FOOD CONSUMPTION AND SUSTAINABLE DEVELOPMENT: AN INTRODUCTION (1)

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1 Introduction

The relation of sustainability to the area of consumption was first stressed in Agenda 21, where it was said that unsustainable consumption and production patterns were the main cause for global environmental deterioration. In 1994, at the Oslo symposium, sustainable consumption was defined as "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations". Consumption, in general, is crucial for sustainable development. Since food belongs to the very basic needs of all living beings, since it is, worldwide, the most essential product for daily consumption, one can even say that food consumption, in particular, is capital for sustainable development. In an analysis of the environmental impact of products (EIPRO), Tukker et al. (2005) underlined that within the EU-25, approximately one third of total environmental impacts (amongst which energy use, land use, water and soil pollution, emission of greenhouse gases, …) from households could be related to food and drink consumption. When including the environmental affects of storing and preparing meals and of out-of-home consumption, the figures for food-related environmental impacts rose to more than 40% of the total. They also revealed that, in fact, the environmental impact of consumed foods and beverages exceeded the impacts of all other investigated consumption domains, even transport (17% of measured impacts) and housing (7% of measured impacts).

Moreover, besides of external environmental aspects, food is also an "internal" issue, closely connected to our health. (Tischner and Kjaernes, 2007).

Following Schäfer et al (2007), present food consumption patterns cannot be called "sustainable", as they endanger not only the carrying capacity of the earth, but human health as well. A transformation to sustainable food consumption would be essential for sustainable development.

There is no common definition nor internationally accepted criteria system for sustainability of food. Most definitions mention three dimensions of sustainability: social sustainability (i.e. people issues, such as health, food safety, quality of life, hunger, …), environmental sustainability (i.e. land use, energy use and gas emissions, soil pollution, …) and economic sustainability. One cannot speak about food sustainability without evoking a *sustainable agriculture* (a way of producing / raising food that is healthy for consumers and animals, does not harm the environment, is humane for workers, respects animals, provides fair wages to farmers and supports and enhances rural communities), and *sustainable nutrition*, defined by Koerber et al (2004) through the following aspects: enjoyable and easily digestible foods, preferably plant-based foods, preferably minimally processed foods,

organically produced foods, regional and seasonal products, products with environmentally sound packaging, and fair-trade products. (Tischner and Kjaernes, 2007)

Also linked to the idea of sustainable food is the concept of "*food security*".

Sometimes confused with food safety, the term food security means ensuring that all members of a population have access to a supply of food sufficient in quality and quantity, regardless of their social or economic status. A secure food supply satisfies the consumer's needs without jeopardizing the production process in the short or long term. It ensures the sustainability of supplies while considering the safety of the methods of production and the nutritional suitability of the food produced. In addition, food security means that everyone always has both physical and economic access to enough food for an active, healthy life. The concept encompasses the following principles

• The ways in and means by which food is produced and distributed respect the natural processes of the earth and are thus sustainable.

• Both the production and consumption of food are grounded in and governed by social values that are just and equitable as well as moral and ethical.

• The ability to acquire food is assured.

• The food itself is nutritionally adequate and personally and culturally acceptable.

• The food is obtained in a manner that upholds human dignity. (WHO, 2004)

Sustainable food consumption can be defined as access and use by all present and future generations of the food necessary for an active, healthy life, through means that are economically, socially and environmentally sustainable.

As Tischner and Kjaernes (2007) underline it : "The goal cannot be to reduce consumption of food as much as possible, but to figure out which kinds of food, produced and processed where and in what way, prepared how and by whom, consumed, digested, with leftovers disposed off or even reused in what way etc. are the most sustainable options for different regions and cultures, different productions systems and consumers/ citizens.

Food consumption and its sustainability cannot be considered as such, but in a broader system including the production, processing, transportation, packaging, preparation, and disposal of food, each of the various stages being possibly analyzed both in terms of their impact on the environment and on human health.

