



In June 2009, the United Nations published a report stating that 1.2 billion people worldwide, a sixth of the earth's population, suffered from malnutrition, defined as "severe dietary deficiency,"<sup>1</sup>. Between 2007 and 2009 alone the number of those suffering from hunger increased by 200 million. Ironically, a large number of those are in the South, where agriculture is the principal means of subsistence. They are, as well, the populations most affected by the effects of climate change. These shocking statistics confirm that humanity is experiencing an unprecedented food crisis, itself only one aspect of a far larger environmental, economic and social crisis.

In the North as in the South, food is a good illustration of the necessity of sustainable development, a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:

- the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.<sup>2</sup>

Those needs are many and are likely to increase. Global population is expected to increase to 9 billion by 2050, an increase largely concentrated in developing countries<sup>3</sup>. Average life expectancy in the world increased by almost twenty years between 1950 and 2002, rising from 46.5 to 65.2 years in 2002<sup>4</sup>. The population is also more urbanised, with half the world's people living in cities. That proportion attains 80% in Québec<sup>5</sup>. In that context, how can we get the earth to provide enough food to feed more people living longer, both more healthfully and more equitably? Is it possible to imagine a diet good for both humans and the planet, from the earth to the plate?

## Environment, Food and Health

### Eat to the health of the planet

Eating is as essential to survival as drinking and breathing. As well as satisfying the basic physiological needs of human beings, eating is a source of pleasure and creativity, and provides an opportunity for sharing and relaxation. Food is also a source of concern, since it has a direct impact on human health and on that of the planet, our "Mother Earth."



Photo Suzanne Tucker



# Food production: from the “green revolution” to environmental awareness



Agriculture saw spectacular advances beginning in the 1950s with the “green revolution,” based on the premise that increased productivity and agricultural yields were necessary to feed a growing population and wipe out famine in developing countries. Governments invested heavily in research and called on science to find ways to increase food production. New varieties of plants offering higher yields were developed through genetic research. Agricultural chemists developed fertilisers and effective pesticides, and systems of irrigation and mechanisation were devised to increase agricultural productivity.

Looking back, it is clear that this “green revolution” was neither revolutionary nor green. Certainly, it radically changed the methods and techniques of agriculture and livestock raising and boosted production of basic foodstuffs. The yields of certain cereal crops, such as wheat, rice and corn, doubled in the second half of the 20<sup>th</sup> Century, particularly in Asia



Photo Sia Chen How

and Latin America. This dramatic increase in productivity, however, was accompanied by costs to the environment, society and human health.

The rapid development of the agri-food industry has contributed significantly to the loss of agricultural biodiversity, a phenomenon likely to be further aggravated by climate change. Two-hundred-forty-thousand species are believed to exist in the world, of which 3,000 have been domesticated by man. Today, only 150 of those are widely cultivated<sup>6</sup>. This loss of **biodiversity** is attributable to a certain standardisation of agriculture demanded by the agri-food industry. In order to produce food at lower cost, we have increased the area under cultivation, chosen high-yield seeds (often developed and patented by biotechnol-



Photo Alistair Scott

ogy research and development companies) over traditional seeds, and encouraged monocultures and intensive cultivation. The use of insecticides and herbicides has destroyed a number of insect species and with them the food supply of their predators, thus disrupting the food chain.

More than two-thirds of water for human consumption is used in agriculture. In Asia, that proportion is as high as four-fifths<sup>7</sup>, primarily because that continent is the world’s principal producer of rice, which requires large quantities of water. Feed crops for animal consumption also require large quantities of water for irrigation. Fertilisers, manure and pesticides contribute to water pollution. Farming is one of the principal causes of water contamination by nitrates, phosphates and pesticides.

