48
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Questions sur Produits laitiers & Nutrition and Environment

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1. What is sustainable development?

Sustainable development must meet today's needs (food, shelter, clothing), without compromising the ability of future generations to meet their own needs. It takes into account three interrelated factors (see Appendix A):

- **Economics:** rational use of resources and natural environment, development of international economic relations (e.g. a system of fair and ethical trade ...), integration of environmental and social costs into the price of goods and services
- **Social:** satisfaction of basic human needs, combating exclusion and poverty, reducing inequalities, respect of cultures
- **Environment:** sustainable management of natural resources, maintenance of the ecological equilibrium (including climate, biodiversity, oceans, forests ...), risk reduction and prevention of environmental impacts

2. Why is sustainability so important?

- **Population growth:** today there are 7 billion people in the world, expected to grow to 9 billion in 2050, generating greater needs for food, urbanization, etc.
- **Increased pressure on the environment:** depletion of fossil fuels (oil, coal, gas) which meet 80% of the world's energy needs; global warming, due in part to human activities and recognized as a global threat; loss of biodiversity (fauna and flora)*; increased water pollution and soil erosion.

With the current situation being unsustainable, other models must be considered, especially with regard to food systems, in order to feed more people without putting any additional pressure on the environment.

* Forests are in constant decline (- 2.4% since 1990); more than one quarter of mammalian species and 12% of threatened bird species face extinction.

3. What is a sustainable diet?

According to the FAO*, sustainable diets should have a low impact on the environment, and contribute to food security and nutrition as well as to a healthy life for present and future generations. They must also

contribute to protecting and respecting biodiversity and ecosystems, be culturally acceptable, economically equitable**, accessible, affordable, and optimize the use of natural and human resources *(Appendix A)*.

Western food systems are not considered sustainable in relation to the current use of resources and their impact on the environment and health (excess weight, obesity and associated diseases). Many researchers are now looking at how to develop sustainable diets.

* Food and Agriculture Organization of the United Nations
** Fair Trade is a trading partnership which aims to achieve greater equity in international trade (better trading conditions, rights of producers and workers) *(Appendix B)*.

4. How can we evaluate the environmental impact of food?

Whether in terms of greenhouse gas emissions (GHG), biodiversity, water quality, etc., the environmental impact of food is particularly complex to determine, as it has both negative and positive effects.

Negative impacts on air and water are estimated by a life cycle approach (Life Cycle Analysis or LCA), which takes all the impacts of the food chain into account, from the extraction of raw materials to waste disposal.

Positive impacts (such as the preservation of biodiversity and soil quality) are estimated using an ecosystem services valuation approach.

These two complementary methods provide an overview of the potential impact of food production on the environment but are, however, extremely difficult to implement*.

* Especially for farming, because most impacts are at a very local level and can only be understood completely in the context of that same local or regional level. Evaluation methods are difficult to implement because they involve a range of complex biological processes, different scales, and take into account climate, soil type and land use. Thus, these methods are still incomplete and far from being harmonized at an international level, with the exception of global warming.

5. What is it?

Food production involves the use of land (crops and livestock), water (irrigation, cleaning, etc) and fossil fuels (transport, storage, cooking, etc.). It therefore affects biodiversity and air pollution (emission of GHGs*).

Along with transportation and housing, food production is one of the three sectors that have the biggest impact on the environment in Europe (these three sectors represent 70-80% of the environmental impact in the European Union). However, unlike the transport and housing sectors, the food industry also provides environmental benefits that should be taken into account.

* Greenhouse gases include carbon dioxide (CO_2), methane (CH4) and nitrous oxide (N_2O). The measurement of these three gases is in grams of CO_2 equivalent (g CO_2e). These measurements also are referred to as the carbon impact or carbon footprint.

6. What about greenhouse gas (GHG) emissions?

Food production and consumption is one of the four main components of the carbon footprint in France, along with transportation, housing and the service sector. On a yearly basis the carbon footprint of these four components were estimated as follows: food amounted to about 2.2 t CO_2e per person, transportation 2.5 t CO_2e, housing (heating, production and supply of electricity, gas and water) and service sector 1.9 t CO_2e. Since 2007, the carbon footprint associated with the movement of people and the service sector is on the rise, while that of the food industry is getting smaller.