2 Consumption

2.1 Misconsumption

The processes of modernization and economic transition have led to industrialization and urbanization in many countries and the development of economies that are dependent on trade in the global market. Food and food products have become commodities produced and traded in a market that has expanded from an essentially local base to an increasingly global one. Rapid changes in diets and lifestyles resulting from those processes are having a significant impact on the nutritional status of populations. At a global level, good evidence indicates a transition in nutrition, in which rising national wealth is accompanied by a shift away from diets based on indigenous staple foods, such as grains, starchy

roots and locally grown legumes, fruits and vegetables, towards more varied diets that include more processed food, more foods of animal origin, more added sugar, salt and fat, and often more alcohol.

This combines with a decline in energy expenditure that is associated with a sedentary lifestyle, with motorized transport, and labour-saving devices at home and at work largely replacing physically demanding manual tasks, and leisure time often being dominated by physically undemanding pastimes. Because of these changes in dietary and lifestyle patterns, nutritional and diet-related diseases are increasingly significant causes of disability and premature death in both developing and newly developed countries. (WHO, 2004). These consumption patterns not only undermine the quality of life but also have other negative environmental, social and economic impacts. (Barber, 2000)

2.2 Over-consumption

The over-consumption of food is also a serious issue. This trend appears in both developing as well as affluent industrial nations. In contemporary post-industrial societies, where the food system provides people with ample access to a wide variety of foods, many of which are high in fat and are calorically dense, there is a strong link between food, eating, and weight. Post-industrial food systems add unnecessary calories at all stages (production, processing, distribution, acquisition, preparation, and consumption) and are therefore labelled "fattening food systems" (Sobal, 2006: 385)

Obesity is one of the greatest public health challenge of the 21st century. Its prevalence has tripled in many countries in the WHO European Region since the 1980s, and the numbers of those affected continue to rise at an alarming rate, particularly among children. Obesity is already responsible for 2-8% health costs and 10-13% of deaths in different parts of the EU. (Tischner and Kjaernes, 2007)

The problem of overweight and obesity has only recently come to the forefront of public health, as public health nutritionists were primarily concerned with the problems of undernutrition, especially in vulnerable groups in society. WHO, however, calls overweight (a body mass index – BMI2 – of 25–29.9) and obesity (BMI of 30 or more) the biggest unrecognized public health problem in the world; they contribute substantially to both ill health and death in populations. Excess weight is calculated to be responsible for nearly 300 000 deaths annually in the EU – nearly 1 in 12 of all deaths recorded – by contributing to cardiovascular diseases and cancer. The major complications of excess weight are type 2 diabetes, high blood pressure, coronary heart diseases, strokes, a range of cancer types, arthritis, tooth decay and osteoporosis. A series of disabilities and psychological problems are linked directly to excess weight. (WHO, 2004)

2.3 Between over and mis-consumption: anorexia and bulimia

Sociologists have commented on how the social system provides easy access to high-calorie inexpensive food, with a consequently high prevalence of obesity and the parallel development of a fear of fatness (Sobal, 2006: 385). In developed countries, food is abundant, and food manufacturers, through the media, continuously and persuasively encourage people to enjoy the full pleasure of food consumption. As a number of authors have noted, when food is scarce, cultural ideals favour a large body, whose "abundance" symbolizes wealth and status. Conversely, in times of plenty, social mores shift towards disciplining food intake, and the thin body becomes the ideal. In today's advanced capitalist societies, food is readily available and social worth is increasingly measured by a person's ability to resist excess. Regimes of body control, particularly through the regulation of food intake, are now common features of Western culture. (Germov and Williams, 2006), and starts to permeate other cultures. Indeed, eating disorders are increasingly becoming a global problem, with rising number of cases in non-Western countries worldwide. (Hepworth, 2006)

2.4 Under-consumption

While inhabitants of industrialised countries often consume too much calories leading to negative health effects, still a too large proportion of inhabitants of developing and emerging countries have no access to enough food and save drinking water. Hunger, defined as "inadequacy of dietary intake relative to the kind and quantity of food required for growth, activity, and maintenance of good health" (Whit 2004), is a salient indicator of the unsustainability of the global food system. (Barber, 2000)

