

ensa

Growing appetite for a healthy and sustainable diet:
Soyfood production and consumption in Europe





Introduction

Due to a number of developments in the last few decades the challenges in the food sector have never been bigger than today: a growing population, changing consumption patterns and increasingly scarce resources have entailed that sustainable food has become an important issue in the political and societal debate, especially in Western Europe.

The European Commission has highlighted the challenges on this issue: "The food Europe produces and consumes has a significant impact on the environment through, for example, greenhouse gas emissions, the use of land and water resources and pollution. A growing number of analyses question the long-term sustainability of the current trends in the production and consumption of food."

Since its establishment 10 years ago, the European Natural Soyfoods Manufacturers Association (ENSA) and its members have focused on the importance of sustainable food production and consumption. As President of ENSA, I am convinced that the soy and plant-based sector

has a crucial role to play in the necessary shift towards a more healthy and sustainable diet. Having the highest protein content of all crops, soy requires fewer natural resources for the same protein level. For the coming years, it is ENSA's ambition to explain to society how and why soy and plant-based products can be part of the solution for the challenges that the European Commission has identified.

For all of these reasons and on the occasion of its 10th anniversary, ENSA has prepared this reference guide. Our intent is to give an overview of the global food trends and their consequences, including a closer look at soy and plant-based diets. In addition, it examines both the challenges that the European food sector experiences and possible solutions.

We have based this analysis on public and independent studies and reports of highly reputed institutions, such as the OECD, the FAO, the IPCC, the European Commission or the WHO. This collection of data guarantees the required objectivity for such an analysis. We have used

facts and figures collected by our members only for the chapter 'Global and EU soy – Supply and Demand'.

We truly hope this publication can be the basis of a thorough debate with all stakeholders on the necessity of a gradual shift to healthier and more sustainable diets in Europe. Any authority or stakeholder will find that ENSA is a partner who welcomes discussions and actions to effectively implement this essential turnaround. Please do not hesitate to contact the ENSA secretariat (secretariat@ensaeu.org) for any additional information you would need on this topic or on natural soy food in general.

I wish you a pleasant reading.

Bernard Deryckere
President of ENSA



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A sustainable
global food supply
to feed a growing
population

Population growth and higher daily intake lead to increased global food consumption

Unprecedented and sustained growth in global population

The world population grew from 2.6 billion in 1950, to 6.1 billion in 2000 and up to 7 billion in 2012. It is expected that it will keep on growing, up to 9.5 billion in 2050. The highest increase is expected to occur in the least developed regions of the planet. These will account for 99% of the expected growth.

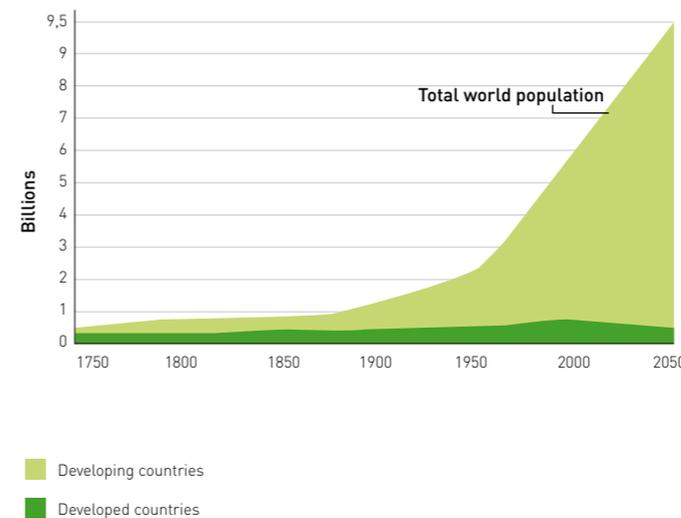
Nine countries will be responsible for half of the world's projected increase from 2010 to 2050: India, Pakistan, Nigeria, Ethiopia, United States, the Democratic Republic of Congo (DRC), Tanzania, China and Bangladesh. The increasing global population is the most direct cause for the higher global food consumption since the 1960s.

Increased daily intake

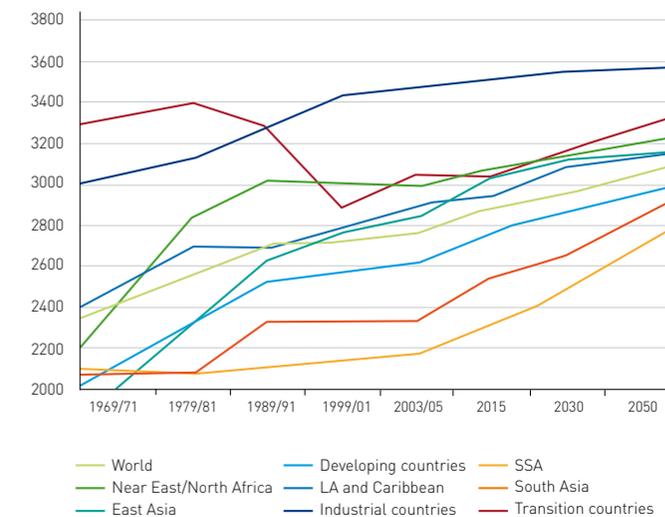
The second reason for increased global food consumption is a rise in daily intake per person. This shift is mainly due to the overall economic progress of the developing countries. The figures show that most of this increase took place in China, Indonesia, Brazil and Mexico. This means that there are still many developing countries where this increased daily intake shift will occur in the near future.

Therefore, considering the predicted population growth and higher daily intake per person in developing countries, a strong increase in food consumption and demand is forecasted. This entails huge challenges to feed the world in a healthy and sustainable way.

World population 1750-2050



Apparent food availability per capita



Source: Food and Agriculture Organization, 2012, Global trends and future challenges for the work of the organization Web Annex http://www.fao.org/docrep/meeting/025/gt_webannex_rc2012.pdf

Global consumption patterns have changed to a more Western, resource-intensive diet

Shift towards livestock products

Aside from the increased daily intake, there is also a change in consumption of major food items: over the last decades, there was a shift towards more livestock products (meat, eggs, milk). This shift occurred mainly in developing countries as most of the developed countries had already completed the transition to such diets.

According to the FAO, the share of consumption of livestock products in developed countries has reached 48% of the total food consumption (i.e. dietary energy supply). This percentage has been stable for several decades and is not expected to further increase.

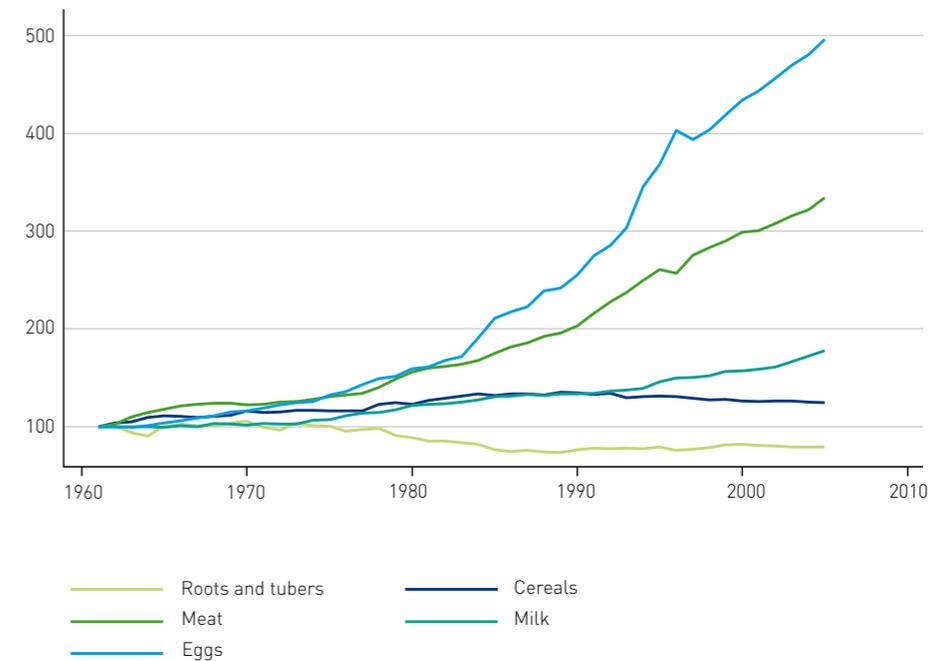
Evolution in developing countries

Currently, meat, eggs and milk provide 29% of the total food consumption in the developing countries. Three decades ago, this was only 20%. Since the early 1960's, the consumption per capita has almost doubled for milk, more than tripled for meat and increased by a factor five for eggs.

According to the FAO¹, it is expected that the share of livestock production in total world food production will increase from 36% in 2005, to 39% in 2050. This results predominantly from a rise in this share from 30% to 35% in the developing countries.



Per capita consumption of major food items in developing countries 1961 - 2005



Source: Food and Agriculture Organization, 2012, Global trends and future challenges for the work of the organization Web Annex http://www.fao.org/docrep/meeting/025/gt_webannex_rc2012.pdf

The first challenge: Provide enough food to live up to increasing demand

Food security

Food security is a crucial element in any food policy: after the second World War, it was the main reason to introduce the European Common Agriculture Policy in 1957. Today food security remains a leading challenge at global level with over 800 million people suffering from chronic hunger and a rapidly increasing population, providing enough food for the world is a key objective.

According to the OECD², agricultural production will have to increase by at least 60 per cent over the next 40 years to meet an additional consumption of 940 million tonnes of cereals and 200 million tonnes of meat a year.

Already a global problem

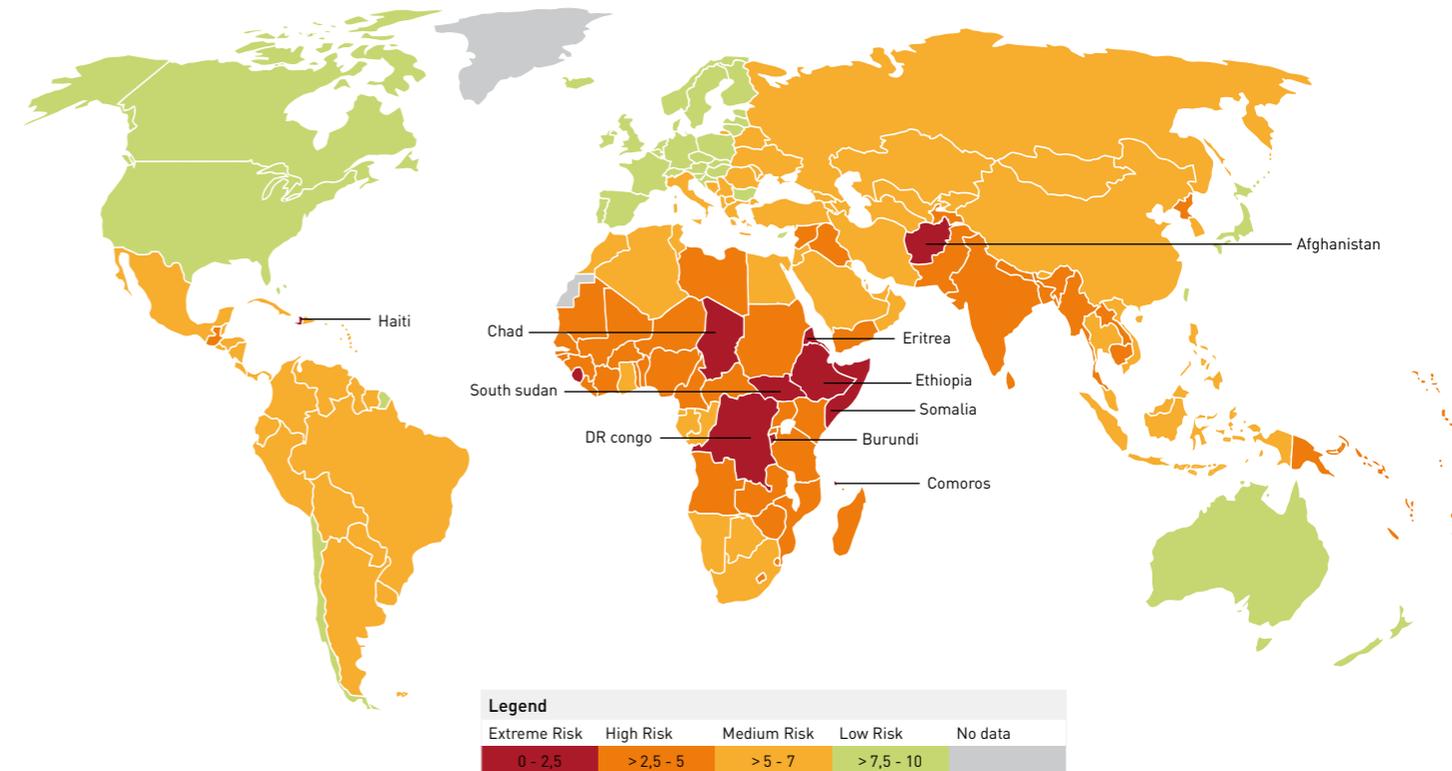
At this very moment, with a global population of 7 billion people, there are numerous countries where food security is at risk.