Global agriculture is also being affected by **climate change**. The impacts of global warming are varied, particularly in the South, where they are likely to have serious consequences. As weather becomes increasingly less predictable and the climate more variable, planning agricultural operations represents a serious challenge. This tendency is likely to get worse. We are

## GMOs: a danger to health?

Genetically modified organisms (GMOs) are organisms whose genetic code (DNA) has been modified in a way that would not occur naturally in nature. The effects of GMOs are still being studied. It is difficult to detect the long-term impact of GMOs on human health, since they are a relatively new phenomenon. For the moment, no rigorous scientific study has demonstrated that consuming GMOs carries greater health risks than consuming traditional foods. Nevertheless, certain scientific organisations such as the Royal Society of Canada and the British Medical Association consider that GMOs should be studied further before they are put on the market.<sup>8</sup>

## Returning to the source

In the Indian state of Andhra Pradesh, more than 12,500 families of poor farmers are benefiting from a project instituted by the organisation BALA VIKASA, in collaboration with L'ŒUVRE LÉGER. They have accepted the challenge of restoring old agricultural water reservoirs. These large reservoirs, constructed over a hundred years ago, provided peasants with water through a gravity distribution system. That method was abandoned in the 1970s with the advent of the "green revolution," that encouraged the use of fertilisers, pesticides and GMOs and contributed to soil depletion. Using heavy equipment, farmers removed the silt that had accumulated over the years in the natural basins and used this as fertiliser. Rain filled the reservoirs and replenished the water table that feeds the surrounding wells. Trees planted around these water basins help to improve a climate of frequent droughts. Thanks to the some 150 restored basins, farmers have doubled and even tripled both their yields and their incomes.



Photo : L'ŒUVRE LÉGER

## Water, Culture and Agriculture Project in Nicaragua (PECAN)

The ONE DROP Foundation, in partnership with Oxfam-Québec, has initiated a farming and water project to improve living conditions in Nicaragua. The project is intended to develop access to potable water to improve the health, food security and incomes of small producers and to help them manage their irrigation systems. The project includes an innovative art and education component that gives participating families the opportunity to develop greater collective awareness of the use and conservation of water and other natural resources. A van travels from one village to another presenting performances in the streets, squares and schools of the various communities. The success of PECAN has led to the creation of a similar project in Honduras.

already seeing a rise in sea levels threaten the lands of those living on islands with low elevations. Climate change also has an impact on biodiversity, according to the Intergovernmental Panel on Climate Change (IPCC). A large number of species are threatened with extinction as the earth's temperature continues to rise. Even northern countries face risks: we have only to think of that most typically Québec product, maple syrup, whose production is intimately reliant on climatic conditions (nights of frost followed by days of thaw).

**Livestock** represents 40% of world agricultural production<sup>9</sup> as well as the strongest area of growth. Here again, our effort to produce more food at less cost has had consequences for the environment and human health. Pasture land covers 26% of the earth's land surface, while production of forage requires almost a third of the earth's arable land. This has contributed to the deforestation of certain regions, notably in Latin America and, in particular, the Amazon basin. At the same time, cattle grazing contribute to the erosion and compaction of soils.

In terms of impact on human health, the increasing incidence of certain illnesses transmitted by foods or, especially, by animals is a growing



cause of concern. These have become more common since the 1980s and have attracted the attention of the media worldwide. Strains of **zoonoses** (diseases transmitted between humans and animals) are appearing in the North as well as in the South. Cases of salmonellosis, associated with the consumption of raw or incompletely cooked foods—red meat, poultry, eggs, shellfish, etc.—have increased over the course of the last thirty years. The notorious “mad cow disease” or bovine spongiform encephalitis (BSE) shook Great Britain in the mid-1990s when it was discovered that this animal disease was the origin of a new variant of Creutzfeldt-Jakob disease in humans. Shortly afterward, the discovery of pockets of avian influenza, a potentially life-threatening illness, sent shock waves around the world. Listeriosis, from eating soft-ripened cheeses and processed meat products after periods of extended refrigeration, caused panic in France, the U.S., Canada, Switzerland and Australia at the beginning of the present century<sup>10</sup>.

The production methods of foods have a clear impact on the environment and on health, and at the same time those production methods are influenced by the environment. But this is only the first stage in the food production cycle.

### Did you know...

Livestock is responsible for 20% of greenhouse gas emissions on earth.