A recent study showed that the carbon footprint of French adults was highly variable depending on the individual, because of quantitative and qualitative differences in food consumption. The average carbon footprint was found to be 4170 g CO_2e per person per day*; 4725 CO_2e /d for men, which was significantly higher than that of women (3658 CO_2e /d).

The carbon footprint is also variable depending on the type of food: meat and deli-meat are the largest contributors to the carbon footprint of the food industry (27%). The contribution of cheese is 9%, the same as fruits and vegetables. Milk and other dairy products contribute at most 5.5% *(Appendix A)*.

* This figure does not include transportation between the point of sale and the consumer's home; use; storage and preparation by the consumer; or disposal at the end of product life.

7. Can we reduce GHG emissions through changes in our diet?

The generalization sometimes used to promote a vegan diet is neither a sustainable nor realistic approach*. In addition, modifying diets based on a single environmental measurement (such as GHGs), without taking into account the side effects of this change on all other criteria may cause unintended consequences (such as increased water pollution by use of pesticides, degradation of soil quality or carbon emissions due to converting grasslands).

In addition, it is primarily the amount of food consumed that plays the biggest role in GHG emissions ***(Q6)***.

At the request of WWF**, British researchers tried to construct a diet that was culturally adapted to the population, nutritionally balanced and would reduce food chain GHG emissions by 25% by 2020. The results show that such a diet can be achieved without removing an entire food category. The researchers also noted that the amount of dairy must remain significant because of its nutritional importance.

*A diet that changes eating habits to the point of recommending eliminating certain staple foods is not plausible.
** World Wildlife Fund, the world's leading nature conservation organization.

8. Nutrition and environment: are they going in the same direction?

A recent French study showed that a diet considered to be nutritionally adequate was more likely to be associated with a greater carbon footprint. Thus, the consumption of sugary foods and savory snacks would have a more beneficial impact on carbon footprint than the increased consumption of fruits and vegetables. These results are not heading in the expected direction. Diets considered as nutritionally adequate diets contain adequate amounts of fruits and vegetables. Even if these have a lower impact on GHG emissions, they would be consumed in greater quantities. This means that a "healthy" diet has a similar, if not greater, carbon impact than a nutritionally inferior diet.

Note: The more food that is consumed the greater the impact on carbon footprint, which is why men have a higher GHG impact – ***(Q6)***.

Dairy sector Assets

9. What is the carbon footprint of the dairy sector?

An FAO report published in 2010 indicated that the dairy sector contributes 2.7% of total global GHG emissions*.

The LCA carried out on the entire dairy sector showed that about 80% of the GHG impact was at farm level** and 20% due to processing. Nevertheless, it is at the agricultural and livestock production level where the main environmental assets of the sector are found ***(Q10)***.

* This includes emissions from the production of milk, its processing and transport. Emissions are based on 1 kg CO_2 eq / liter of milk.

** Mainly due to enteric fermentation of cattle: approximately 70% from belching and 30% from manure.

10. What are the environmental assets of the dairy sector?

The key environmental assets of the French dairy sector are found at farm level. In fact:

- 11 million hectares of pasture grazed by ruminants (all species) store large amounts of carbon which compensate for carbon emissions*. These grasslands would not exist without pastoral farming and provide a large number of advantages, from protection against erosion, to the quality of landscapes, and making them more attractive to tourists.
- Dairy cow feed is made up of more than 75% forage that is inedible by humans (50% of grass and 25% of corn on average), produced on land where cereal production for human food is not possible.**
- The conversion of plant protein to animal protein is especially efficient by dairy cows; producing 1 kg of milk proteins only takes 2.5 kg vegetable proteins (and not 6 kg as sometimes suggested!). The conversion rate of vegetable proteins/animal proteins is 40% for dairy products. Moreover, these proteins are of excellent quality (Q11).

