

**149 - ENVIRONMENTAL IMPACT ON THE PRODUCTION OF FOOD IN THE WORLD AND IN BRAZIL**

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**INTRODUCTION**

The World Bank and FAO estimate that in the early 80s, between 700 million and 1 billion people lived in absolute poverty around the world. Contrary to what many think, the poor are getting poorer every year. Forty-three developing nations ended the 80 poorer than they were at the beginning of the decade (FAO, 2007). In Latin America, one in every eight people goes to bed hungry every night. In Brazil more than 30 million people are classified as poor by official statistics. In 1980, about 44% of the population lived in a state of absolute poverty (SAVE EARTH FOUNDATION, 1992). Those who are today suffering from hunger live mostly in rural areas and depend for their subsistence agricultural activities, for example, in some countries of Africa and South America and Central America.

Surely this sad reality is connected to a system that excludes the population access to basic goods needed to assure a decent life. To investigate the question of enclosing necessarily entails a thorough analysis of the assumptions underlying the dominant systems in the world, but this issue is beyond the scope of this article. The present work aims to draw attention to one important aspect of daily life, ie eating habits and show how they are closely linked to the pictures of poverty, malnutrition and hunger. It has also a liaison with enormous waste, environmental degradation and health of the population as a whole.

**PRODUCTION AND FOOD CONSUMPTION**

Richer countries have developed and, in general, population growth rate lower than that of underdeveloped countries. This is because the majority of its citizens have access to education, methods of birth control and family planning education. However, energy consumption and waste production are much higher in developed countries. For example, a Swiss citizen consumes per year, an amount equivalent to the energy consumed forty Somali nationals and a U.S. citizen consumes more (DALLARI; BOTTLE, FRANCE, 2007).

Only one third of the world population lives in developed countries, but consumes about 85% of total resources produced in the world. In fact, the terrestrial environment would not be able to support the population it has today if all nations were developed and lived within the current development patterns. Calculations indicate that the maximum population of the world, the level and way of life were equivalent to those of an average U.S. citizen would be only about 1 billion people. Moreover, this supposed billion people have a very strong environmental impact, causing more pollution and depleting natural resources even more quickly (DALLARI; BOTTLE, FRANCE, 2007). This question takes connotation worrying, considering that the vehicle footprint and production system currently imposes limits on economic growth itself, with serious restrictions on the economy and the food chain.

The key resources for food production (seeds, soil, organic matter, water, etc.) are sources, which should allow agriculture to be a highly sustainable. However, modern agriculture has characteristics that close to one extractive industry, which tends to make it unsustainable. Additionally, fees may apply non-environmental concerns such as impacts on workers, communities, regions and consumers, to varying degrees, according to the activity (LOPES, 2007).

"While some sectors of agriculture, particularly the staple food crops, food grains and seeds may not be particularly profitable venture capitalists scale, the sphere of domestic production in agriculture becomes progressively smaller, and with less consequences for the overall character of the food system. Increasing competition will award a technological innovation that can reduce costs, reduce risks in the short term, or rationalize all major enterprises. The structures, practices and techno-scientific ideologies of integration and global competition, they will slowly but surely, to show or highlight the specific geo-socio-agro-ecological farming that have historically contributed to agricultural production tend to be regulated by domestic producers" (BUTTEL, 1997, p.346).

Also in relation to food production, some data show the need to do something to improve the effectiveness of the system as a whole, taking based on soy, it takes approximately 7.2 kilograms of soybeans to produce only 1kg beef, 2.7 kg to produce pork. If we consider the parameters of efficiency of use of the same protein found in grains, is wasted on average 90% of grain protein when it recycles through the production of beef, 99% of carbohydrates and 100% of the fibers (EARTHSAVE FOUNDATION, 1992).

Raising cattle requires the intensive use of vast amounts of land both for the animals are fed with products obtained in the harvest or left to graze in pastures or forests. In any case, the land is often deprived of their productive capacity - sometimes permanently. Worldwide, approximately 50% of farmland is to pasture for cattle (ANUALPEC, 2007). In Brazil, Santa Catarina, 2.4 million hectares are exploited by crops, pastures 2.5 million and 1.9 million by woods and forests (IBGE, 2006).

One thing to consider is in relation to the capacity of the soil medium and low fertility, such as the Cerrado and the Amazon rainforest. Most farmers increase their production levels only with the incorporation of new areas, or soils that were occupied by native forest, which implies the use of natural resources. It is known that the incorporation of new technologies could increase production by at least 3 to 5 times current levels, which would keep Brazil in the major exporter of agricultural products, but the pressure on natural resources diminish.