The Food Security Risk Index is a barometer identifying the countries which may be vulnerable to food shortages and societal unrest resulting from these shortages.

In 2013, the highest risks for food insecurity are in developing countries. As most of the population growth is expected in these regions, this risk will only increase. Food security challenges also remain considerable in emerging economies, such as Brazil, Russia, India or China (BRICs).

Since some developed countries are classified in the 'medium risk zone' food security is a global issue which goes beyond the developed/developing country divide.

Food Security Risk Index 2013



Growth of net agricultural output is slowing down

Lower expectations

To adequately assess the food security challenge, the growth potential of the agricultural production needs to be taken into account.

Global agricultural output grew by 2.1% per annum over the last decade, led by growth in the BRIC countries (Brazil, China, India and the Russian Federation).

However, the OECD expects that globally there will be a slower output growth of agricultural production in the coming decade, both in the developed and the developing countries.

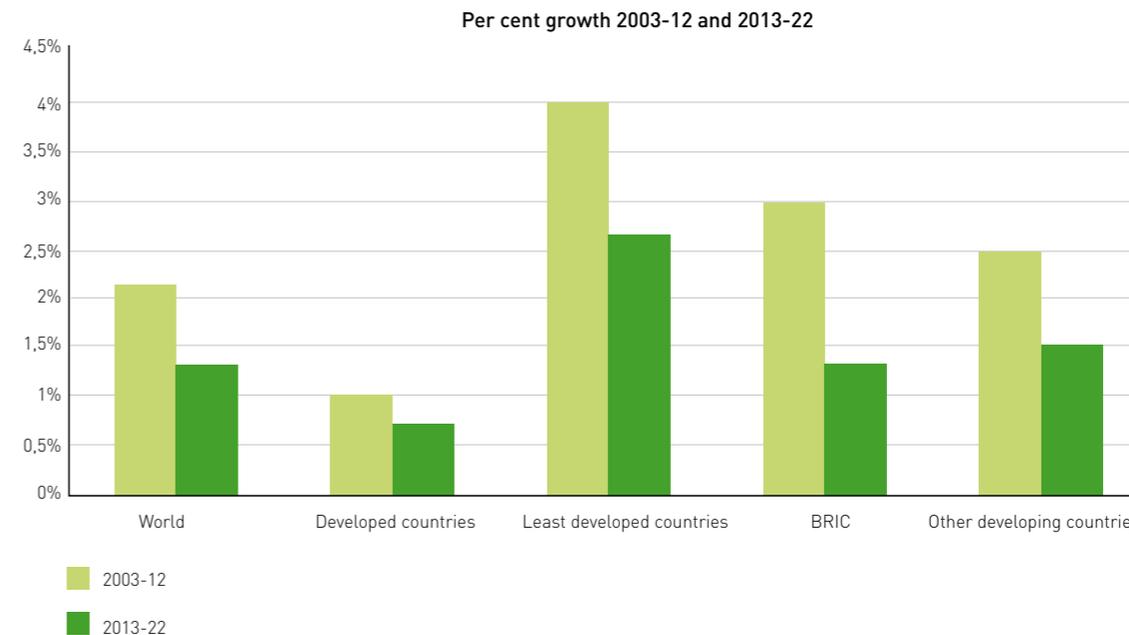
Particular challenge for developing countries

Between 2013 and 2022, the global agricultural production is projected to increase by 1.5% annually, compared to 2.1% in the previous decade.

In particular, the developing countries and the BRICs are expected to enter a period of considerably lower yield and production growth for most crops. In the BRIC countries for example, the annual growth rate will more than halve. In the developed countries, the average annual growth will be almost stable.

Although the agricultural production and yields will still rise: in the long term, it is very unlikely that this growth will keep up with the population growth.

Average annual growth in net agricultural output to slow



The second challenge: Increase food production with constant inputs

A future with fewer resources

The required natural resources for agricultural production, such as land, energy and water, are limited quantity. Growing population does raise concerns about the additional land and other resources that will be needed for the additional production.

Up to now, increased production has been mostly obtained by the increased use of resources and factors of production – land, capital and variable inputs (such as fertilisers) – as well as by higher productivity of those inputs.

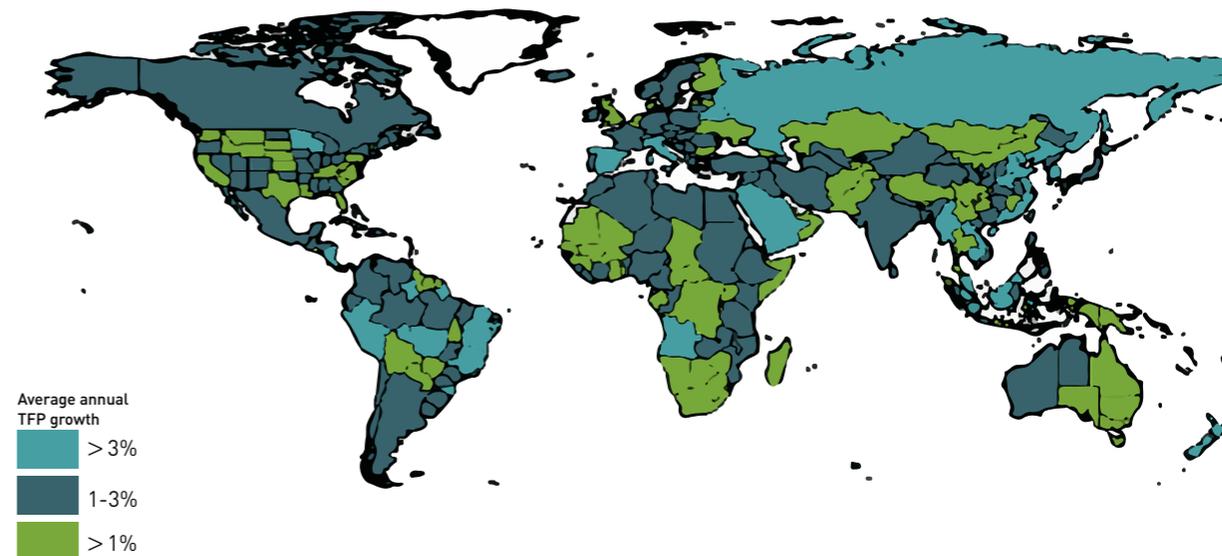
In many regions, it is already very difficult to further exploit the resource base in a sustainable way. The shift towards higher agricultural outputs based on a sustainable and stable use of natural resources is unavoidable.

Total Factor Productivity

Therefore, the total factor productivity (TFP) needs to increase. The TFP measures the ratio of total commodity output (the sum of all crop and livestock products) to total inputs used in production, including all land, labour, capital, and materials.

However, the TFP does not take into account the effects of e.g. loss of biodiversity or greenhouse gas emissions. Policymakers need to take these environmental considerations into account as well. They have to promote the type of food production which consumes the smallest amount of resources and has the lowest impact on the environment.

Average growth rate in agricultural productivity since the mid-1990s



Source: K. Fuglie, "Productivity Growth and Technology Capital in the Global Agricultural Economy", in *Productivity Growth in Agriculture: An International Perspective*, ed. K. Fuglie, S.L. Wang, and V. Eldon Ball (Oxfordshire, England: CAB International, 2012). Note: Growth rates are annual from 1995 to 2007 or 2009, depending on data availability.

Restrictions for agricultural land expansion

Strong competition for land use

Land use is the first main production factor which will come under pressure when additional food needs to be produced. There are a range of countries where land availability has reached or is about to reach its limit. The OECD gave an overview of vulnerable areas regarding land availability and quality. Large areas in major countries such as the USA, Brazil or China figure on this list.

Looking at the global land availability, there are still some land resources available. However, despite the potential to expand agricultural land use, there is strong competition for much of this land. These areas are also used for urban growth, industrial development, environmental reserves and recreational use. Other areas are not readily accessible or are of poorer quality and therefore not adequate for agricultural use.

Risk of land quality depletion

But even if there is suitable land of high quality, there is a high risk for land quality depletion. If the same land is used repeatedly and intensively, its quality will deteriorate. On top of that, the capacity to increase land-use for agriculture is closely linked to availability of water supplies. Some areas cannot be used for agriculture as irrigation is impossible.



World vulnerable areas regarding land availability and quality



● Circles highlight vulnerable areas

Water scarcity becomes a global issue

Water use under pressure worldwide

A second production factor that affects our ability to produce more food is water. At present, agriculture accounts for over 70% of water use globally, but both the absolute amount of water available for agriculture and its share are expected to decline. After all, water is also used for industry or household activities, which are also expected to intensify: the OECD predicts that the water used for agriculture will only represent 40% of the total water use by 2050.

Similar to land availability, there are an increasing number of countries or regions, reaching critical levels of the availability of fresh water resources. In countries such as the USA, Australia but also the Southern European countries the situation is already problematic.

Major regional differences in the EU

In Europe, agriculture absorbs smaller but still significant amounts of water, accounting for around 26 % of total water use. However, this share varies remarkably between the different Member States. In some Southern European countries, such as Spain, Italy or Greece it can reach up to 60 % and irrigation of crops accounts for virtually all agricultural water use. In Northern European countries, such as Germany, Belgium or Finland water use is predominantly used for industrial means.

To make sure that enough water is available for the increase in food production, it is essential that water is used in a smart way by all sectors, including agriculture.