The presence of dairy farming and dairy businesses is also at the heart of the development and vitality of these regions. They shape the landscape, contribute to biodiversity, and also maintain economic activity due to the great diversity of production systems adapted to the land.

* The essential role of grasslands in the effort to manage GHG emissions is also recognized by the Kyoto Protocol.
** These areas are not irrigated. Animals also eat by-products of human food that would otherwise not be used (100 kg of food consumed by humans generates around 37 kg of by-products). One example is rapeseed meal, which remains after the oil is extracted.

11. What are the nutritional and health benefits?

The nutritional value of dairy products is excellent. In France, they are the main contributors to intakes of calcium*, iodine, zinc, phosphorus, retinol, vitamins B2 and B12. They also provide proteins of excellent nutritional quality based on their digestibility (> 95%) and their particularly well balanced essential amino acids composition.

While protein consumption in Western regions often meets the recommended amounts, there is still cause for concern when protein intakes are mainly derived from plant food sources.

In addition to nutritional contributions, the consumption of dairy products is associated with a decreased risk of certain diseases. A recent literature review shows that the consumption of dairy products is likely to be linked to a reduced risk of hypertension, coronary heart disease (including infarct) and colorectal cancer. Studies also suggest a link between consumption of dairy products and improved bone mineral density, reduced risk of type 2 diabetes, metabolic syndrome and stroke.

* Calcium from dairy products provides 50 to 70% of the total calcium intake in Western diets.

12. What about the relationship between milk/nutrition/environment?

Research is intensifying to link the environmental impacts and nutritional benefits of foods. As one example, a recent Swedish study developed an index relating the nutritional value* to the climate impact for different beverages. The higher the beverage scored, the better the nutritional quality in relation to its impact on GHG emissions.

In this index, milk scored 0.54, compared to 0.25 for soybean beverages and 0.28 for orange juice. Because milk is an important source of micronutrients, its environmental impact is largely offset by its nutritional quality. Additional research that includes other indicators (such as biodiversity or use of water resources), as well as aspects such as costs, could be interesting.

* In this study, the nutritional value of the food is the contribution of recommended intakes for 21 nutrients (proteins, carbohydrates, lipids, retinol equivalents, vitamin D, vitamin E, thiamin, riboflavin, vitamin C, niacin equivalents, vitamins B6, B12, B9, phosphorus, iron, potassium, calcium, magnesium, selenium, zinc, and iodine).

In summary

The nutritional value of milk and dairy products is an important component when considering the environmental impact of foods. Dairy products are in fact not substitutable by other foods and their health benefits need to be taken into account before any recommendations for diet modification are made for environmental reasons. In addition, as the available studies mainly evaluated the effects on greenhouse gas emissions, other indicators such as water use or biodiversity also deserve consideration. Significant efforts are required to quantify the benefits provided by livestock farming (biodiversity, pastures ...).

To find out more

- CNIEL 2009 – The French dairy industry and the environment – www.cniel.com
- Ademe (Agency for Environment and Energy Management) – www.ademe.fr
- Department of Ecology – www.developpement-durable.gouv.fr/
- Nicole Darmon and Old Florent, 2012 - Impact carbon and nutritional quality of food in France: objectives Environmental going to necessarily mean nutritional goals? – Choledoc n°131 – www.cerin.org
- Esnouf, C., Russel, M. et Bricas, N. (Coords), 2011. For a sustainable food. Strategic Dualine – www.inra.fr/l_institut/prospective/rapport_dualine
- FIL/IDF – www.dairy-sustainability-initiative.org/Public/
- IDELE – Livestock Institute – www.idele.fr

Questions sur Produits laitiers &

8. Qualités nutritionnelles du lait *(Nutritional qualities of milk)* (2004) **9.** Calcium Laitier *(Dairy calcium)* (2004)

10. Ostéoporose *(Osteoporosis)* (2004) **11.** Fromage, nutrition, santé *(Cheese, nutrition, health)* (2004) **12.** Lipides *(Fat)* (2005)