“According to the Québec analysis of greenhouse gas emissions, agriculture contributed, in 2007, 7.3% of the total GGE in Québec, compared to 40.7% and 32.4% for the transportation and industrial sectors respectively.”

Source: L'agriculture et les GES, UPA, MAPAQ, Programme Prime-Vert, May 2009

# Processing, transportation and marketing: food's long journey



Most of us living in industrialised countries have access to a vast array of foods from the four corners of the globe, every hour of the day, every day of the week, twelve months a year. We can eat sushi or pizza in Berlin or Denver, buy tinned pineapple in Québec or Oslo—in short, we have seen the globalisation of our dinner table. The evolution of our dietary customs is a reflection of the evolution of society: urbanised, sedentary and busy. We consume more and more prepared and processed foods, generally rich in fats, sugar and salt and often unhealthy. The more foods are processed, the more pressure they put on the planet by demanding resources not only

for production but also for handling, processing, packaging, storage, transportation and marketing.

At the same time, the food and beverage **processing** sector constitutes an important source of revenue in Québec and Canada and creates employment. In Canada, we export 30% more processed products than we import<sup>11</sup>. In constant growth since 1996, the agri-food processing industry has become the principal manufacturing sector in Québec<sup>12</sup>. Nonetheless, there are concerns that concentration in this sector, resulting from mergers and acquisitions, gives processors too much control over the market or the power to impose rigid constraints on producers in terms of prices, volumes, etc.

Market concentration is even greater in the food **distribution** sector. In Québec, food distribution is dominated by three large chains that control 75% of the market<sup>13</sup>. To maximise their profits, these processing and distribution companies exploit market competition and source on a global scale, putting pressure on farmers who are forced to produce at the lowest possible price in order to compete.

The globalisation of the economy and the opening of markets have enabled rapid development of the agri-food industry and particularly the food processing sector. But they have also increased the **ecological footprint**<sup>14</sup> of food production. Each stage of the food production cycle has an impact on the environment, uses human, natural and material resources, and creates greenhouse gases (transportation, energy) and waste. The Institut bruxellois pour la gestion de l'environnement estimates that food is responsible for a third of the ecological footprint of Belgians<sup>15</sup>. The British have developed the concept of the "food mile" as an indicator to measure the distance travelled by food, from the soil to the dinner table.

In general, the more a product is processed, the further it has travelled. It is also likely to require packaging, which creates **non-organic waste**. Food packaging serves three purposes: it



Photo Africa Studio

protects the product (preventing deterioration or breakage, but also preserving freshness); it facilitates distribution or shipment of the product (for transporting and handling the foods); and it advertises the product (making it more attractive, providing information about the product, making it easier to use). Often, the containers used for packaging food are constructed of multiple materials (e.g., juice containers of plasticised cardboard with an interior metal coating), making recycling difficult, or of certain types of plastic, such as Styrofoam, that are not recyclable.

**Harmful substances** present in certain types of packaging or cookware are attracting the attention of scientists, since they present risks for human health and are known to be carcinogens or endocrine disruptors. For example, perfluorocarbons (PFCs) are found in Teflon, which is used as a non-stick agent in cookware and in certain waxed packaging such as popcorn bags to be used in microwave ovens. PFCs are among the most extensive and persistent of pollutants and can today be detected in the tissue of virtually every living organism on the planet. Bisphenyl A is found in the plastic lining of metal cans. Canada was alerted to the presence of this substance in baby bottles in 2008, when it became known that its toxicity increased in the presence of heat. Phthalates, which are found in the packaging of fatty products (potato chips, chocolate, cheeses, etc.), are transmitted from the container to the food in the presence of heat or fats<sup>16</sup>.

Food itself is responsible for generating its share of **organic waste** at each stage of the production cycle. Peasants and

Photo Shutterstock



farmers throughout the world are at the mercy of meteorological conditions. Heavy rains can destroy a strawberry crop in Québec just as a hurricane could wipe out a banana plantation in the West Indies. Such natural phenomena are obviously beyond human control. While it is difficult to evaluate the precise quantity of food products discarded at each stage of production, it is estimated that roughly 40% of the food produced in North America finds its way to the dump. That statistic is part of the work of Timothy Jones, a University of Tucson anthropologist, who spent a decade excavating dump sites to study food waste.