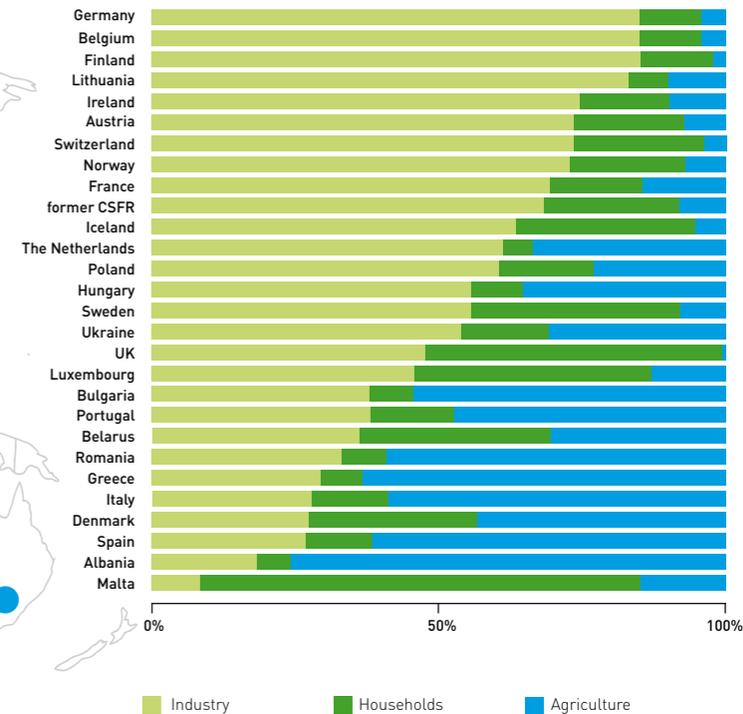


World vulnerable areas with respect to freshwater availability



● Circles highlight vulnerable areas

Water use in Europe



Source: OECD/FAO (2012), OECD-FAO Agricultural Outlook 2012-2021, OECD Publishing and FAO. http://dx.doi.org/10.1787/agr_outlook-2012-en
 Source: European Environment Agency, Water Stress in Europe – can the challenge be met?, 1999, <http://www.eea.europa.eu/publications/92-9167-025-1>

Energy: food sector should rely more on low-carbon energy systems and become energy efficient

Energy in the entire value chain

Alongside land and water, it is also important to take into account the availability of energy for food production. Energy is not only needed for agricultural production but also for transport, processing, packaging and storage, amongst other uses.

According to the FAO, the food sector currently accounts for around 30% of the world's total energy consumption. Developed countries use a greater portion of this energy for processing and distributing food. In Developing countries, the highest share goes to retail, preparation and cooking.

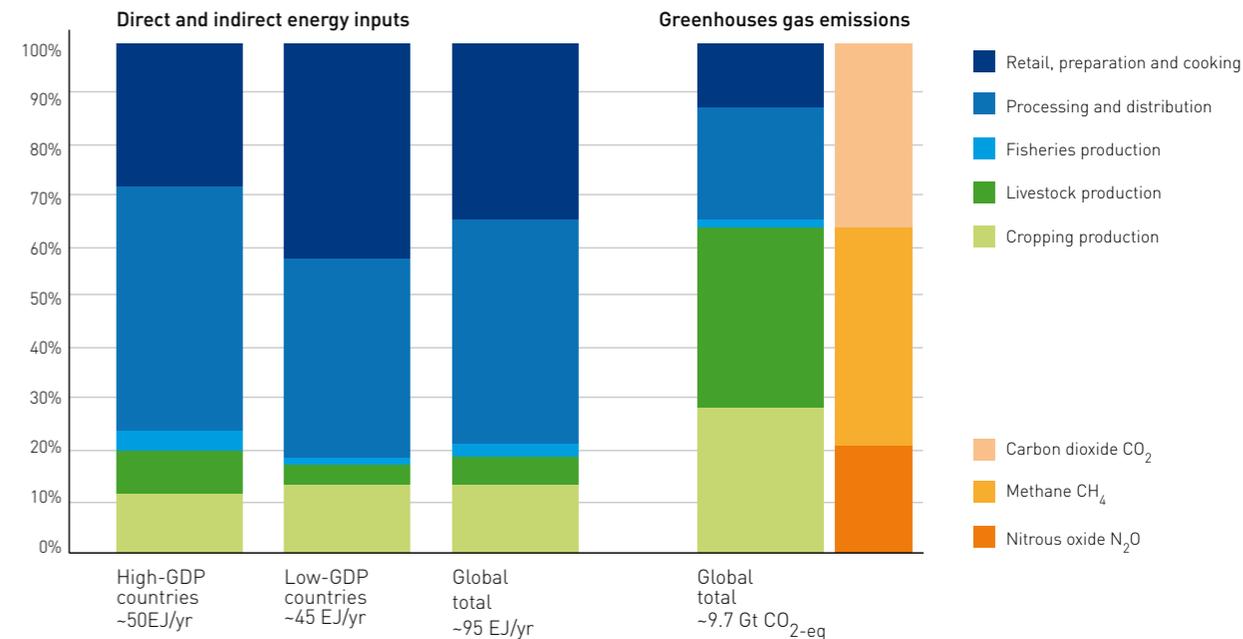
Also, because it is expected that the energy costs will steadily rise over time, it is important that agriculture becomes a 'smart user' of energy and adapts to the challenges of a society with fewer resources.

Reduced energy intensity

Becoming 'energy-smart' means providing and using sustainable energy for the food sector and generating sustainable energy from the sector. According to the FAO³, it will require a fundamental transformation along the food chain comprising:

- Increasing the efficiency of direct and indirect energy use so that the energy intensity (MJ/kg of food produced) decreases;
- Relying more on low-carbon energy systems and using energy more efficiently;
- Improving access to modern energy services.

Energy inputs vs Greenhouse gas Emissions for food sector



The third challenge: Minimize CO2 emissions from agriculture to mitigate climate change

Agriculture is a major contributor

Climate change is one of the biggest global challenges of all time. It is widely accepted that emissions of greenhouse gases are the major contributor to climate change. The three main causes of the increase in greenhouse gases observed over the past 250 years have been the consumption of fossil fuels, land use change, and agriculture. Consequently mankind is mainly responsible for climate change and needs to take action at global level.

Agriculture produces large amounts of greenhouse gases such as carbon dioxide, methane, and nitrous oxide. The carbon footprint of agriculture (14%) is similar to that of transport (13%).

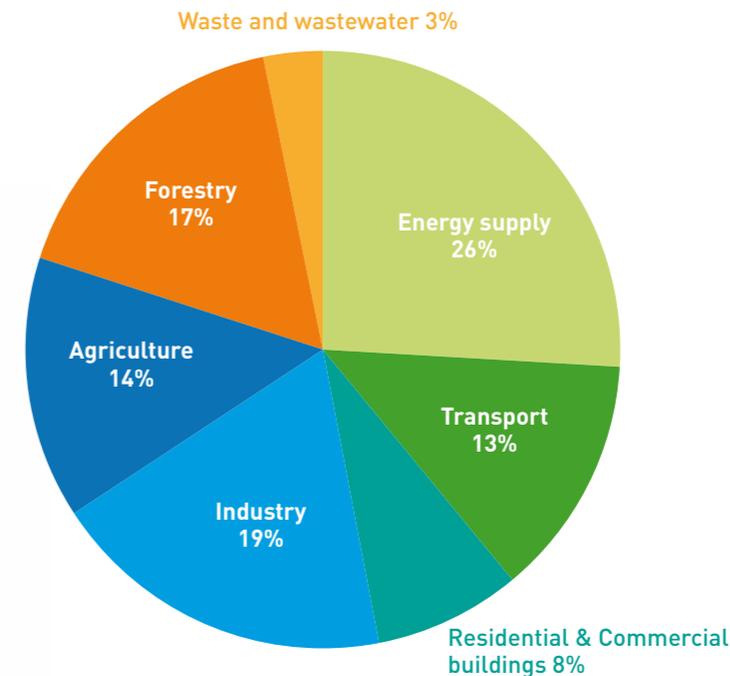
Deforestation and transport emissions

Greenhouse gas emissions from agriculture mostly come from livestock, the management of agricultural soils and biomass burning. On top of that, part of the greenhouse gas emissions linked to forestry need to be attributed to agriculture. Changes in land use, such as deforestation are an important source of carbon dioxide. If the costs of transport of agricultural raw materials are added to this, the real carbon footprint of agriculture is even more considerable.

As food production needs to be enlarged to feed the growing population, it is almost inevitable that the greenhouse gas emissions related to agriculture will increase as well.



Global greenhouse gas emissions by source



Source: IPCC (2007); based on global emissions from 2004. Details about the sources included in these estimates can be found in the Contribution of Working Group I to the fourth Assessment Report of the Intergovernmental Panel on Climate Change.

The fourth challenge: Encourage a healthy diet to counteract obesity

Overweight and obesity

According to the WHO, there are at least 2.8 million people worldwide who die each year as a result of being overweight or obese. Overweight is defined as a Body Mass Index (BMI, a measure of weight relative to height) of 25 or more and obesity as defined by a BMI of 30 or more.

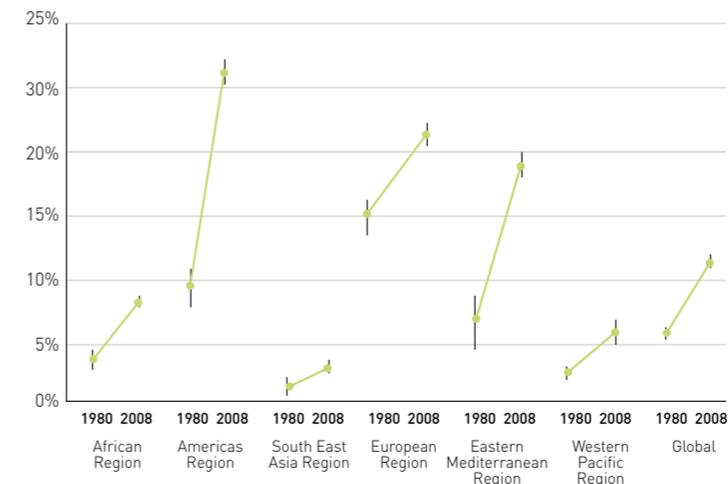
Overweight and obesity lead to adverse metabolic effects on blood pressure, cholesterol and triglycerides levels or insulin resistance. More importantly, mortality rates increase considerably the more overweight people are, as measured by BMI.

Global increase of overweight populations

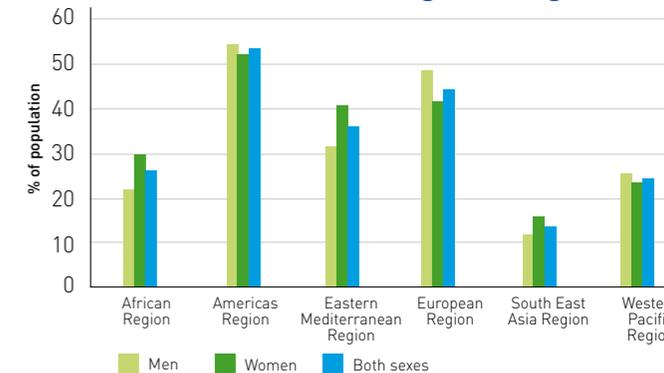
The prevalence of overweight and obesity is the highest in America (62% of the population is overweight and 26% is obese) and lowest in South East Asia (14% are overweight and 3% are obese). On the European continent, 55% of the population is overweight and 22% of the population is obese. The prevalence of obesity increased in all regions between 1980 and 2008.

From these figures, it is clear that the daily intake in certain regions increased more than what was needed for a normal functioning body. Policy makers cannot stand on the side-lines and need to focus on the promotion of a balanced and healthy diet for their populations.