13. Cholestérol et athérosclérose *(Cholesterol and atherosclerosis* (2005) **14.** Beurre et crème *(Butter and cream)* (2005)

15. L'alimentation des Français *(The French diet)* (2005) **16.** Les protéines *(Proteins)* (2005)

17. Prévention de l'hypertension *(Hypertension prevention)* (2005) **18.** Les laits fermentés *(Fermented milks)* (2006)

19. Prévention du syndrome métabolique *(Prevention of metabolic syndrome)* (2006) **20.** L'alimentation de l'enfant *(Feeding the child)* (2006)

21. Santé bucco-dentaire *(Oral health)* (2007) **22.** Les vitamines des Produits laitiers *(Vitamins in dairy products)* (2007)

23. Qualités nutritionnelles du lait et des fromages de chèvre *(Nutritional qualities of milk and goat cheese)* (2007)

24. Les autres minéraux du lait et des produits laitiers *(Other minerals of milk and dairy products)* (2007)

25. Produits laitiers et cancer *(Dairy and cancer)* (2007) **26.** Le lait à l'ecole *(School milk)* (2008)

27b. Les Trans et CLA *(Trans and CLA)* (2012) **28.** Allergies *(Allergies)* (2008) **29.** Intolérance au lactose *(Lactose intolerance)* (2008)

30. Les bactéries lactiques *(Lactic acid bacteria)* (2009) **31.** Sel / Sodium *(Salt / Sodium)* (2009)

32. Densité nutritionnelle *(Nutrient density)* (2009) **33.** L'alimentation des Français en 2009 *(French diets in 2009)* (2009)

34. Allégations nutritionnelles et santé *(Nutrition and health claims)* (2010)

35. Alimentation des vaches, production de lait & composition nutritionnelle *(Feeding cows, milk production & nutritional composition)* (2010)

36. L'iode *(Iodine)* (2010) **37.** Matière grasse laitière, technologies & santé *(Milk fat, health & technology)* (2010)

38. Vitamine D et santé *(Vitamin D & health)* (2010) **39.** L'alimentation des sportifs *(Sports nutrition)* (2011)

40. Lactoferrine *(Lactoferrin)* (2011) **41.** Allégations nutritionnelles et santé *(Nutrition and health claims)* (2011)

42. Amines biogènes, histamine *(Biogenic amines, histamine)* (2011) **43.** Alimentation des personnes âgées *(Diet of elderly people)* (2012)

44. Etiquetage nutritionnel *(Nutrition Labelling)* (2012) **45.** Microbiote *(Microbiota)* (2012) **46.** Gestion du poids *(Weight Management)* (2012)

47. Diabète (s) *(Diabetes)* (2012)

Special Issue No. 1b. Les « rumeurs » autour du lait *("Rumors" about milk)* (2010)

Special Issue No. 2b. Histoire, sociologie et image du lait *(History, sociology and image of milk)* (2010)

Special Issue No. 3b. ABCdaire reglémentaire *(Regulatory ABCs)* (2011)

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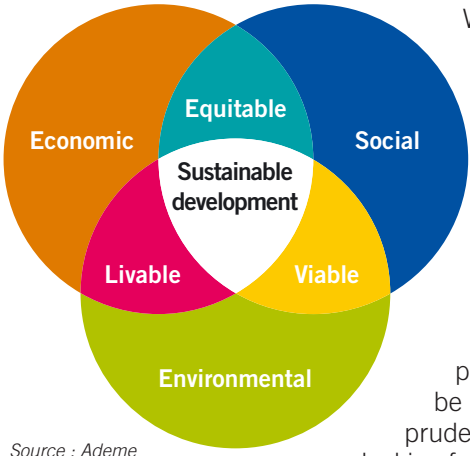
Sustainable Development



Source : Ademe

Sustainable development is based on three interrelated factors: economic, social, and environmental.

Where these three pillars connect with each other, we can identify three other concepts that illustrate that the world is only sustainable if it is **equitable,** meaning absence of all inequalities **livable,** a place where one can live and not only survive, and **viable** because it meets the needs of everyone on the planet without compromising the needs of future generations.