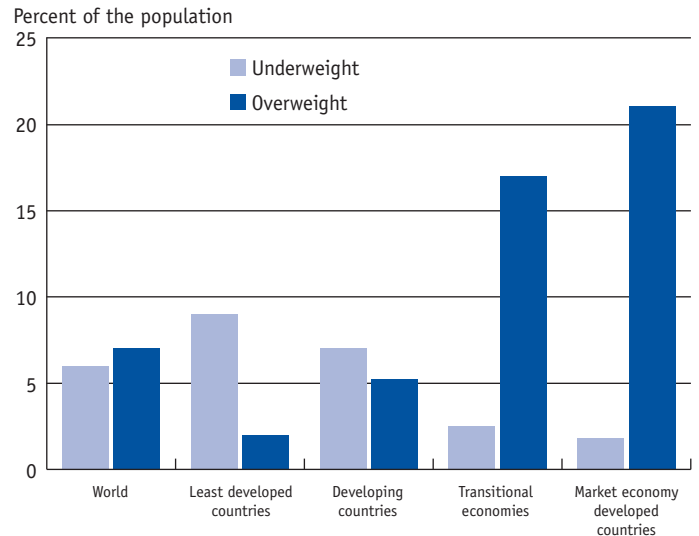
## Food consumption: the price of obesity and the devastation of hunger



There is worldwide medical consensus that diet, physical activity, and abstinence from risk behaviours (smoking, alcohol, drugs, unprotected sex) are the key to good health. In general, the health of the world's population has improved over the past fifty years. Life expectancy has increased and infant mortality has declined, particularly as a result of progress against infectious diseases. Nevertheless, the imbalance between rich and poor nations remains and has even grown. In diet, this imbalance takes the form of health problems associated with malnutrition in the South and over-nourishment in the industrialised countries.

A relatively recent phenomenon, known as **nutritional transition** has arisen with the increasing industrialisation of food production, the urbanisation of populations, and a certain homogenisation of dietary habits. As the poorer nations become more prosperous, they experience the advantages, but also the problems, of industrialised economies. Among these is obesity, resulting, in part, from the replacement of traditional diets by diets rich in sugar, salt, fat and meat. Major food retailers and fast-food chains are rushing to take advantage of new markets, such as China and India.

### Being overweight increases with prosperity, from the least developed to the most developed countries



As countries become more prosperous, they face a number of problems common to industrialised nations. One of the most worrisome is obesity.

Source: OMS, 2000

# To close the circle: cultivating hope to better feed the world...



Understanding the links between diet, health and the environment requires a global vision. It is an extremely complex and vital question, that takes into account, at the same time, the demographic context, the economic system and ideological choices, both individual and collective.

The picture is dark, but so is the reality, when we consider that a billion people go hungry, even though the earth's resources are sufficient to satisfy all the world's food needs. Fortunately, we are seeing increased global awareness of the challenge of feeding the world. We are discovering that our development model based on productivity and profitability has its limits. Major inter-

national organisations such as the WHO and the United Nations Food and Agriculture Organisation (FAO), governments, farmers and peasants, as well as citizens in general are working together to find new ways of thinking about food that are fairer and respectful of the health of both people and the environment.

In the world of agriculture, there have been a number of initiatives responding to concerns for human and environmental health. Organic farming<sup>17</sup> has seen remarkable growth in the past years, and demand continues to grow. Demand for local products is also on the rise. Integrated farming<sup>18</sup> requires its adherents to respect strict environmental standards. Fair trade products, in turn, provide agricultural workers with fair compensation for their labours and have proven an undisputed success in Northern nations. In Québec, the program of Community Supported Agriculture (CSA) created by the organisation Équiterre provides consumers throughout the year with a weekly basket of organic fruits and vegetables produced locally, assuring farmers a stable income. In the Clubs-conseils en agroenvironnement, created in 1993 with the support of the Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec and the Union des producteurs agricoles, farmers share their knowledge of agro-ecology, receive customised training, develop new skills and adopt sustainable practice for their farms.