Agricultural production at current levels could feed everyone on the planet, but it does not. Beyond the nutritional minimum requirement of 2,300 calories per day, each person could regularly be provided 2,650 calories. World Resources Institute reports that there is enough food in the world to feed 12% more than the actual population (Barber, 2000). Though, ten years after the 1996 Rome World Food Summit (WSF), the number of undernourished people in the world remains high. There has been virtually no progress towards the WSF goal – to reduce hunger by half by 2015. In 2001-03, FAO estimates that there are still 854 million undernourished people worldwide: 820 million in the developing countries, 25 million in the transition countries and 9 million in the industrialized countries. (Tischner and Kjaernes, 2007). At the same time, one-third of the food wasted each day in the United States could feed 26 million people. While there is more food, the poor cannot afford to buy it (Barber, 2000).

Adequate nutrition could be derived from grains, but only 40% of the grain grown in the world is fed to livestock to produce high-priced meat. (Whit, 2004). Moreover, large parts of the surface of the globe to produce luxury products for rich consumers – for example beef, sugar, coffee, tea, and chocolate, at the expense of food crops for less affluent consumers. (Leahy, 2004). This can lead us to think again about over-consumption (cf.supra) through another lens…

Following P-M Boulanger, from a sustainability perspective, there is overconsumption if it results in underconsumption elsewhere (contemporaries) or later (future generations), i.e.when:

- Some people don't have access to sufficient amounts (i.e above a specified threshold or norm) of a given resource or of resources in general (underconsumption)

- Others enjoy levels of consumption of these resources above that threshold (overconsumption as such);

- There is a causal relation between the deprivation of the former and the (over)consumption of the latter. (Boulanger, 2007:24-25).

There is over-consumption of certain kinds of foods (especially meat) in industrialized countries, since it has as consequence to make the increase the price of the crops, from now on unaffordable for the poorest…

Barber (2000) also points out the problem of "hidden hunger" (deficiencies in vital micronutrients such as iron, iodine, and vitamin A)0 which strikes at 1.2 billion, leaving a devastating wake of illness.

The WHO claims that "nearly 30% of humanity are currently suffering from one or more of the multiple forms of malnutrition." Problems linked to malnutrition claim the lives of 40,000 people each day, with 19,000 of these deaths among infants and children. Worldwatch points out that "roughly half the population in all nations – wealthy and poor – suffers from poor nutrition of one kind or another"

3 Production

Contemporary methods of food production resulted from scientific developments in agricultural research: the genetic selection of crop strains and animal breeds; the application of nutrients to crops and animal feed; the increase of yield through the use of biochemicals, such as pesticides and growth enhancers; and the use of veterinary medicine to prevent disease outbreaks in groups of confined animals and to promote their growth and productivity. These technical developments have been matched by increased financial investment in farming and food production to gain from economies of scale. This has led to reduced labour costs; increased mechanization; the development of monoculture cropping patterns; increased field, herd and flock sizes; reduced crop biodiversity; longer transport distances; increased food processing and use of additives; greater concentration of retailing outlets; and increased marketing and advertising activity. (WHO, 2004)

Consumption depends on where and how food is produced, processed, packaged, preserved, distributed, prepared and disposed of. The most significant environmental impacts occur at the beginning of the production chain, in the area of food production. Agricultural production requires 28% of the food sector's total energy requirement. (Friedl et al, 2006). Together with livestock production, agricultural production is responsible for the following impacts and costs of industrial agriculture:

- **Soil degradation and soil erosion** through ploughing and subsequent exposure of bare soil to rain and wind, through the use of herbicids that destroy weeds cover for soils, and through the removal of tree cover on slopes.

- **Cropland loss to urbanization**

- **Gradual destruction of forests**, wetlands, and other wild areas to create land for agriculture, destruction of wildlife.

- **Loss of biodiversity in crop species**

- **Yield loss:** The dramatic rise in grain yields between the 1960s and 1980s tended to outweigh the loss of arable land. However, since 1984, grain yields have slowed to such a degree that they no longer compensate for the steady elimination of grainland.

