

# Taking global food order seriously: food supply and human health

## Levando a sério a ordem global alimentar: o fornecimento de alimentos e a saúde humana

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### Introduction

Since the Neolithic Revolution, mankind was able to domesticate different plants and animals for its survival, a series of new techniques were developed allowing people to become sedentary. For the past two centuries, it seems that we have been experiencing a new agricultural revolution, one that will have to cope with much more complex issues rather than just how to feed the global population.

After World War II, the industrial revolution of the food chain was intensified (Weis, 2007). Although enough food is produced to feed the entire population of the planet, there are lots of problems concerning production methods, decision making, food quality and consumer's awareness. To address these issues and the consequences for the global food chain and global health concerning food policies, the Actor-Network Theory (ANT) is an adequate tool, because it "deconstructs" the power of different actors (social, natural, technological) showing how they strive to maintain the large number of relationships in which their power is based (Morgan et al, 2006). The ANT helps to unveil the embedded processes involved in food supply. This theoretical framework will be complemented by the three paradigms of Heasman and Lang (2004): 1) the Productionist; 2) The Life Science Integrated, and 3) the Ecologically Integrated. These paradigms capture quite well the diversity of food policies in present time.

The first section of this article will address the outcomes of food policies based on these paradigms, concerning food production and global health. For these purposes a brief explanation of every paradigm will be followed by the analysis of public health implications, environmental costs, which affect the food chain, and the government's role. Taking this path, this study will clarify how events have changed and will continue to change eating habits.

In the second section, it will be discussed how the consumer and the food industry interacted over the last hundred years. Here some trends are identified: from undernourishment to over-consumption; the creation of new food products which deliver more vitamins and minerals; labeling which should allow better decision-making for the consumer and alternatives movements against the fast food chain.

### Food policies: issues in the food supply chain

Food policies are not just a matter of governments. It involves other actors, such as companies, non-governmental organizations and consumers, whose decisions will influence the food chain. Over the years it was

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possible to identify different food policies which were well grasped by Lang and Heasman's paradigms (Lang; Heasman, 2004).

The *productionist paradigm* embraces the increase of output at any cost. This model is based on cheap oil to produce larger crops. While oil is cheap it is possible to maintain long distance trucking to supply retailers and to use heavy machinery. Here is already possible to realize its first limitation: oil dependence. This factor raises two issues: first, every time there is an increase in oil prices, food production costs are also affected and so is the consumer; second the reliance on oil characterizes it as a linear system, which means that sooner or later this model will collapse once oil is a limited resource. Another issue concerns to monoculture, that results in soil loss.

This paradigm is also known by its negligence towards food quality. The industrial livestock production, for instance, had to deal with the bovine spongiform encephalopathy (BSE), also known as "mad cow disease", which results from cattle cannibalism (Weis, 2007). The food industry also focuses on conservation techniques as well. Processed food is usually rich in chemicals, grease, salt and sugar. Food being perceived as just fuel for the body demonstrates the flaws of this paradigm in addressing public health adequately that is why its approach on the matter is considered a medicalized one rather than socially determined. Besides, healing diseases instead of preventing them proved expensive for health care systems worldwide. Cancers, heart diseases, diabetes, hypertension, obesity, are the most common diseases nowadays. Obesity levels are increasing, in the US alone, three hundred thousand people have died from diseases related to obesity in 1999, the same trend can be observed in Brazil, where the number of heart attacks soared from seventy-six thousand to eighty-three thousand deaths from 1998 to 2003<sup>1</sup> (Lang; Heasman, 2004; Datasus; 2010).

The use of pesticides affects human health and the environment as well<sup>2</sup>. A report released by the World Health Organization (WHO) in the early 1990's has shown that approximately three million people suffer some sort of pesticide intoxication, as consequence it is estimated that around two hundred thousand deaths are related to pesticide poisoning (this figure also accounts the suicide toll) (Weis, 2007).

This food policy jeopardizes the future of food supply once it has no consideration for natural resources whatsoever. Modern agriculture demands around 72 per cent of the fresh water consumption, while beef production requires three thousand litres of fresh water in order to produce a single kilogram of beef (Weis, 2007). These facts show that it is not possible to maintain this model on a long-term basis.