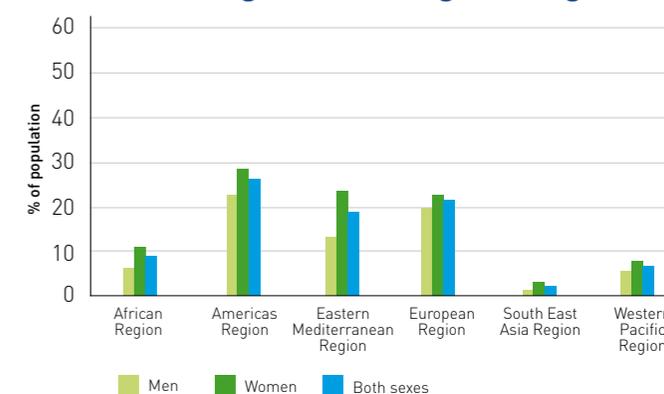
Age-standardized prevalence (%) of obesity (BMI >kg/m²) among adults aged 20 years and over by WHO region, 1980 and 2008.



% obese (BMI 30+), ages 20+, age std



% overweight (BMI 25+), ages 20+, age std





Global and EU
soy supply
and demand

Soy is the leading oilseed in the world

Global production

Compared the other oilseeds such as cottonseed, peanut, sunflower seed, rapeseed, copra and palm kernel, soybean is the leading oilseed in the world. The global soybean production in 2011/2012 represented 52% of the global oilseed production.

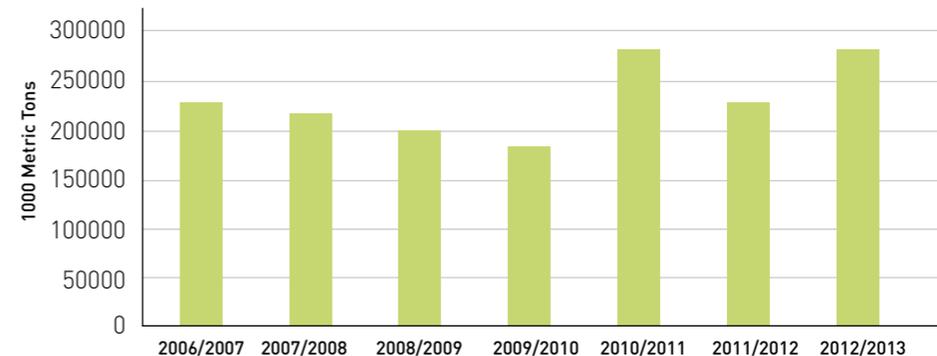
Major producers of soybean are the United States (82 million tonnes in 2012/13), Brazil (82 million tonnes in 2012/13) and Argentina (50 million tonnes in 2012/13)⁴. These 3 countries represent almost 80% of the global soybean production. In particular, production in Brazil has expanded over the last years. Although the European Union is a minor producer of soybeans, its production has also increased.

Expansion of soy production

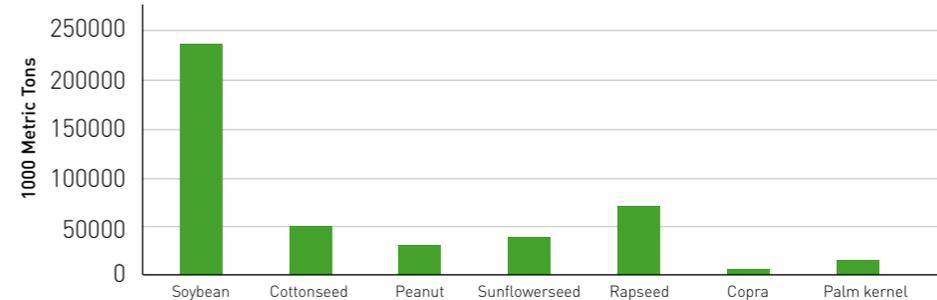
Although more stable over the last few years, there has been a rapid expansion of soy production since the late 1990's, from 155 million tons in the 1998/1999 season to 236 million tons in the 2011/2012 season – a 73% increase in just over 10 years ^{5/6}.

The worldwide soybean production is likely to increase further due to the growth of the global population and to the change in food consumption habits of the population. As soy is a major feedstock, the transition to the consumption of more livestock products increases the demand for soy.

World soybean production



World major oilseeds production



Growing EU soy production, but EU remains large importer

Soybean cultivation in the EU

The production of soybeans in the EU has been increasing steadily over the last few years from a low base. Since 2007, the European soybean production has increased with 54%.

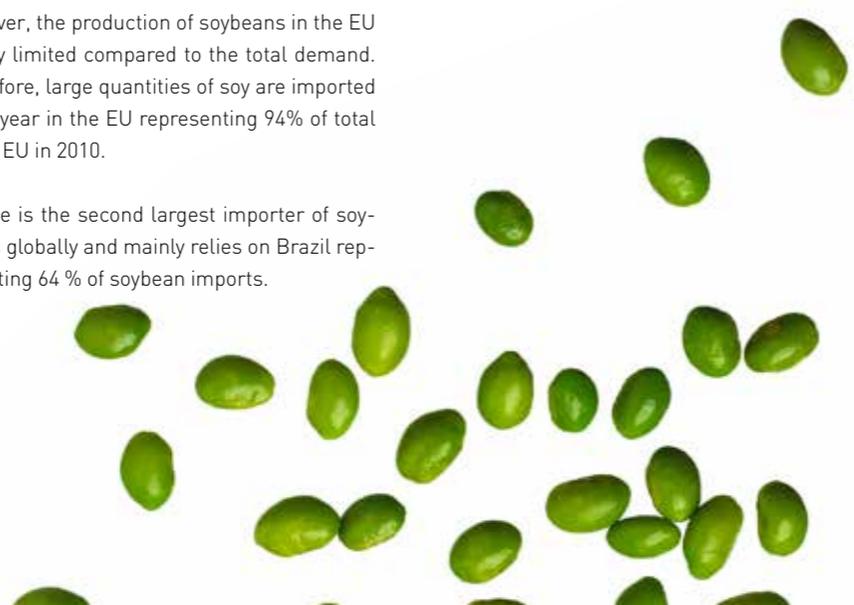
There is an increasing support for the production of soybeans in Europe as it is a nitrogen-fixing crop, which improves the quality of the soil, in particular in a crop rotating system.

In 2011, total EU production peaked at only 1.3 million tonnes, the main producers being Italy (45%), Romania (12%), Croatia (12%) and France (10%). Together, they account for 80% of the EU cultivation area of soy.

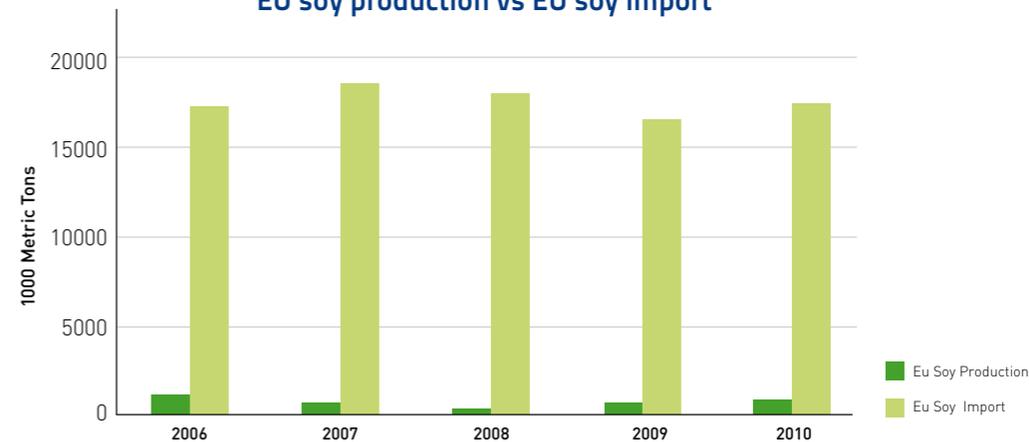
Imports remain indispensable though

However, the production of soybeans in the EU is very limited compared to the total demand. Therefore, large quantities of soy are imported every year in the EU representing 94% of total soy in EU in 2010.

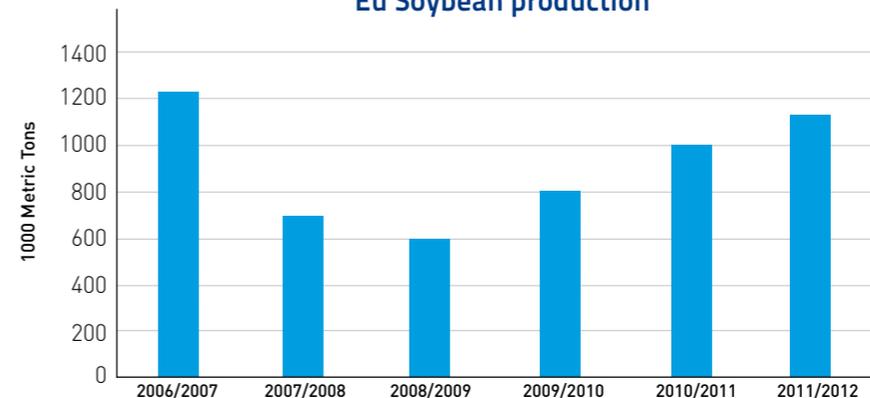
Europe is the second largest importer of soybeans globally and mainly relies on Brazil representing 64 % of soybean imports.



EU soy production vs EU soy import



Eu Soybean production



EU production of soy is entirely free of Genetically Modified Organisms (GMOs)

Soy production is GM-free in Europe

Genetically modified (GM) soy is widespread around the world: 81% of global soy production is genetically modified⁷. However, GM soy cannot be cultivated in the EU. As a result, all soybeans produced in the EU, regardless of their end usage, are GM-free.

ENSA members are committed to providing only GM-free soyfoods and put a lot of efforts in their supply chain to guarantee this. Nevertheless, it remains challenging to source GM-free soy and produce natural soyfood products which are free of GMO.

This is why ENSA members support initiatives aimed at developing the cultivation of GM-free soy in Europe such as the Danube-Soya initiative.

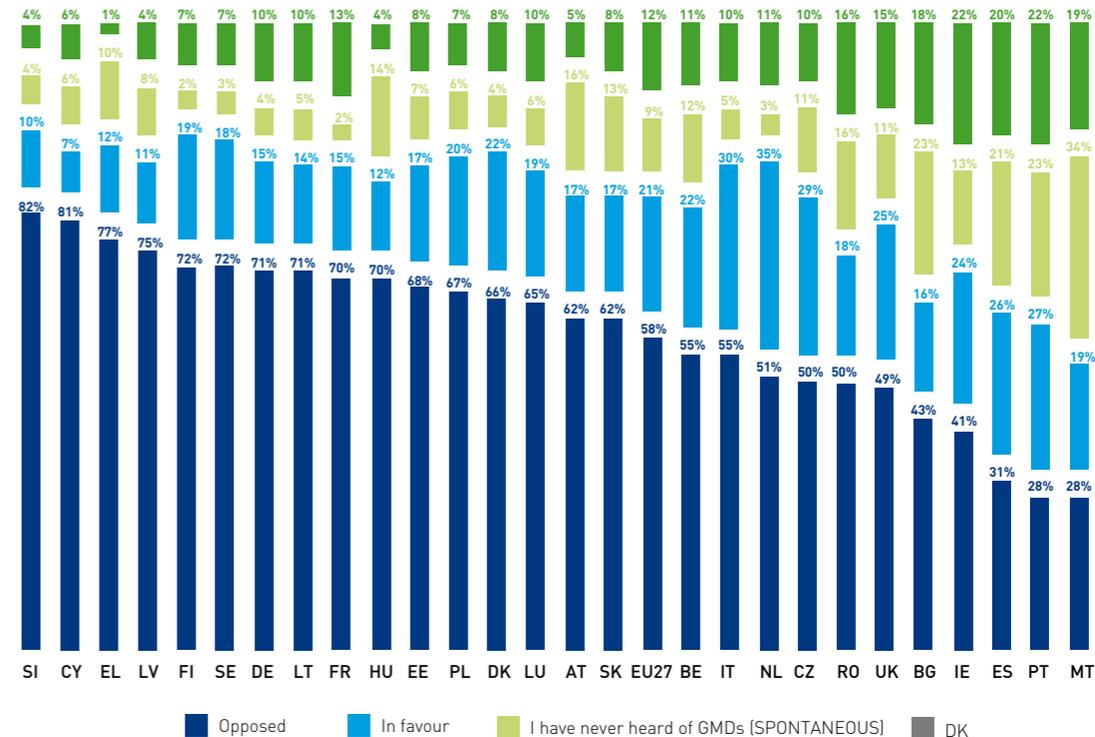
No consumer acceptance for GMOs

According to a Eurobarometer survey, 58% of the EU population is opposed to the use of GMOs. Only 21% is in favour and another 21% is not knowledgeable about the issue or has no opinion.