Sustainable development is also based on a number of principles: **solidarity** (between generations, nations, and also among people within the same society), **participation and good governance** (to involve all stakeholders in projects of general interest to ensure their success, whether it be businesses,communities, citizens ...), **caution** (by showing prudence in action, favoring a "reasoned" approach, or even by looking for alternative solutions).

The key aspects of sustainable food

Social

- Inequalities (e.g. North-South)
- Governance of the food system
- Justice, equality
- Access to food for all
- Consumers and innovations
- Respect of cultural aspirations
- Consumer concerns
- Working conditions

Economic

- Efficiency of companies
- Employment
- Planning (jobs geographically distributed)

Environmental

- Pollution (land, air, rivers, soils)
- Emissions of greenhouse gases (CO_2, CH_4, N_2O)
- Biodiversity (a source of environmental services)
- Consumption of water and land

Health

- Lifestyle and diet (deficiency malnutrition, obesity, cancers, allergies ...)
- Quality and safety of food (mycotoxins, pesticides ...)
- Immunity of the population

Source: For a Sustainable Food, strategic duALine

GHG emissions by type of food

Food type	g CO_2e*/100 g*	g CO_2e*/portion**
Banana	186 – 280	279 – 420 / 150 g
Clementine	52 – 78	78 – 117 / 150 g
Raw carrot	117 – 175	140 – 210 / 120 g
Lettuce	127 – 191	76 – 115 / 60 g
Pasteurised orange juice	94 – 140	188 – 280 / 200 ml
Potatoes cooked in water	26 – 40	65 – 100 / 250 g
Cooked frozen chips	152 – 228	380 – 570 / 250 g
Wholegrain bread	76 – 114	38 – 57 / 50g
Cooked white rice	78 – 116	195 – 290 / 250 g
Gruyère	879 – 1632	264 – 490 / 30 g
Camembert	658 – 1222	197 – 367 / 30 g
Semi-skimmed milk	99 – 183	248 – 458 / 250 ml
Fromage blanc (20% fat)	134 – 250	134 – 250 / 100 g
Natural yoghurt	157 – 291	196 – 364 / 125 g
Fruit yoghurt	126 – 234	158 – 293 / 125 g
Sausages	499 – 927	749 – 1390 / 150 g
Grilled lamb chops	1540 – 2860	1540 – 2860 / 100 g
Ham	452 – 839	452 – 839 / 100 g
Minced beef (15% fat)	1400 – 2600	1400 – 2600 / 100 g
Roast chicken	438 – 813	438 – 813 / 100 g
Hard boiled eggs	346 – 642	346 – 642 / 100 g
Cooked shrimps	1131 – 2100	1357 – 2520 / 120 g
Salmon	273 – 507	328 – 608 / 120 g
Tinned tuna	394 – 732	473 – 878 / 120 g
Pizza	329 – 611	659 – 1222 / 200 g
Breaded fish	301 – 559	361 – 671 / 120 g
Crisps	211 – 317	127 – 190 / 60 g
Pain au chocolat	167 – 251	100 – 151 / 60 g
Olive oil	173 – 259	17 – 56 / 10 g
Butter	1848 – 3432	185 – 343 / 10 g
Cream	319 – 593	32 – 59 / 10 g
Tap water	0,04 – 0,06	0,08 – 0,12 / 200 ml

*These figures only take into account agricultural production, processing, packaging and transport to the point of sale. Transport by the consumer, storage, cooking and waste are not included here.
** Portions for an adult, as per GEMRCN 2011.

Source: Ecological Economics 75 (2012) 91-101

Frequently Asked Questions

• What is a greenhouse gas (GHG)?

Certain gases can trap some of the heat from solar radiation around the Earth, which is emitted back into the atmosphere. This is called the greenhouse effect. This is essential to life on earth. However, from the beginning of the twentieth century to the present day, the concentrations of greenhouse gases have increased by 50%. This phenomenon is directly linked to human activity. The combustion of oil, coal and gas, methane from agriculture, gases from the cooling of buildings and cars; these emissions change the composition of the atmosphere and disrupt the global ecosystem. Main consequences: rising temperatures and water levels.

