane into ethanol, and some cars there can run on pure ethanol. In Europe, biodiesel, a fuel commonly made from palm oil, is generally available. On the face of it, biofuels look like a great solution because cars are a major source of atmospheric carbon dioxide.

Moreover, using biofuels as jet fuel also offers a solution to carbon emissions from a travel. For example, in 2016, United Airlines announced a new initiative to integrate biofuel to substitute fossil fuels with hopes of reducing greenhouse gas emissions by 60 per cent.

Unfortunately, the substitution of fossil fuels by biofuels is not so simple.

Using biofuels can be beneficial. Indeed, biofuels can be manufactured from a wide range whereas oil is a limited resource. Moreover, biofuels are much more easily renewable than fossil fuels. In addition, biofuels can be produced locally, so, countries won't have to depend on foreign energy. Besides, this local production will create hundreds or thousands of employments, especially in local areas. It will provide economic stimulation to the agriculture industry. Finally, it will enable to reduce carbon emissions. When biofuels are burnt, they produce less carbon output and fewer toxins in order to preserve atmospheric quality and lower air pollution.

Even if biofuels produce less carbon output and fewer toxins, energy output of biofuels require greater quantities to be consumed which implies cutting forests to cultivate more and more crops and plants so considerable carbon emissions. Moreover, local biofuels productions could strain water resources. For efficient energy outputs, they must build the necessary manufacturing plants so a high investment for a current production. In addition, using valuable cropland to grow fuel crops could have food shortages. And these food shortages could entail an increase of price of food crops so a potential decrease of purchasing power.

3) Is sustainable agriculture really possible to implement?

Nowadays, sustainable system is difficult to reach and conventional agriculture is debated. The world tends to have an agricultural system which protects the environment and generates no waste to allow future generations to have a better ecosystem.

All groups have shown that food is a problem in the world but the real question is sustainable agriculture possible to be developed worldwide?

First, we will explain why conventional agriculture is an issue and then, why organic agriculture can be an alternative in the world.

Conventional agriculture is an agricultural system which aims at producing a lot of food to provide the population with as much food as possible. Indeed, for farmers it's profitable because it's not very expensive for consumers.

Unfortunately, this system is highly polluting, for example tractors consume fossil energies which produce some greenhouse gases. Pesticides and chemicals are used by a lot of farmers.

Therefore it has a huge impact on the environment. Indeed it is very harmful for people and animals. This agricultural system leads to overconsumption and pollute the ecosystem.

If farming and food production go on like this, the whole resources will be used on Earth

Many people advocate organic agriculture and oppose conventional agriculture.

For them, organic agriculture offers many good sides, let's explain them.

First, this agricultural system doesn't pollute because it uses natural fertilizers to replace pesticides and chemicals. Moreover, there is no waste.

Thanks to this system, food has a better quality and is more nutritious. Organic agriculture has bad sides too. Indeed, it's not spread much. We can see that because only 1% of agricultural lands are devoted to organic agriculture. So the production is low and rare, therefore it's more costly. Furthermore, farmers need to be subsidized which is only possible in wealthy countries. It's important to preserve the animal resources and stop overconsumption.

To finish, we have seen that organic agriculture is better than conventional agriculture because it preserves the environment but everyone must make concessions and adapt their way of life. For instance, it's possible by consuming less meat.

And you, are you ready to eat less meat and fast-foods?