Therefore, ENSA members have a strong commitment and a strict traceability system in place to guarantee that all of their products are GM-free, irrespectively of whether they are soybeans produced in the EU or abroad.



Eurobarometer: Are you personally in favour or opposed to the use of GMO's?



Source: Eurobarometer 2008: Are you personally in favour or opposed to the use of GMO's?

Soybeans are increasingly processed into animal feed

Food, Feed, Fuel?

Of the 268 million tonnes of soybeans globally produced (2012/2013), only 6% was used directly as food for human consumption.

Food uses of soybeans include traditional soy foods such as soy drinks and tofu as well as more recent innovations such as meat alternatives and soy-based variations to yogurts and cream.

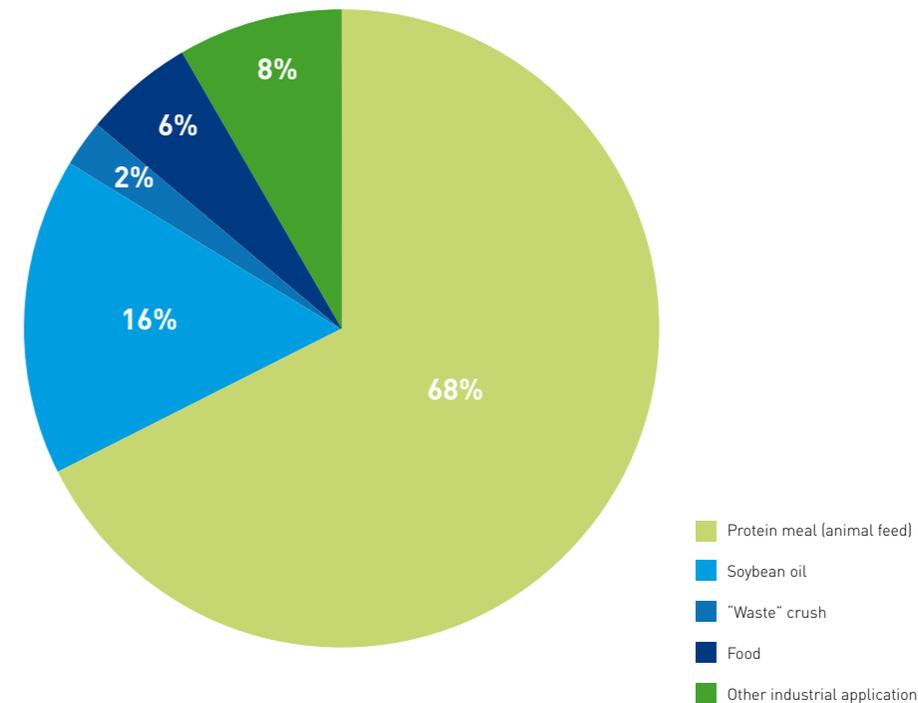
More soy for direct human consumption?

Currently about 68% of the global soy production is used in animal feed, mainly for cattle but also for poultry and pigs as well as for fish.

Around 16% is used for soybean oil, of which 95% is primarily used as edible oil for human consumption. 8% is used for other industrial applications such as adhesives, coatings and printing inks, lubricants, plastics or specialty products. Soybean production is also being stimulated by the increased use of biodiesel in the context of the search for alternative sources of energy.

The most efficient use of the soy protein is for direct human consumption. The proportion of soybeans used in food should therefore increase in the future.

Global soybean application



The soyfood sector has grown but remains a niche market compared to the reference dairy market

Growing sector

Between 2008 and 2012, the turnover of the EU soyfood industry represented by ENSA increased by 18%. The sector today has a combined turnover of about 550 million euros.

This sustained growth relies on:

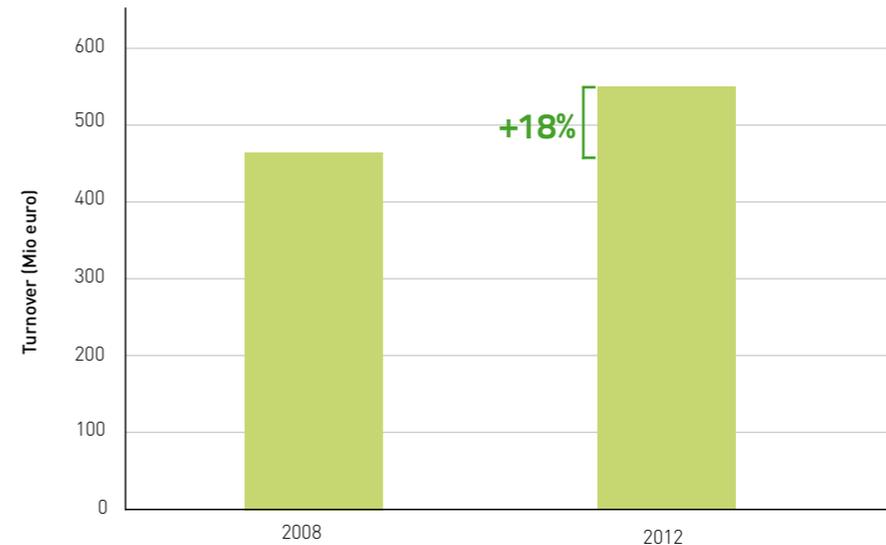
- A greater awareness among European consumers of the environmental and health benefits of soy and plant-based products as part of a daily diet;
- Continuous innovations to diversify the offer of soy products and other plant-based products in Europe;
- High-quality standards in the production of EU soyfoods guaranteeing safe, nutritious and tasty products.

Still small compared to dairy

Despite its strong growth, the soyfood market remains very small compared to the dairy market, with a market share of about 2% of the total dairy market in volume.



Annual aggregate turnover of ENSA members



A diversifying offer of plant-based products

Other plant-based products

The market for soy and other plant-based products manufactured in Europe increased by 22% over the past 5 years.

In recent years new plant-based products have been introduced on the market such as, almond milk, rice drinks, oat drinks, coconut drinks, and hazelnut drinks.

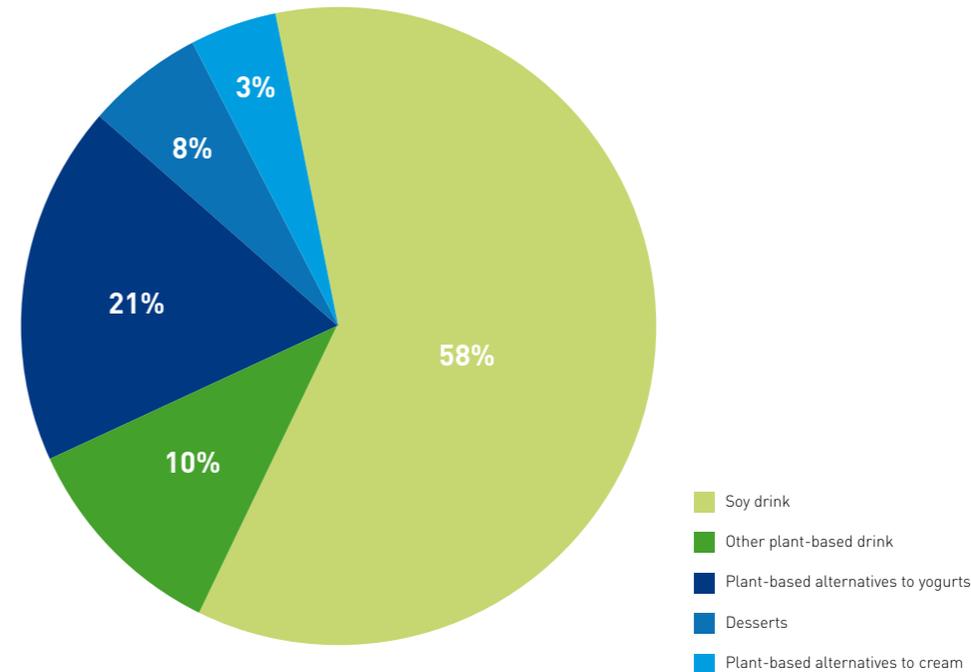
The share of soydrinks remains the highest at 58%, with other plant-based drinks growing to 10%.

A wide range of products

There are soy-based alternatives to virtually any animal protein product.

The following soy products can be found in most of the European supermarkets or in specialised health shops: soy drinks (natural or flavoured), soy-based variations to yogurt, soy desserts, soy-based margarine, soy-based culinary cream, tofu and soy meat replacers in the shape of burgers, minced or sausage.

Soy and plant-based market (non dairy) 2012





What role for
soy- and
plant-based
diets to feed the
increasing
population?

Soy products are more resource-efficient than animal based products

Rethink the consumption of protein

The sustainable production and consumption of products of animal origin, i.e. the main source of proteins, is the biggest sustainability challenge for the agriculture and food sector, with the livestock sector accounting for e.g. 18% of the global GHG emissions⁸.

Protein crops are currently fed to animals, that are then indirectly fed to people as dairy or meat. However, it would be more efficient to use these crops directly for human consumption: a recent study⁹ indicates that if food was grown exclusively for direct human consumption, taking into account the current mix of crop uses, an additional 4 billion people in the world could be fed.

To achieve a more sustainable consumption of protein, it would require:

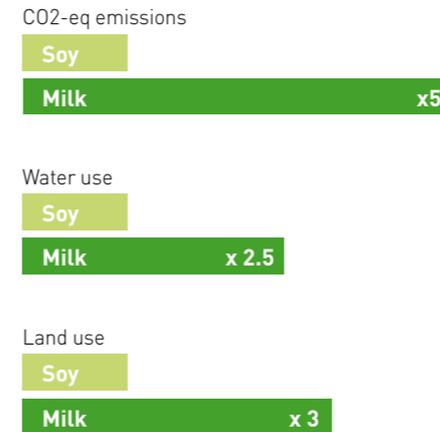
- Cutting out one third of consumption completely in the Western world: this is the amount generally over-eaten;
- Replacing one third of animal protein with plant-based protein;
- Replace the remaining third of animal protein with protein from free range animals¹⁰.

Resource-efficient, plant-based food

Plant-based products are consumed in the same way and at the same consumption moments as dairy and meat products. In particular, soy is a source of high quality protein containing all essential amino-acids, making soyfoods fully-fledged alternatives to dairy and meat products.