-**Water pollution:** The increasing use of inorganic fertilizers is resulting, in some areas, in the contamination of drinking water with nitrates and damage to aquatic ecosystems from eutrophication.

- **Overpumping of groundwater:** In many irrigation-dependent countries, including China, India, North Africa, Middle East, southwestern United States, water tables are falling because of overpumping.

- **Salinity in dry-land culture**

- **Overfishing:** overfishing has resulted in reduced productivity of fisheries, with the marine fish harvest now stagnant. Fish stocks are declining, with about one-fourth currently depleted or in danger of depletion and another 44% being fished at their ecological limit. Moreover, fishing techniques are used that destroy other sea animals or habitat. (Barber, 2000)

- **Resistance of plant and insect pests to chemical pesticides and herbicides**

- **Elimination of predator insects**

- **Dependence on oil and external energy resources:** Modern agriculture relies substantially on fossil fuels. Nitrogen fertilizers, feed concentrates, pumped irrigation, and power machinery such as tractors account for much of the energy used on farms.

- **Greenhouse gases emissions**: while fuel combustion is the main source for CO2 emissions, other important greenhouse gases are methane (CH4) from animal husbandry, waste and rice planting, and nitrous oxide (N2O) from industry and agricultural soils.

- **Concerns about animal welfare**:Animals and nature have become commodities: raw material for an industrial production system. (Tischner and Kjaernes, 2007). Farm animals are made to work very hard in producing meat, milk, eggs and wool, not least because the genetic selection of many breeds to generate profit has outrun the strength of their bodies. There is evidence that animals suffer discomfort or severe pain throughout their short lives so that the consumers can buy cheap food in the shops. (ex: joint deformities and heart diseases due to forced fattening, enhanced reproduction rates to the limit of the animal's biological capacity, restriction on the movement of the animals, …) (Atkins and Bowler, 2001)

Impacts on health:

- Insecticide, rodendicide, herbicides, and fungicides are of concern to the consumer's health because of the residues that appear in food. Adverse health effects can result from both acute and chronic exposure too foodborne chemicals and may include kidney and liver damage, fetal developmental disruption, endocrine system disruption, imunotoxicity and cancer (WHO, 2004).
- Drugs (for instance antibiotics) are also routinely used by farmers to increase the growth or yield of their animals and to protect them from diseases. There is a risk that, over a period of time, bacteria become immune to them and that this immunity might pass through the food chain to make bacterial infections in human more difficult to treat.
- A similar issue is raised by the use of hormones as growth promoters, that could have bad implications on both animal and human health. (Atkins and Bowler, 2001 : 216)

3.1 Processing

The European food processing industry is the third biggest EU industry employing some 2.7 millions people with more than 26000 companies across the EU. More than 70% of the agricultural goods produced in the EU are transformed into food industry products. There is a tendency toward the consumption of highly processed foods (fast and convenience foods) and a higher amount of appliances in the kitchen, accompanied by decreasing knowledge about nutrition and food. (Tischner and Kjaernes, 2007).

The alteration of natural foods to make them more appetizing or to preserve them has been a feature of the food industry for hundreds of years. We have come to accept such practices as a matter of course and indeed, processed or manufactured foods constitute about three quarters of our diet and seem quite normal. About 3800 additives are used in our daily food, for three basic purposes.

- First, there are cosmetic chemicals that make products look more attractive to senses, especially colouring agents, flavours, sweeteners and texture modifiers, such as emulsifiers and stabilizers.

- Second, there are preservatives, including antioxidant and sequestrants, which add life to a product.

- Third, processing aides assist the manufacturing process, for instance by preventing food from sticking to machinery.

A small but significant group of people are allergic to individual or group additives. Such allergic reactions can be sudden and dramatic, but perhaps even more worrying is the unknown and insidious long-term effect that food additives and chemical residues may have. (Atkins and Bowler, 2001)

Methods of storing and processing food tend to reduce than enhance nutritional content.