**GRAIN CONSUMPTION**

"Feeding the world's population on a diet based on American style would require 2 ½ times the amount of grains that are produced worldwide for all purposes. A future world from 8 to 14 billion people fed up with the American diet of 220 g daily meat generated from the consumption of grain is only a flight of fantasy" (BROWN, 1990).

During this century, a change in diet of Western nations of plant foods for animal foods has resulted in a parallel shift in world grain production for human consumption for grain destined for animal feed. Recent studies show that this is quite common

in populations that enrich. The consumption of animal protein is essential for the proper functioning of the human body, but emphasized that it is possible to eat this type of protein in animals more efficient in converting vegetable protein into animal. As an example, we quote the poultry and pork spending 2.0 and 3.5 kg feed, respectively, for each kg of meat produced, while cattle spend around 5.0 kg for the same production.

Producers like the United States make use of feed for production of cattle in confinement, which increases the competition for grain between humans and animals. Currently, we seek to stimulate the production of cattle in intensive systems based on forage intake of high quality, in order that they are ruminants.

Another important aspect is that both the poultry and pig impacts to the environment, if not conducted properly, waste treatment, however, there are effective alternatives such as composting and vermicomposting, which also reduce the use of chemical fertilizers because these compounds return to the soil as a source of organic matter and nutrients.

### **WATER CONSUMPTION**

The production of feed and fodder for livestock requires huge amount of water, resulting in water scarcity in certain areas. Sheets of water such as the giant aquifer Ogalalla in the United States, are being rapidly depleted. In the American West, the scarcity requires that industrial, commercial and residential limit the use of water. Rarely consumers are advised that the bans on watering lawns, washing cars and others are due in part to the large amount of water that is extracted to grow grain for cattle and other livestock (BRAZIL, 1992).

Agribusiness in Brazil has to take global leadership in recent years, which actually began in late 1990, initially causing a shock in all sectors of the Brazilian economy. Subsequently, this process of trade liberalization in conjunction with other factors of production and arrangements macroeconomic forced the agricultural sector to modernize and year after year there was growth in exports and domestic. The reason for this success is due to the development and application of new technologies in rural areas such as intensive use of land, mechanization, fertilizers and pesticides and, thus, producing efficiency and competitiveness of agricultural products (POLAQUINI; SOUZA; GEBARA, 2006).

While meat production worldwide has grown 301% in the last 50 years the average growth in Brazil was 772%, making it the largest exporter of beef in the world, showing that the products offered by the country are gaining space in supermarkets the world (MAPA, 2007).

Another inference that can be made is that the Brazilian producer was able to fit the constraints of national and international consumers, and new technologies and production systems and marketing will enable the sector to grow further in coming years (POLAQUINI, 2004). But this has been questioned by environmentalists, who warn that rampant production, which has caused excessive deforestation, and soil compaction, erosion, siltation of rivers, contamination of groundwater and surface water, essential to sustain these production levels.

### **FOOD WASTAGE**

The distribution of population by continents and countries provide plenty of sharp contrasts. For example, Asia has about 3 billion people, Oceania has only 28 million, China has more than 1 billion and India about 800 million people, while there are countries or independent states with population below 100 thousand as the Seychelles (population 70,000) and the Vatican (1,000) (FAO and WORLD BANK, 2007).

World hunger is a painful reality, persistent and unnecessary. Currently, there is land, energy and water enough to feed more than twice the human population, however, half of the grain produced is exported to the animals while millions of people starve. In 1984, when hundreds of Ethiopians were dying daily from hunger, Ethiopia continued to grow and export millions of dollars in food for cattle in the United Kingdom and other European nations (FAO and WORLD BANK, 2007).

It is estimated that the annual consumption of food in the world is 375 million tonnes and most of them come from plants. Whereas 10% is consumed fresh and 10% are leaves and stems that are thrown away, we have therefore a waste of almost 4 million tons of food (FAO and WORLD BANK, 2007). It should be noted that the suggested amount may be higher or lower than 10% would hypothetically be considered, but even so, it is a huge waste of food.

Calculated by the Department of Agriculture and Food Supply of São Paulo shows that Brazil plays in waste the equivalent of \$ 12 billion in food annually, an amount which could be used to feed about 30 million people, or eight million households one year. The waste occurs at all stages of food production from planting and harvesting to get to the final consumer, who is also responsible for a large percentage of it. Currently, it is estimated that in Brazil, 20% of agricultural production is lost during harvest and also, during transport or the use of inadequate packaging. This loss does not compare to the first world countries, where it is smaller, but there are countries that lose up to 70% of its production due to various causes. According to the Brazilian Agricultural Research Corporation (EMBRAPA), the total waste in the country, 10% occur at harvest, 50% handling and transport, 30% in power supply and the bottom 10% are diluted between supermarkets and consumers. Specifically in the case of vegetables, studies find that, in Brazil, the average levels of post-harvest losses are 35%, reaching up to 40%, while in other countries like the United States, no more than 10% (VILELA, LANA; MAKISHIMA, 2003).