When comparing the environmental impact of animal and soy products in terms of land, water and CO₂ emissions, soy products consistently outperform animal products.

Comparison of CO₂-eq emissions, land and water use between soy drink and cow milk



Comparison of CO₂-eq emissions, land and water use between soy meat variations and beef



Less land is needed for plant-based food production

Current use of farmland is suboptimal

Rearing animals to produce meat and dairy uses significant areas of land: 70% of the world's available farmland is directly or indirectly involved in livestock production¹¹.

It includes grass land for grazing cattle as well as land used to grow crops to feed animals.

Crops and plants require far less land than animal products for a similar nutritional output. In other terms, more food can be produced by growing crops on land than by rearing livestock.

Greater land-efficiency

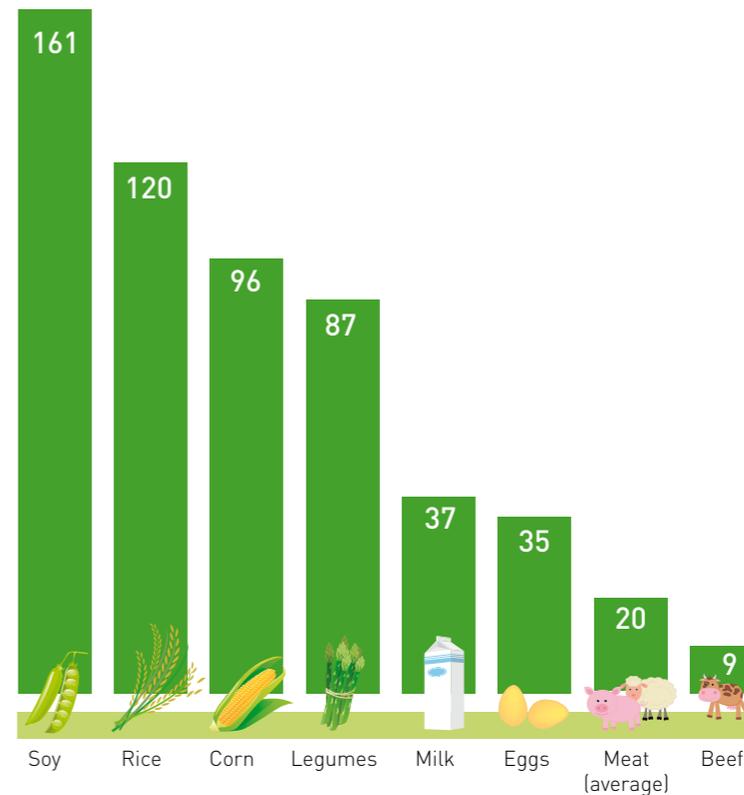
The FAO / WHO / Unicef Protein Advisory Group's figures show that soy offers the highest usable protein per acre of farmland compared to other vegetal crops and to animal products.

Life cycle analysis shows that a soy burger requires 45 times less land than a beef burger and a glass of soy drink requires three times less land than a glass of dairy milk.

If less land was used to rear livestock and grow feedstock, it would free up arable land to produce more vegetal-based food for direct human consumption. As a result, no more additional arable land would be needed to produce food, thus reducing a.o. the risk of deforestation.



Usable protein per acre of farmland (measured in kg)



Source: FAO/WHO/Unicef Protein Advisory Group (2004)

Water inputs are lower for plant-based foods

Water in the food chain

Water input is essential at all stages of the food production: to grow crops, to let livestock drink, to incorporate in drinks' recipes, to wash raw food, to clean equipment, to cook...

However, a significant amount of water is used at the agricultural production stage, especially in the livestock sector according to figures from STOA. If the actual amount of water that is drunk directly by livestock is very small (1.3% of total water use in agriculture)¹², this volume increases dramatically (reaching up to 43 000 litres per kg of beef) when the water used to produce the feed stock is taken into account.

Water and plant-based food

When the crops are used directly for human consumption instead of being fed to animals, the conversion factor water input/food output naturally increases. A plant-based diet requires on average 2.9 times less water than an animal-based diet¹³.

Life cycle analysis shows that a soy burger requires 20 times less water than a beef burger and a glass of soy drink requires two and a half times less water than a glass of dairy milk.

As water becomes scarce, a more efficient use of water in the food production system is an imperative, which requires rethinking the consumption of water-intensive foodstuffs.



Agricultural Water Requirement in liter/kg

Livestock/Crop	Litre/kg
Cattle beef	12,560 - 43,000
Sheep	4,500 - 6,100
Pig	4,460 - 5,906
Eggs	2,700 - 4,657
Poultry	2,390 - 4,500
Soy bean	1,800 - 3,200
Rice	1,800 - 3,600
Wheat	900 - 2000
Dairy cattle	560 - 1000
Maize	450 - 900
Vegetables	190 - 1,160
Apples	500 - 700
Oranges	500
Potato	105 - 500

The impact of plant-based foods on Green House Gas (GHG) emissions is lower

Lower energy input

Soy is a very efficient crop to produce in terms of energy when compared to animal sources of protein. The reason is that a lot of energy, in particular linked to the use of fertilisers is required to produce the crops used to feed animals. By using these crops for direct human consumption, more food can be produced with the same energy input.

According to the University of Chicago, producing soyfood is 20 times more energy-efficient than producing dairy and 65 times more than beef.

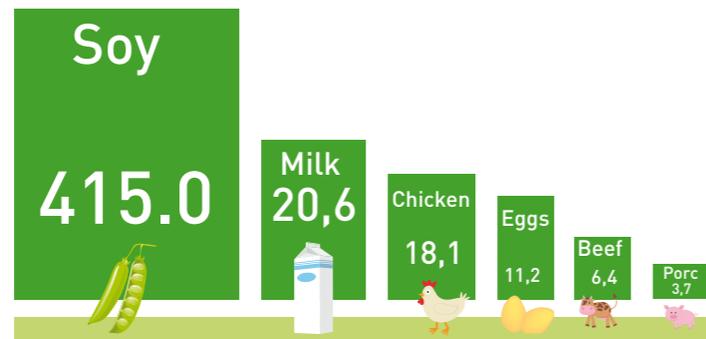
Fewer GHG emissions

The GHG emissions from different sources of protein vary greatly, with beef production being the biggest contributor (6.25 – 370kg of CO_{2-eq/kg}) according to STOA. Other types of meat such

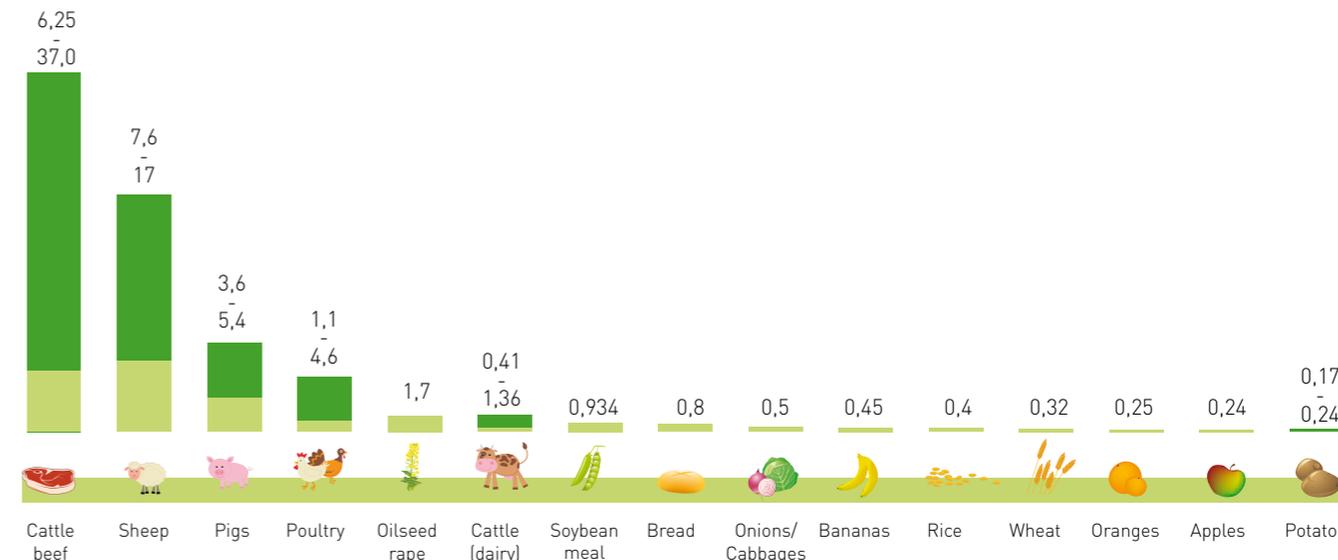
as poultry (1.1-4.6kg of CO_{2-eq/kg}) have a smaller impact on the climate, with a smaller footprint in terms of GHG emissions. GHG emissions from animal by-products such as milk (0.41 – 1.38kg of CO_{2-eq/kg}) are lower than meat but still higher than plant-based products.

A litre of soy drink emits on average five times less carbon dioxide (CO₂) equivalents than a litre of cow's milk. A soy burger generates 10 times less carbon dioxide (CO₂) equivalents per kilogram than a beef burger.

Energy efficiency in production (measured in kcal)



Ranges of GHGe from various food products (kg carbon dioxide equivalents* per kg Product)



* Carbon Dioxide equivalents is a measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

■ Maximum range
■ Minimum range

Source: FAO/WHO/Unicef Protein Advisory Group
European Parliament Science and Technology Options Assessment

Plant-based foods are part of a healthy, balanced diet.

Dietary guidelines...

Nearly all European countries, including Belgium, Germany and the UK have developed dietary guidelines to guide consumers to a healthy and balanced diet. Most of them are based on the WHO Food Pyramid.

This graph compares the 'Eatwell-plate', based on the recommendations by the Food Standards Agency (FSA) in the United-Kingdom, with the current typical UK diet. Key findings are:

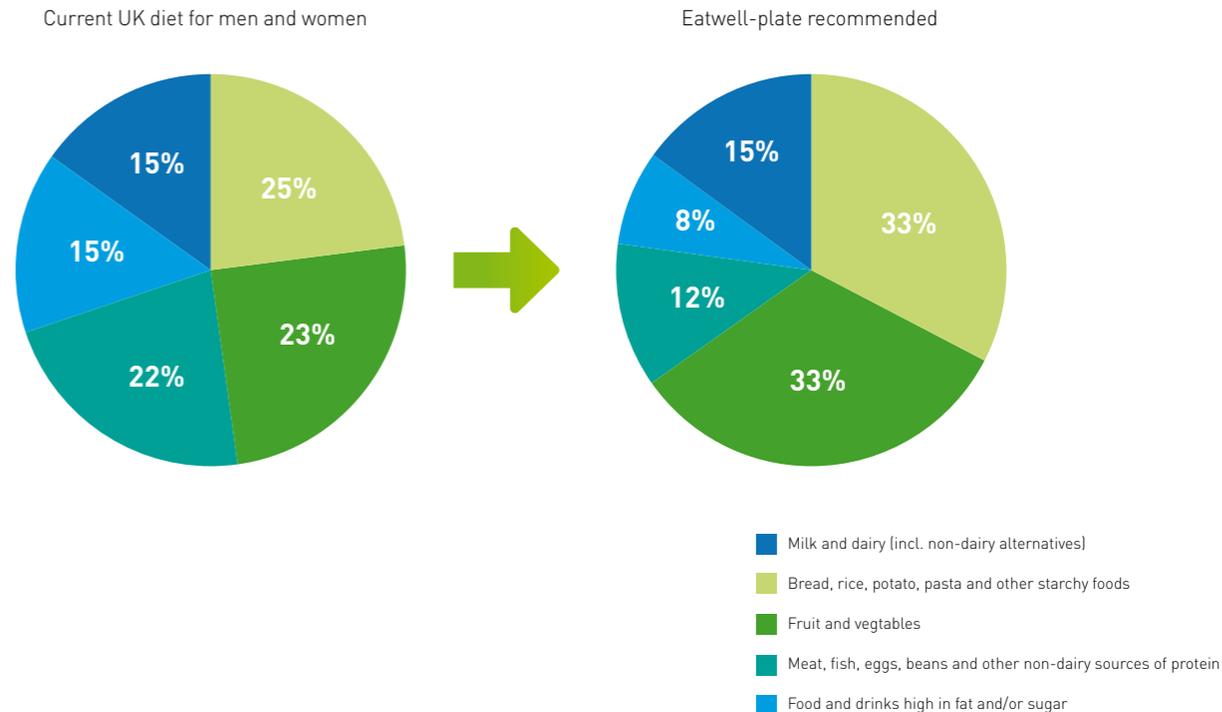
- Beans and soy non-dairy alternatives are considered equivalent sources of protein from a nutritional point of view;
- The current consumption of protein (22%) is too high compared to the recommended intake (12%);
- The current consumption of fruits and vegetables (23%) is too low compared to the recommended intake (33%).