Governments also have their share of guilt concerning the productionist paradigm. The US and the European Union have bold subsidize policies for their agriculture. In 2002 the US passed the *Farm Security and Rural Investment Act* which guaranteed a US\$ 190 billion for its agricultural sector for a period of ten years while Europe spends around €55 billion on farm subsidies annually. Practises like these affect the global food supply chain, once that market laws are not being fairly respected. Brazil has suffered with such policies, because it is the third largest agricultural exporter in the world behind the US and the EU. Brazil has supported a trade reform at the WTO by leading the G-20 in the Doha Round. Another objection to governments and the food supply chain concerning this paradigm is that "*both have failed to adapt to new scientific knowledge in relation to food and health*". (Weis, 2007; Lang; Heasman, 2004, US Department of Agriculture, 2010).

The *life science integrated paradigm* resembles the previous one concerning monoculture production, its commercial structure processes and agribusiness companies operating on a global scale. On the other hand, it addresses problems such as the use of chemicals inputs and food without good nutrients. In order to supply good quality food, new biological technologies are used to manipulate living materials that can be applied in processing and manufacturing of foodstuffs, the laboratory and the agricultural fields seem to be entwined. It is important to hi-

<sup>1</sup> The cost of public treatment increased 195% between 1998 and 2005 (from 149 to 449 million).

<sup>2</sup> Pesticide has collateral implications on wildlife, threatening biodiversity, polluting the soil and groundwater.

highlight that the most distinguishing characteristic of this food policy is the shift from chemistry to biology. In this sense, genetic modified organisms (GMOs) are a well known feature of this model. The genetically modified seeds are becoming usual, that is why some analysts see this trend as irreversible and perhaps the most likely to substitute the productionist paradigm (Lang; Heasman, 2004).

This paradigm interprets health on a long-term basis. Food is perceived as medicine because it has a preventive capability on several diseases and it can also ease some side effects as well. Laboratory techniques allowed scientists to add more nutrients in the food, which is called functional food or nutraceuticals, term coined by the Innovation in Medicine foundation. Concerning gene engineering, the manipulation of living materials is still recent, what makes difficult to foresee the outcomes for human health in the long-term. This is the reason why in many countries genetic modified crops have to be labeled. It is also possible to identify the scientific approach in livestock breeding. Poultry have bigger breasts for meat consumption<sup>3</sup>, this is the result of hormone use. Besides, cattle herding requires the use of large amounts of antibiotics because the herds became so big that any disease can spread quickly.

Governments continue to be an important player concerning global food governance<sup>4</sup> because of their legitimacy to create and enforce trade rules, farming subsidies or market access for GMOs. However, companies like Monsanto, Cargill, Conagra and Brazil Foods have become food clusters and are present in several levels of the food chain (from seed production to harvesting, herding and delivering to big retailers). These companies have leverage on the government of their headquarters, for instance, during the Uruguay Round, the American proposal concerning the agriculture sector was drafted by Cargill's former vice-president (Morgan et al., 2009). The policies desired by these companies' personnel usually usher trade liberalization for developing countries, once the consumers of these countries might benefit from an international food market.

Transnational agri-food companies have the expertise in developing new seeds and getting patents for them. The technology is not used for humanitarian purposes, but for surplus increase, it is the "commodification of seeds" (Weis, 2007). An interesting example is the case of Monsanto, which has been able to spread its technology throughout American fields and elsewhere in silence. Once farmers realize what was happening, some tried to escape from it, but they had to face lawsuits. In Canada, Percy Schmeiser was sued by Monsanto because the company investigators found GMO seeds developed by the corporation in his fields. The court convicted Schmeiser highlighting the seeds in his field as the most important evidence (Weis, 2007). What is should be taken into account is that a private company replaced the state in supervising property laws and that they are squeezing farmers who try to save seeds as their relatives used to do in the past. In Brazil, processing industries of various kinds pre-establish types, quantities, conditions and prices, in which farmers are driven to produce exclusively for the buyer enterprise. The producer has also to follow a particular technology standard controlled by the firm (Balsan, 2006).

Farmers also risk losing control of their business because they have to buy inputs for their crops usually at retail prices and after they have to sell their yield at wholesale prices. Staying away from the market decreases the possibility of major profits for them. Besides that, each time that new technology is introduced, the output increases and prices levels go down according to the supply and demand economic law. Farmers have to cope with these tradeoffs concerning new technological achievements, and they are prone to lose against the agri-industrial complex.