At the beginning of the new century, governments of industrialised nations initiated a number of programs to attack poverty at home. The government of Québec has taken major steps in inaugurating a campaign against junk-food in schools. This has led to substantial reforms in Québec school cafeterias, including, in some cases the total disappearance of unhealthy foods such as french fries and soft drinks. Governments are also encouraging the valorisation of residual organic wastes through composting and transformation into biogas.

Food has also been the subject of numerous debates and campaigns, in both North and South. The Via Campesina peasant

Previously considered a Western problem, **obesity** is now becoming more common in countries with low and intermediate incomes. The World Health Organisation (WHO) estimates that almost a billion people are obese, only slightly fewer than the number who suffer from malnutrition. Approximately 2.6 million people die each year from problems associated with being overweight or obesity.

Diet is also linked to certain **chronic diseases** (diabetes, hypertension, heart problems, cancer). Chronic diseases are increasingly the principal cause of death worldwide, particularly as living standards and life expectancy increase. The incidence of these diseases is growing especially quickly in intermediate economies such as India, China and Russia.

## A farm supporting drop-outs

Since 1996, the Jeunes au travail farm in Laval has been welcoming, year round, some forty young people in trouble. For roughly six months, they rediscover their roots by becoming farmers, developing skills, and discovering new interests. Some of them choose to work in agriculture, carpentry, cabinetmaking, cooking or mechanics. They learn to cook and develop good eating habits. Through the efforts of L'ŒUVRE LÉGER, these young people find a second family

and a new support network to help them through life. They develop self-confidence, integrate into the work force, or choose to return to school.



Photo: L'ŒUVRE LÉGER

coalition, for example, has drawn attention to the patenting of seeds and food security. In France, numerous organisations are fighting against GMOs and junk-food and for agricultural biodiversity, etc. The "slow food" movement (ecogastronomy) has arisen in reaction to the proliferation of fast-food. And world hunger and food sovereignty have become major issues for NGOs and advocacy groups.

Eating has become a political act. Our daily choices have a direct impact on the environment. The unbridled industrialisation of food production has cut us off from the natural environment. A primary objective is to reduce that distance by choosing foods that are healthful, natural, and local, involving as little processing and packaging as possible. Reducing our consumption of meat is a simple way to help reduce greenhouse gas emissions and perhaps discover a new creativity in vegetarian cooking and menu planning. All our choices have consequences. Organic farming and fair trade, for example, are thriving because consumers have demanded them.

Nature is rich in colours, textures, tastes and aromas. Eating is a source of pleasure to be cultivated....for the health of the planet!