... taking into account the environment

WWF launched the 'LiveWell-plate' initiative¹⁴ which aims at taking into account environmental impacts in the design of dietary guidelines. The recommended diet would achieve a 25% reduction in GHG emissions from the current average diet, while strictly complying with national nutritional requirements and costing no more than the current dietary patterns.

On top of the recommendation to decrease the overall intake of proteins, dietary guidelines also indicate a need to rebalance diets towards more plant-based foods including fruits and vegetables, cereals like bread or pasta and legumes like soybeans.

The UK Diet Displayed in the Eatwell Plate Food Groups



Soy is a high quality protein source of vegetal origin

The right protein intake

In Western countries, there is an over-consumption of animal protein compared to what the body needs. European citizens (EU-27) eat an average of 73kg of meat per year or 200g per day¹⁵. This is largely above the dietary needs for proteins as nutritionists agree that a human being only needs 90g of meat per day¹⁶.

By contrast, a low protein intake remains a cause of malnutrition in many areas of the world. Soybeans contain about 40% of protein. The typical protein content of a soy drink is more than 3%, which is similar to the typical protein content of cow's milk.

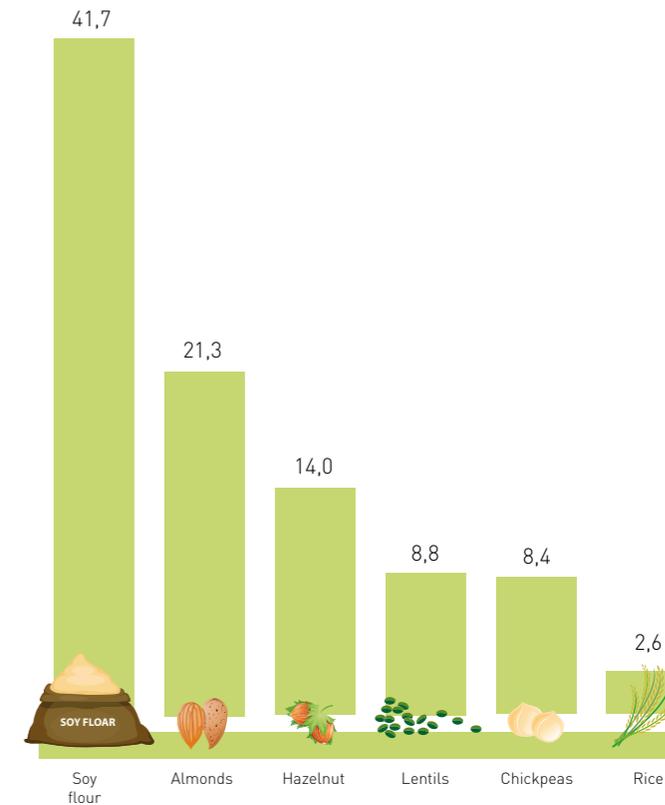
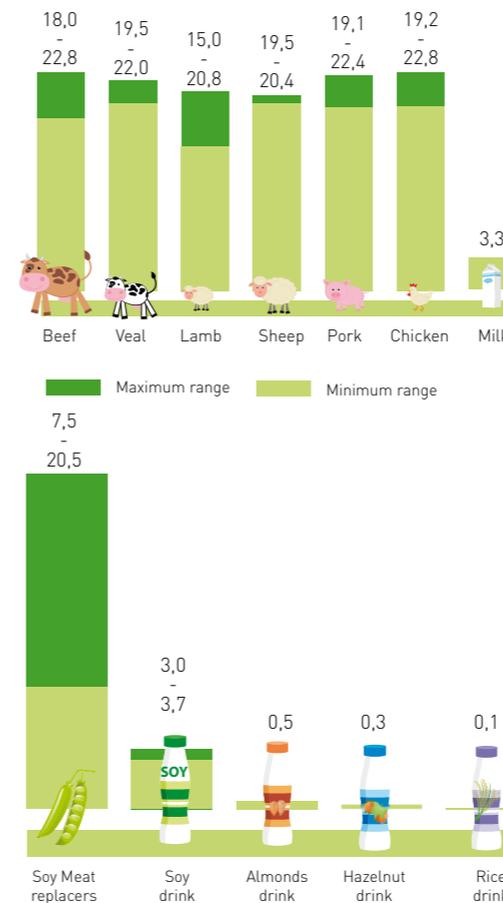
The protein content of soy meat-variations can be as high as 20,5g of protein per 100g, which is similar to beef (between 18 and 22g per 100g)¹⁷.

The best vegetal source of protein

Soyfoods are fully-fledged alternatives to animal protein sources because they offer a "complete" protein profile: the soy protein contains all the essential amino-acids that must be provided to the human body.

Whereas other plant-based foods can also bring protein to the diet, only soy fully compares with foodstuffs of animal origin from a nutritional point of view.

Protein content per 100g



Source: Nubel and <http://www.scienceofhealthindex.com/v.html>

Saturated fat intake is lower with soy- and plant-based diets

Good and bad fats

Dietary guidelines recommend a healthy, balanced diet, with a reduction in the total fat intake compared to the current average consumption levels. More specifically, the intake of saturated fat needs to be reduced while unsaturated fat should represent a bigger share of the total fat intake¹⁸.

Fats are essential nutrients that the body needs in order to function. For those who have chosen a full plant-based diet (vegetarian or vegan), it is important to find alternative sources of fat. Not only soy products, but also other plant-based non-dairy products bring essential fats to those who cannot or do not want to consume animal-based products.

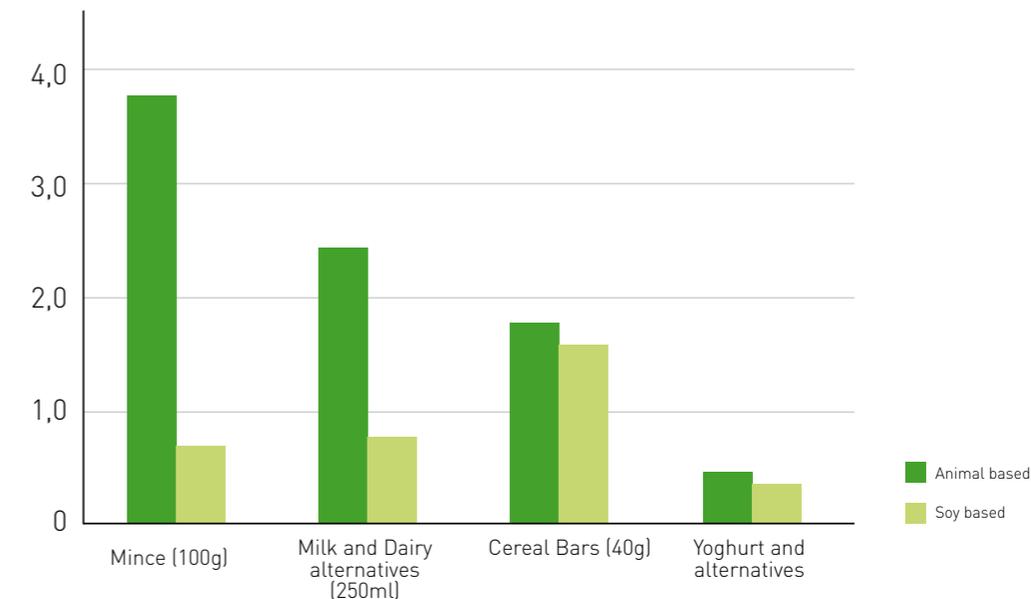
Water and plant-based food

Reducing the consumption of saturated fat contributes to the maintenance of normal blood cholesterol levels, which is an established risk factor in cardio-vascular diseases¹⁹.

Such a reduction can be achieved by replacing certain animal-based products high in saturated fat, such as meat, whole milk or butter, with plant-based alternatives, which are low in saturated fat, such as soyfoods, plant-based drinks or margarine.



Saturated fat content (g) of various animal based products compared to soy alternatives (UK market)





Soyfood and
EU policy

The EU must provide the right conditions for the supply of GM-free soybeans and the marketing of GM-free soyfoods

Ensuring a GM-free food supply

66% of the citizens of the European Union are worried about GMOs found in food and drinks. This is an average figure which means that in certain EU countries worries are even stronger, reaching 81% in Greece or Lithuania.

As European consumers have made it clear that they do not want GMOs in their food, it is essential that the EU policy facilitates the supply of GM-free soybeans. This entails supporting the cultivation of GM-free soy in Europe via the Common Agricultural Policy.

Harmonised GM-free labeling

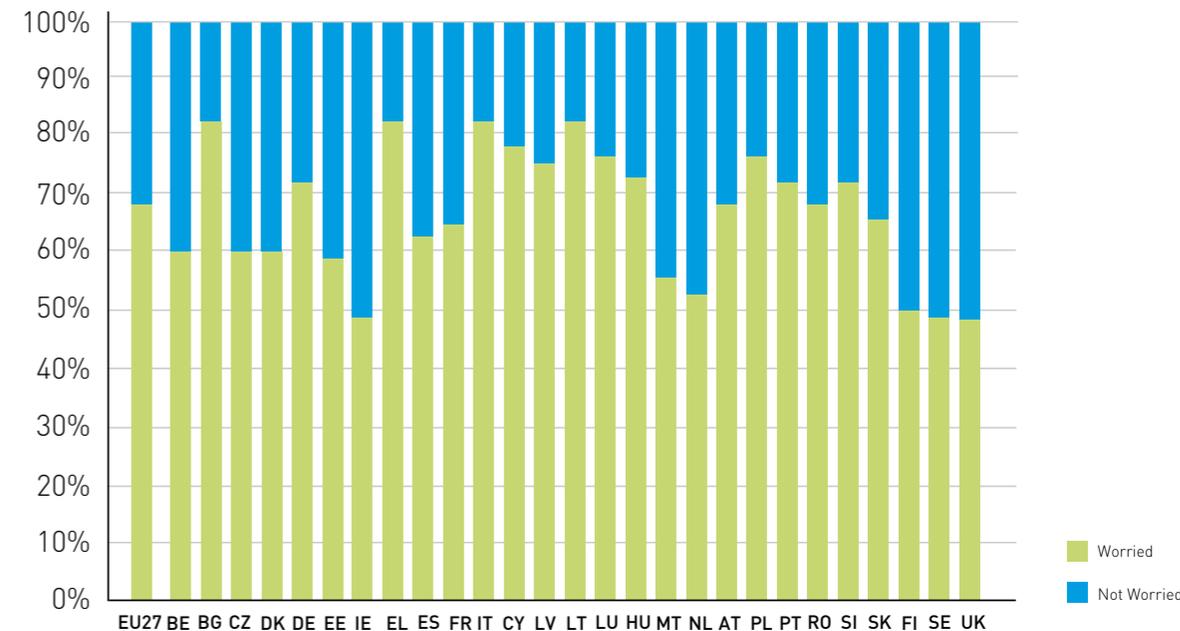
Given the strong appetite of European consumers for GM-free foods, food manufacturers should be allowed to communicate to their consumers their commitment to a GM-free supply, through clear GM-free labeling.