4 Distribution

Once food is produced, it is then packaged, transported and delivered to a sales outlet. Some food is moved by cart to the local village market, other (an increasingly major share, cf.infra) is loaded into huge cargo boxes and shipped or flow thousands miles away, later carried by refrigerated railroad cars and/or trucks to a warehouse to perhaps wit for weeks or even months. (Barber, 2000)

Global trade in agricultural products has increased rapidly in the last few decades. In the last five decades, the volume of agricultural exports has risen by 550% and total agricultural production, 320%. The difference shows that an increasing proportion of food is grown for export rather than local consumption. The volume of exports has increased significantly, but their value has increased even more dramatically, rising an estimated 1730% in the period, indicating a significant increase in the per-unit value of the foodstuffs being shipped, as a result of refrigeration techniques and faster delivery using air transport. Several problems associated with increased food trading may threaten the sustainability and security of the food supply. These include the selection of the commodities traded; the concentration of trade among a few dominant multinationals; the effects of transport – increasing transport adds to air pollution and road hazards – , storage and packaging on the environment, and the need for traceability in the food chain. (Barber, 2000; WHO, 2004)

5 Food safety

Although today control and regulation of food safety are very high, the consumer trust in food safety is reduced by food scandals. Food scares are becoming common: salmonella, BSE, bird flu, genetically modified crops, … Whether the science supports such worries or not seems to be a marginal matter, because media have raised the debate to such a pitch that consumers are making purchase decisions on the basis of fear rather than fact. (Atkins and Bowler, 2001)

Therefore, food safety – the assurance that food will not cause harm to the consumer when it is prepared and/or eaten – has commanded the most attention from public, politicians and officials in Europe in recent years.

Concerns over food safety and control of food supplies have arisen from a number of factors such as:

- rising numbers of incidents of foodborne disease
- the emergence of new, serious hazards in the food chain
- the globalization of the food trade
- demographic changes and an increase in vulnerable groups
- new opportunities for chemical contamination
- the need for appropriate risk assessment procedures for new technology.

Adverse health effects can result from:

- exposure to foodborne chemicals (arising from environmental pollutants, agricultural and veterinary practices such as pesticides, fertilizers and drugs, and food processing and packaging techniques)
- infection: when viable organisms (bacteria, viruses, or parasites) are present in the food and enter the body, where their growth and metabolism produce the disease response)

- intoxication : when the presence and growth of an organism in the food because of incorrect storage are accompanied by the accumulation of a toxin that is ingested with the food and causes illness. (WHO, 2004)

Food poisoning is among the commonest forms of illness. It is on the increase in developed countries. The reasons for the secular increase is bound up with the changing food system. First, food production has become much more intensive over the last 50 years and there are pressures on farmers and food processors to cut corners in order to reduce costs. Abattoirs and food processing plants have been shown to be major points for infection and, because they are growing larger and larger, a single incident can have a big impact.

Second, consumers are demanding more convenience food but these are often not properly stored. Refrigerator temperatures over 5°C are dangerous as is food kept beyond its use-by date, and also frozen food not fully defrosted before cooking. Traditional cooking skills have often been substituted by technological innovations such as microwave ovens, which may give a false impression that the food has been thoroughly heated. (Atkins and Bowler, 2001)

6 Conclusion : sustainable food?

Summarising the environmental impacts of food consumption, of all stages of a food product life cycle, agriculture production is responsible for the highest environmental effects. The influence of packaging material and transport is of minor importance compared to other categories. Concerning food categories, the smallest environmental impacts can be expected from seasonable and fresh vegetable products grown in an extensive manner (such as organic agriculture) with little transport and light packaging. Not surprisingly, meat and meat products show the most severe environmental consequences, followed by dairy products and other product groups (such as fats and oils, soft drinks and bread/bread products).

A sustainable food diet would give preference for meatless or reduced meat diets, organically, regionally and seasonally produced foods, minimally processed, ecologically packed and tastefully prepared foods, diets that have low environmental impacts but provide the required amount of nutrients and energy to maintain good health, as well as foods traded fairly.

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