### Bibliographic Sources

- <sup>1</sup> World Food Summit, June 2009.
- <sup>2</sup> UNITED NATIONS WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT (1988). *Our Common Future*, <http://www.un-documents.net/ocf-02.htm> [online].
- <sup>3</sup> CENTRE D'ACTUALITÉS DE L'ONU. *La population mondiale devrait dépasser les 9 milliards de personnes en 2050*. [www.un.org/apps/newsFr/storyF.asp?NewsID=18663&Cr=population&Cr1](http://www.un.org/apps/newsFr/storyF.asp?NewsID=18663&Cr=population&Cr1)
- <sup>4</sup> OMS, *Rapport sur la santé dans le monde, 2003*. [En ligne] [www.who.int/whr/2003/chapter1/fr/index1.html](http://www.who.int/whr/2003/chapter1/fr/index1.html)
- <sup>5</sup> STATISTIQUE CANADA. *Population urbaine et rurale (Québec)*. [www40.statcan.ca/l02/cst01/demo62f-fra.htm](http://www40.statcan.ca/l02/cst01/demo62f-fra.htm)
- <sup>6</sup> LES AMIS DE LA TERRE. *Brevets sur les semences, paysans sous dépendance*. [www.amisdelaterre.org/Brevets-sur-les-semences-paysans.html](http://www.amisdelaterre.org/Brevets-sur-les-semences-paysans.html)
- <sup>7</sup> FAO. *Agriculture mondiale : horizon 2015/2030*, Rapport abrégé. [www.fao.org/DOCREP/004/Y3557F/y3557f11.htm](http://www.fao.org/DOCREP/004/Y3557F/y3557f11.htm)
- <sup>8</sup> Information source for genetically modified organisms. [www.ogm.gouv.qc.ca/sante\\_risques.html](http://www.ogm.gouv.qc.ca/sante_risques.html)
- <sup>9</sup> FAO (2009). *La situation mondiale de l'agriculture et de l'alimentation*.
- <sup>10</sup> ORGANISATION MONDIALE DE LA SANTÉ. *Maladies émergentes transmises par les aliments*. [www.who.int/mediacentre/factsheets/fs124/fr/](http://www.who.int/mediacentre/factsheets/fs124/fr/)
- <sup>11</sup> STATISTICS CANADA *Exportations et importations canadiennes*. [www.statcan.gc.ca/pub/15-515-x/2004001/4064688-fra.htm](http://www.statcan.gc.ca/pub/15-515-x/2004001/4064688-fra.htm)
- <sup>12</sup> UPA et CDEC. *Je cultive ma citoyenneté*, Guide de l'enseignant, p. 56.
- <sup>13</sup> WARIDEL, Laure (2003). *L'envers de l'assiette*, Montréal, Éditions Écosociété, p. 110.
- <sup>14</sup> BRUXELLES ENVIRONNEMENT. *Institut bruxellois pour la gestion de l'environnement*. [www.bruxellesenvironnement.be](http://www.bruxellesenvironnement.be)
- <sup>15</sup> BRUXELLES ENVIRONNEMENT. *Institut bruxellois pour la gestion de l'environnement*. [www.bruxellesenvironnement.be](http://www.bruxellesenvironnement.be)
- <sup>16</sup> RÉSEAU QUÉBÉCOIS DES FEMMES EN ENVIRONNEMENT (2009). *Sabotage hormonal : Comment des produits d'usage courant menacent notre santé*, p. 20.
- <sup>17</sup> In Québec, the designation "organic" is reserved for products that have received organic "certification." Only those certification bodies

recognised by the Conseil des appellations agroalimentaires du Québec (CAAQ) are entitled to certify organic agricultural and food products grown or processed in the province.

- <sup>18</sup> Integrated agriculture is an agricultural production method that pays greater respect to the environment. In France, "*agriculture raisonnée*" is supervised by the government (the Ministère de l'Alimentation, de l'Agriculture et de la Pêche and the Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer). Certification is granted to farm operations that respect the principles of agriculture raisonnée. Source: Wikipédia.

Project coordinator: Jean Robitaille, CSQ

Research and text: Véronique Brouillette

Production assistant: Louise St-Gelais

Verification: Union des producteurs agricoles (UPA)

Secretary: Susy Bélanger

Editing: Andrée Bérubé, CSQ

Graphic production: Graphiscan inc.

Illustrations: Christine Baby

Publisher: Centrale des syndicats du Québec (CSQ)

Funding: This second edition was made possible by the Global Classroom Initiative of the Canadian International Development Agency (CIDA), the Union des producteurs agricoles along with the Programme en agroenvironnement of the UPA funded by the Conseil pour le développement de l'agriculture du Québec (CDAQ).

Partners: RECYC-QUÉBEC, Oxfam-Québec and its youth division, le CLUB 2/3, the Union des producteurs agricoles, L'ŒUVRE LÉGER, la Fondation Monique-Fitz-Back pour l'éducation au développement durable and the Quebec Provincial Association of Teachers.



Special thanks to the Quebec Provincial Association of Teachers for providing translation and revision of the documents relating to *The Earth on Your Plate*.

© ERE Éducation 2002, 2010

All rights reserved by ERE Éducation with unrestricted licence of use for educational purposes for the CSQ.

ISBN: 978-2-89061-106-1

October 2010