All this requires the burning of thousands of tons of food due to poor maintenance, deterioration or contamination by pesticides. To get an idea, CEAGESP of Rio de Janeiro is a waste daily 40 tons of food.

Another fact that should be highlighted is that according to the regulations of Decree 2848, 1940, restaurants can not donate leftovers of processed foods, they will be liable if the individual who eat what remains will have symptoms of Foodborne Diseases (FBD). To avoid this risk, the restaurants choose to play a lot of food waste daily (CORRÉA, SOARES, ALMEIDA, 2006). If this were allowed, a few tons of good quality food and already prepared could be distributed among the poorest sections of society.

For the losses and waste are reduced work needed for the awareness of all stakeholders in the chain. In this sense, it is suggested that educational campaigns as a way to stimulate the adoption of technologies to reduce losses and waste, providing training, from producers to the employees of restaurants. Furthermore, it is necessary to educate consumers both in institutional and domestic, to be aware of the importance of reducing losses and waste. To be made effective a general education campaign among consumers, it is suggested that children are included by inserting, in schools, an educational program to reduce waste and losses.

### **ENVIRONMENTAL DEGRADATION**

Various studies have pointed to the intensification of global warming in the twenty-first century, the maximum indicated by the Intergovernmental Panel on Climate Change (IPCC) is the order of 3 to 6 C in average temperatures on Earth. Since the main cause is attributed to the gradual increase in the levels of gases that enhance the greenhouse effect, caused largely by human activity. According to the IPCC since 1750 the concentration of CO<sub>2</sub> in the atmosphere increased by 31% a 151% CH<sub>4</sub>

and N<sub>2</sub>O in 17%. The increase in concentration of these gases has contributed to the increase of 0.6 °C to 2.0 °C in mean air temperature on the surface only in the twentieth century. The same study pointed to the IPCC the 1990s as the warmest since 1861. However, despite the values indicate only the increase of global average temperature, this will not occur evenly across surface. Studies predict that some areas will suffer major changes than others. However, there is no place on the planet free of its consequences. There are, however, a group of scientists aware of the change in the Quaternary that disagrees with the assertion that global warming is essentially the modern genesis of human activities. This controversy highlights the need for discussions on climate change on the basis of negative and striking effects on ecosystems and on human society.

In a study prepared by the Academy of Sciences of the United States, was appointed effects of warming in the atmosphere, namely: increased temperatures, increased rainfall from the high levels of water vapor in the atmosphere, although some regions may be affected the decrease in its rates, increasing sea levels on the order of 0.09 (optimistic) and 2.00 meters (pessimistic) between 1990 and 2100 resulting from the melting of the polar ice caps and continental glaciers, and thermal expansion caused by average elevation of ground temperatures and changes in the flow of ocean currents as the Gulf Stream, in lower latitudes, stratospheric cooling caused by the retention of radiation in the lower atmosphere and the decrease in retention of ultraviolet radiation due to the reduction of the ozone layer; increased incidence of many diseases linked to climate, disasters and food hygienists, etc. (MENDONÇA, 2008).

In farming, increased CO<sub>2</sub> may contribute in principle to plant growth, yet the variations in the rainfall and temperature will require changes in irrigation, fertilization, selection of crops and pest control. Large investments will be required, bringing hardship especially for the small producer. Climate change will promote changes in the spatial distribution of crops, some will no longer be viable in certain areas (MENDONÇA, 2008).

Biological systems are also affected. According to the IPCC, the migration of biomes or ecosystems may be mild, reflected in changes in the composition of species or appearance of new dominant species in certain areas. An example of this in Brazil is the possibility of retreat in the areas covered by the Araucaria forests, which have their spatial directly influenced by climate. Confirmed the increases in average temperatures may be provided for a reduction of the coverage areas of Araucaria and an expansion of tropical forest ecosystems on them.

Since the major global conferences for the Environment, was established the 8 millennium goals, among them the protection of the environment and ensuring food for all populations. This is a great paradigm, knowing that should keep the balance between the fed and preservation and maintenance of environmentally important areas.

Some people may be evicted from their home areas and are forced to migrate in search of land, food and water to new areas, where talk of forced migration and exile environment. The struggle for survival of the poor will require greater effort, a fact that explains the worsening of social injustices arising from global changes, which will focus directly on the development of serious and intense social and environmental conflicts (MENDONÇA, 2008).