The *ecologically integrated paradigm* also relies on biology but its approach is much more integrative instead of engineering concerning nature. This pursuit to create a partnership with nature and not its modification is still marginalized when compared to the previous ones, but its influence is increasing. From ecological production

<sup>3</sup> The documentary "Food Inc" unveils how the food industry practices are harmful to public health.

<sup>4</sup> An European survey in 1999 reported that 8 countries are responsible for 83 per cent of the total funds in biotechnology research (Weis, 2007).

has emerged a discipline called agroecology that provides the main guidelines of study, which helps to manage agroecosystems that are “*culturally sensitive, socially just and economically viable*”. This trend receives great attention in developing countries, once it has a small scale farming approach, creating jobs, and because it address the agri-industrial complex issue, standing against modified seeds that resist pesticides that require the payment of royalties to enterprises which own the intellectual property of both (Lang; Heasman, 2004).

The ecological approach to public health is very different when compared to the previous ones. Ecosystems and social relations seem to be entwined with individual and population health, once both rely on the stocks of natural resources. This integrative perspective of society and nature is a reply to the life science integrated paradigm which heavily relies on laboratory techniques. This perspective resembles the WHO approach<sup>5</sup>:

Ecological public health emphasizes the common ground between achieving health and sustainable development. It focuses on the economic and environmental determinants of health, and on the means by which economic investment should be guided towards producing the best population health outcomes, greater equity in health, and sustainable use of resources (WHO, 1998).

Therefore, the food supply chain should seek a production way which won't rely on long distance trucking and chemicals inputs. It also tries to step away from monoculture crops, favoring diversity. During the “Conference on Ecological Agriculture: Mitigating Climate Change, Providing Food Security And Self-Reliance For Rural Livelihoods In Africa” (Ethiopia in 2008), the Food and Agriculture Organization of the United Nations (FAO) stressed that the global organic market grew about 15 per cent yearly over the last decade. Internal markets for organic products are also developing rapidly, particularly where consumers are aware of the health benefits from eating organic food. Brazil alone has over fifteen thousand certified farms working under this paradigm.

Concerning the government's role, it is difficult to generalize once countries have different approaches to this food policy. So far governments have focused on partnership among ministries, promotion of decentralization and team work. Besides, either nationally or internationally, health scientists don't get much voice on public policy development (Lang; Heasman, 2004). Public authorities should try to build partnerships with food retailers because they have the power on what kind of goods can be found on their shelves, such policy should promote fruits and vegetables, foods that are rich in fibers and good nutrients.

## You are what you eat: the eating habits issue

Over the last century the food chain has been revolutionized, the same thing can be said concerning the relationship between individuals and food. The studies of Sir Frederick Gowland Hopkins and Sir John Boyd Orr, in the beginning of the twentieth century achieved similar conclusions concerning food habits in the UK, the dietary issues affecting the British society were related to the people's income people, most of the population could not afford to buy a nutritionally appropriate food (Idem).

The productionist paradigm was able to provide the necessary amount of food to feed the population, although quality was not among its major concerns. Quantity was served with a variety of goods on the supermarkets shelves. As food became more processed and people had less time to prepare their meals at home, the food industry experienced a boom. The vegetable consumption decreased because of convenient food (Kiple, 2007).

<sup>5</sup> The concept of ecological public health has evolved in reply to the new challenges of health issues and their interactions with emerging global environmental problems like the damage of the ozone layer, water and air pollution and, of course, global warming.

During World War II, eating outside became usual, after the conflict this trend decreased. Restaurants had to develop new strategies to bring costumers back for their tables. They used advertisement as strategy. Never before the media played such a strong role as in the previous century to promote food, focusing not only consumers' mouths, but increasingly their minds<sup>6</sup> (Lang; Heasman, 2004). Burgers and soft drinks might be relatively cheap, but in the long-term have proved bad for the health. The "burgerization" of dietary has brought to the consumer a higher caloric intake poorer in nutrients. The western dietary, rich in meat, fats, salt and sugar has been responsible for the increase in obesity levels. In 1999, The Journal of the American Medical Association published an article about obesity and heart disease levels. The figures have shown that twenty seven per cent of American women were obese, while twenty one per cent of men could be characterized as such (Kiple, 2007). Meanwhile, in Brazil 38.8 millions are above weight, of which 10.5 millions are considered obese (IBGE, 2011).