• Why do cows emit GHGs?

When cows ruminate, they belch and emit gas (methane), which contributes to the greenhouse effect. Studies are currently underway to develop the most environmentally friendly farming systems possible (e.g. promoting on-farm crop production) but also to produce feed that would reduce rumination time and therefore the production of gas by the animals.

• The global dairy sector contributes 2.7% of total GHG emissions*.

Approximately 80% of GHG impact occurs at farm level (20% from processing). Nevertheless, it is at the agricultural and livestock production level where the main environmental assets of the sector are found...

** This includes emissions from milk production, processing and transportation.*

• Should the land used to grow grain for cattle instead be used to feed people?

Dairy cow feed is made up of more than 75% forage that is inedible by humans (50% of grass and 25% of corn on average), and produced on land where cereal production for human consumption is not possible*. Livestock production is a good solution since cows provide protein of good nutritional quality from non-edible plants.**

** These areas are not irrigated.*
*** The conversion of plant protein into animal protein is especially efficient in dairy cows, as producing 1 kg milk protein requires 2.5 kg of vegetable protein (and not 6 kg as sometimes reported).*

• Should we stop eating animal products to save the planet?

Livestock, like all agricultural products, has an effect on the environment. But it is essentially the quantity of food ingested, and not the type of food, which plays a role in greenhouse gas emissions. Therefore, if we only ate fruits and vegetables, we would have to eat more of them, which would increase GHG emissions. Researchers have recently shown that GHG emissions could be reduced by 25% while maintaining significant consumption of dairy products. Dairy products are not substitutable by other foodstuffs because of their nutrient richness.

• How does the dairy sector manage the use of water?

The production of healthy dairy products requires strict cleaning procedures that are water intensive. Farm wastewater is mainly derived from cleaning the milking parlor and milk tanks. The direct discharge of wastewater into the environment is prohibited. Various systems are used to clean this type of waste (biological degradation by microorganisms in treatment ponds, reed bed filters ...).

In milk plants there is a focus on controlling water consumption: factories are equipped with sensors for sorting (water/milk), loop systems to reuse water in the process of cleaning production lines, training staff about the rational use of water ...

• What is Fair Trade?

Fair Trade organizations have been defined as «a trading partnership, based on dialogue, transparency and respect, the objective of which is to achieve greater equity in world trade. It contributes to sustainable development by offering better trading conditions and securing the rights of marginalized producers and workers, especially in the southern regions of the planet. Fair Trade organizations (backed by consumers) are actively engaged in supporting producers, raising awareness and in campaigning for changes in the rules and practices of conventional international trade."

Livestock and regional balance

Through their practices, farmers are shaping the French rural landscapes. In France today, one in four agricultural operations is a dairy farm. Thus, dairy farms maintain 29,325,000 ha of agricultural land and 10 million acres of prairie.

- **Grasslands:** to feed their herds, dairy farmers work large areas of land mostly covered by grasslands. The grasslands serve to limit runoff, act as a sponge in case of flooding and as a natural water filter, they also act as carbon sinks, help to limit soil erosion and thus protect the earth. In addition they are a reservoir of biodiversity, for both animals and plants (an average farm has 74 ha of cultivated agricultural land, of which 33 ha is grassland and a dairy cow maintains the equivalent of one hectare of biodiversity).
- **Hedges, embankments and ditches:** these structures limit the impact of floods, prevent soil erosion, and trap and degrade nitrates and pesticides. Grasslands are a reservoir of animal and plant biodiversity.
- **Herds:** the manure from dairy cows fertilizes the soil and enriches it with organic matter. This reduces the use of chemical fertilizers. Grazing encourages plant diversity and in dry areas, it can limit fires.
- **Crops:** they add to the diversity of the landscape while providing on-site fodder and grain for the cows.

Life cycle analysis of dairy products