The increase in average temperatures and the consequent increase in rainfall may increase the spread of disease vectors such as malaria, dengue, cholera, schistosomiasis, leishmaniasis and Japanese encephalitis, in addition to problems caused by malnutrition originated from lack of food, cases of diarrhea, dehydration and drowning (MENDONÇA, 2008). Heat waves will increase the humidity and pollution, especially in large cities, aggravating respiratory problems of the population.

Without good accommodation, and faulty nutrition caused by poor nutrition, will be the poor, especially in major population areas the hardest hit. In this regard, and depending on the concentration of economic power, political, scientific and technological estimated populations of less developed countries suffer the effects of increased heating compared to that of underdeveloped countries, which have limited capacity to adapt.

The quest for sustainable development represents a major challenge for humanity and in particular to Brazil. For centuries, the development model has evolved from the extraction and subsistence farming to a holding agro intense, with the application of modern technologies and in many cases, land use and disordered environment resources, which puts at risk biodiversity.

## FINAL CONSIDERATIONS

As you can see, the issue of food production ahead of environmental pressure worries researchers around the world, and is not easily resolved. However, with the use of appropriate technologies that can reduce environmental stress and improve the quality of life of populations.

The development of plants more productive and resistant to pests and diseases, with improvements in animal husbandry systems, can greatly increase the production of food, without making it necessary to incorporate new areas to the production system, which prevent the advance of deforestation in the agricultural frontiers.

Another aspect to be considered is the improvement in production processes, transportation and storage reduce the food supply as a function of inefficiency in all stages of the production chain.

Furthermore, the use of treated waste should be encouraged as it allows the return of organic matter in soil, which reduces the use of chemical fertilizer thus improving the quality of the environment.

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#### **ENVIRONMENTAL IMPACT ON THE PRODUCTION OF FOOD IN THE WORLD AND IN BRAZIL ABSTRACT**

Only one third of the world population lives in developed countries, but consumes about 85% of total resources produced in the world. This study aimed to relate the tables eating habits of hunger and poverty by linking them with waste, environmental degradation and population health. In relation to food production, there is evidence of the need to improve the effectiveness of the system as a whole. In addition, raising cattle requires the intensive use of vast amounts of land, which is often deprived of their productive capacity. Worldwide, approximately 50% of farmland is to pasture for cattle. The consumption of animal protein is essential for the proper functioning of the human body, but emphasized that it is possible to eat this type of protein in animals more efficient in converting vegetable protein into animal. It is estimated that the annual consumption of food in the world is 375 million tonnes and most of them come from plants. Whereas 10% are consumed fresh and 10% are leaves and stems that are thrown away, has thus a waste of almost 4 million tons of food. The quest for sustainable development represents a major challenge for humanity and in particular to Brazil. The development model has evolved from the extraction and subsistence farming to agribusiness intense exploration, applying modern technologies and occupation of the environment, threatening biodiversity. The issue of food production ahead of environmental pressure is not easily resolved. However, with the use of appropriate technologies and improved production processes, transport and storage of food can reduce environmental pressure and improve the quality of living.

**KEYWORDS:** food, environmental impact, production

#### **IMPACT SUR L'ENVIRONNEMENT SUR LA PRODUCTION D'ALIMENTS DANS LE MONDE ET AU BRÉSIL RÉSUMÉ**

Seulement un tiers de la population mondiale vit dans les pays développés, mais consomme environ 85% du total des ressources produites dans le monde. Cette étude visait à relier les tables des habitudes alimentaires de la faim et la pauvreté en les reliant avec des déchets, la dégradation de l'environnement et la santé de la population. En ce qui concerne la production alimentaire, il existe des preuves de la nécessité d'améliorer l'efficacité du système dans son ensemble. En outre, l'élevage du bétail nécessite l'utilisation intensive des vastes quantités de terres, qui sont souvent privés de leur capacité productive. Au niveau mondial, environ 50% de ces terres en pâturages pour le bétail. La consommation de protéines animales est essentielle pour le bon fonctionnement du corps humain, mais a souligné qu'il est possible de manger ce type de protéines chez les animaux plus efficace dans la conversion de protéines végétales en animal. On estime que la consommation annuelle de produits alimentaires dans le monde est de 375 millions de tonnes et la plupart d'entre eux proviennent de plantes. Alors que seulement 10% sont consommés en frais et 10% sont des feuilles et les tiges qui sont jetés, a donc une perte de près de 4 millions de tonnes de nourriture. La quête du développement durable représente un défi majeur pour l'humanité et en particulier au Brésil. Le modèle de développement a évolué depuis l'extraction et l'agriculture de subsistance à l'exploration intense agro-industrie, l'application de technologies modernes et l'occupation de l'environnement et menacent la biodiversité. La question de la production alimentaire à venir de la pression de l'environnement n'est pas facile à résoudre. Cependant, avec l'utilisation de technologies appropriées et des processus améliorés de production, le transport et l'entreposage des aliments peuvent réduire la pression sur l'environnement et améliorer la qualité de vie.