Figures published by health authorities concerning diseases made the food industry pursue healthier alternatives such as functional foods and the replacement of some ingredients considered bad. Functional foods were developed by food producers with the main goal of achieving a better market share in the food market. These foods represent added value in comparison to other similar goods found at supermarkets, it is important to stress that these goods are not the result of public health priorities (Lohm, 2003). Concerning the replacement of ingredients, several new products were developed such as margarine, aspartame, but these replacements brought other sorts of problems, like high levels of trans-fatty acids, which causes bad cholesterol, and degenerative diseases respectively, although studies are still being done (Kiple, 2007).

Health concerns by the public also made food labelling mandatory to allow consumers to find out what they are eating, what is the nutritional composition of the products they buy<sup>7</sup>. This achievement had severe objections from the food industry when it first began, the problem is that sometimes the information is not as accurate as they should be. Other initiatives helping individual food choices come from NGOs that provide better information on nutrition and stimulates food production in community gardens or even distribute fresh fruits and vegetables to increase the nourishment quality of several families (Holms, 2003; Kiple, 2007; Barndt, 1999).

As the westernization of dietary spreads worldwide, several counter movements emerged against food standardization. The most famous one is the "Slow Food Movement", this movement promotes a different perspective of food compared to the fast food chain. Once cooking takes more time and preserves taste diversity, cuisines from distant parts of the world (such as the Japanese and Thai) became popular in western countries (Morgan et al, 2006).

Beauty standards also influence food consumption patterns. In the 1960's it was released the "South Beach diet", promising the lost of weight with a diet rich in proteins. If this diet became famous because of its short term results, practioners began to realize that it was a not an option for the long-term. On the other hand, the "Mediterranean diet" pyramid, published in 1994, focused the consumption of olive oil, cheese, yogurt and red wine (Kiple, 2007).

## Conclusion

The "food wars" among the three paradigms for food production are far from over. What used to be termed as public policy is now a complex trilateral bargaining among states, corporations and civil society. All the actors

6 Eating in restaurants has become usual in the US – Americans annually spend more money on fast food than on higher education, cars, pcs, softwares (Lang; Heasman, 2004).

7 Polls have shown that 85 to 90 per cent European demanded labelling for GMO goods. The EU addressed its consumers' concerns with a legislation that went beyond and instilled producers to be able to trace GMOs organisms at all production chain (Kiple, 2007).



involved have different challenges to address. Governments have to boost more efficient and eco-friendly production methods. Second, they have also to supervise the agri-industrial complex that tends to abuse its economic power against small farmers. Third, they are responsible for creating a legal framework which will regulate food production. Fourth, governments must promote their agriculture interests on the international stage. Finally, they have to recall that once their populations develop healthier eating habits, their healthcare systems will be relieved in the long-term.

The agri-food companies will also have to cope with the following: first, produce more food for a growing population, using less inputs, and still be able to profit while working under the law. Second, provide healthier food options for the costumers and third, respect small farmers rights.

Concerning the individual, this actor is actually on the top of the pyramid. The individual has the power of choice, what he buys will become a trend and therefore companies will try to adapt in order to provide the goods he desires. The individual has also leverage against the government, lobbying to pass better laws on food production. People are paying more attention to their eating habits, adopting healthier diets as the Slow Food Movement in big cities have shown.

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## Abstract

This paper analyzes the three paradigms that have guided food production. The productionist that privileges quantity rather than quality; the life science integrated which replaced chemistry for biology, and the ecologically integrated that focuses sustainability. The challenges to feed a growing population involve governments, transnational companies and individuals in different ways.

## Resumo

Este artigo analisa os três paradigmas que pautam a produção de alimentos. O produtivista que privilegia a quantidade e não a qualidade, a ciência da vida integrada que substituiu a química pela biologia, e o ecológica-mente integrado que foca a sustentabilidade. Os desafios para alimentar uma população crescente têm envolvido governos, empresas multinacionais e indivíduos de diferentes maneiras.

Keywords: Food policies; Global food supply; Global Health.

Palavras-chave: Política alimentar; Fornecimento global de alimentos; Saúde global.

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