**MOTS-CLÉS:** nourriture, impact environnemental, la production

#### **DE IMPACTO AMBIENTAL EN LA PRODUCCIÓN DE ALIMENTOS EN EL MUNDO Y EN BRASIL RESUMEN**

Sólo un tercio de la población mundial vive en países desarrollados, pero consume el 85% del total de recursos producidos en el mundo. Este estudio tuvo como objetivo relacionar las tablas de los hábitos alimenticios del hambre y la pobreza, vinculándolos con los residuos, la degradación del medio ambiente y la salud de la población. En relación con la producción de alimentos, no hay evidencia de la necesidad de mejorar la eficacia del sistema en su conjunto. Además, la cría de ganado requiere el uso intensivo de grandes cantidades de tierra, que es a menudo privados de su capacidad productiva. De todo el mundo, aproximadamente el 50% de las tierras agrícolas a los pastos para el ganado. El consumo de proteína animal es esencial para el buen funcionamiento del cuerpo humano, pero insistió en que es posible comer este tipo de proteínas en los animales más eficientes en la conversión de proteínas vegetales en animales. Se estima que el consumo anual de alimentos en el mundo es de 375 millones de toneladas y la mayoría de ellos provienen de las plantas. Mientras que el 10% se consume fresca y el 10% son hojas y tallos que se tiran, por lo tanto tiene una pérdida de casi 4 millones de toneladas de alimentos. La búsqueda del desarrollo sostenible representa un importante desafío para la humanidad y, en particular a Brasil. El modelo de desarrollo ha evolucionado desde la extracción y la agricultura de subsistencia a una exploración intensa de agonegocios, la aplicación de tecnologías modernas y la ocupación del medio ambiente, amenazando la biodiversidad. La cuestión de la producción de alimentos por delante de la presión ambiental no es fácil de resolver. Sin embargo, con el uso de tecnologías apropiadas y procesos de mejora de la producción, transporte y almacenamiento de los alimentos puede reducir la presión ambiental y mejorar la calidad de vida.

**PALABRAS CLAVES:** alimentos, impacto ambiental, la producción de

**IMPACTO AMBIENTAL SOBRE A PRODUÇÃO DE ALIMENTOS NO MUNDO E NO BRASIL****RESUMO**

Apenas um terço da população mundial vive em países desenvolvidos, mas consome cerca de 85% do total de recursos produzidos no mundo. O presente trabalho teve como objetivo relacionar hábitos alimentares aos quadros de miséria e fome, interligando-os com desperdício, degradação do meio ambiente e saúde da população. Em relação à produção de alimento, há evidências da necessidade de melhorar a eficácia do sistema como um todo. Além disso, criar gado requer o uso intensivo de vastas quantidades de terra, a qual é, muitas vezes destituída de sua capacidade produtiva. No mundo, aproximadamente 50% das terras agricultáveis são destinadas a pastagens para o gado. O consumo de proteínas de origem animal é fundamental para o bom funcionamento do organismo do homem, porém destaca-se que é possível ingerir este tipo de proteína, de animais mais eficientes na conversão de proteína vegetal em animal. Calcula-se que o consumo anual de alimentos no mundo é de 375 milhões de toneladas e a maior parte deles provém de vegetais. Considerando que 10% são consumidos in natura e que 10% são folhas e talos que são jogados fora, tem-se, assim, um desperdício de quase 4 milhões de toneladas de alimentos. A busca pelo desenvolvimento sustentável representa um dos maiores desafios para a humanidade e, em especial, para o Brasil. O modelo de desenvolvimento tem evoluído do extrativismo e agricultura de subsistência para exploração agroindustrial intensa, com aplicação de tecnologias modernas e ocupação desordenada do ambiente, colocando em risco a biodiversidade. A questão da produção de alimentos frente à pressão ambiental não é de fácil resolução. Porém, com o uso de tecnologias adequadas e melhora nos processos de produção, transporte e armazenamento de alimentos é possível reduzir a pressão ambiental e melhorar a qualidade de vida das populações.

**PALAVRAS-CHAVE:** alimentos, impacto ambiental, produção

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