Currently, the conditions for GM-free labeling are not harmonised at the EU level which means that different rules apply in different EU countries, thus hampering the free movement of goods.

The multiplication of public and private GM-free labeling schemes also creates confusion among European consumers.

Harmonised, workable rules for GM-free labeling should be adopted at the EU level.

Eurobarometer: % of citizens worried or not about genetically modified organisms found in food and drinks



Source: Eurobarometer 2010: Food related risks. http://ec.europa.eu/public_opinion/archives/ebs/ebs_354_en.pdf

Soy and plant-based diets should be promoted by public authorities at the EU and national levels

Good for health, good for the planet Consumer behaviours

Plant-based diets are not only better for the planet, but also for health. This is illustrated by the Double Food – Environmental Pyramid model of the Barilla Center for Food & Nutrition.

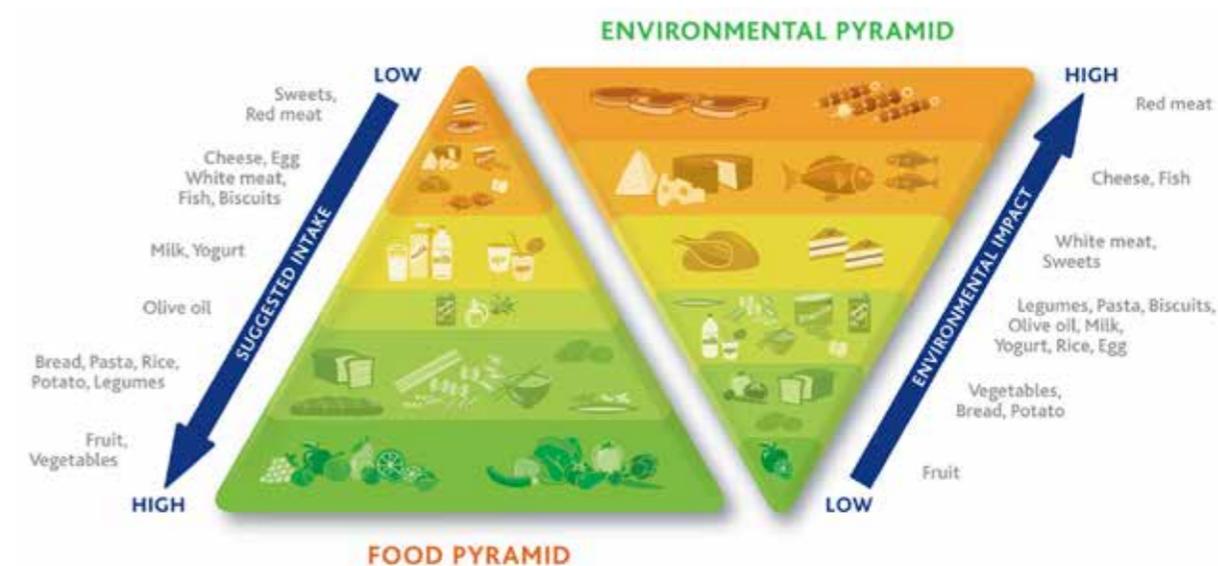
The “Double Food-Environmental Pyramid” shows that the foods which should be consumed the most from a dietary point of view (e.g. fruits and vegetables at the base of the pyramid), are also those that have the lowest environmental impact. On the other hand, foods that should be consumed in small quantities, like meat or cheese, are those with a higher environmental impact.

It is a challenge to convince consumers to change their eating habits and adopt a more sustainable diet. This cannot be done overnight and requires a mix of policy actions to promote sustainable food and plant-based diets.

Although certain initiatives, like the WWF ‘Livewell plate’, are already supported by the European Commission, the European Union should more strongly support the promotion of sustainable diets, by delivering clear guidelines to European consumers on what constitutes a sustainable diet. Local initiatives such as the VeggieThursday in the Belgian city of Ghent or meat-free Monday in the UK should be replicated.

Greater coherence is also needed in all EU policies in order to enhance the effectiveness of EU action around the promotion of sustainable diets.

Food pyramid / Environmental pyramid



Taxation should provide a level-playing-field

Level-playing field

Because soy products are alternatives to animal-based products in terms of usage and are used at the same consumption moments, it is first of all a matter of fair competition that they are treated equally in terms of taxation.

Currently, there is a clear discrimination in terms of VAT in several EU member states in favour of dairy products.

Milk and dairy products are subject to the so-called "super reduced rate" of VAT in countries like Austria, Germany, Italy, Portugal, Spain and Sweden. At the same time, soy foods and drinks do not benefit from the same exemption and are taxed at much higher rates.

In addition, soy and plant-based drinks are, in certain Member States, covered by excise duties

on soft drinks whereas milk and dairy drinks are rightly exempted from these national taxes because of their nutritional benefits. Soy and plant-based drinks should benefit from a similar exemption as they are not soft-drinks and also have nutritional benefits.

VAT rates per country – December 2012

Country	VAT rate cow milk	VAT rate soy drink
Austria	10%	20%
Belgium	6%	6%
Finland	14%	14%
France	5.5%	5.5%
Germany	7%	19%
Italy	4%*	21%
Netherlands	6%	6%
Portugal	6%	23%
Spain	4%	10%
Sweden	6%	12%
UK	0%	0%

* 10% for UGT milk



With a clear labeling policy, the health and sustainability benefits of plant-based foods could be endorsed

Milk denomination

In the European Union, the term 'milk' is a protected denomination reserved for animal mammary secretions. As a result, it is not possible for soyfood manufacturers to call their product 'soymilk', despite the fact that it is commonly used by consumers, the media and the scientific community.

Nutrient criteria

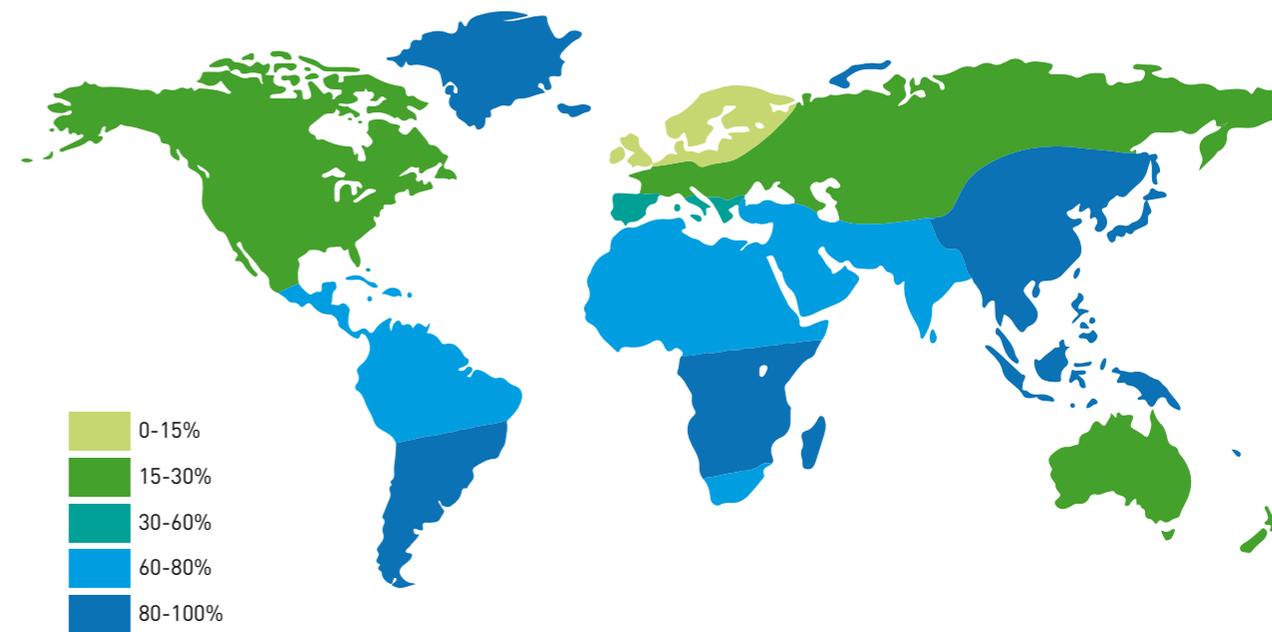
The EU labeling policy should allow consumers to easily compare products which are alternatives to each other from a nutritional point of view, but also from a usage point of view. Soy products should consistently be provided with the same conditions as similar animal products.

In particular in nutrient profiling schemes (be it for the use of health claims or advertising regulation), soy products should be in the same food categories as similar animal products.

Lactose-free labeling

It is essential to accurately inform consumers about the specificities of soyfoods, in particular the fact that they are naturally free from lactose. Given the prevalence of lactose-intolerance among Europeans, it is important that they easily find products which are suitable for their needs. ENSA calls for the harmonisation at the EU level of the conditions for lactose-free labeling, which would allow products which are naturally free from lactose, like soyfoods, to be labeled as such.

Worldwide prevalence of lactose intolerance in recent populations





Looking forward:
10 wishes for the
next 10 years

Looking forward: 10 wishes for the next 10 years

Sustainable food production

1. Further develop the production of high-quality GM-free soybeans in Europe.
2. Ensure that worldwide production of soy is sustainable by supporting a GM-free production outside of the EU and by continuing to oppose deforestation.
3. Achieve a rebalancing in the use of soybeans towards a higher relative share for human consumption, which is the most resource-efficient use of soy.
4. Acknowledge that the issue of food security will require a mix of solutions: increasing agricultural productivity, making the livestock sector more sustainable and reducing the intake of animal protein are equally important.



Sustainable food consumption

5. Make European consumers more aware of the environmental impact of their food consumption and rethink their current eating habits, without patronising them but by providing easy solutions.
6. Rebalance diets towards more plant-based food to reduce the environmental footprint of food consumption while improving human health.
7. Ensure that soy products are considered as fully-fledged alternatives to animal products and are subject to the same marketing conditions.

Sustainable food policy-making

8. Reinforce the coherence and consistency of the different EU policies, to ensure that the need to promote more sustainable food production and consumption is taken into account in all EU policy areas.
9. Continue supporting scientific research in the area of food to provide EU consumers with safe, nutritious and resource-efficient food.
10. Convey ENSA's messages, knowledge and expertise beyond its existing circle of stakeholders.



About Ensa

Established in January 2003, ENSA represents the interests of Natural Soyfood Manufacturers.

The term "natural" refers to the traditional production process used by ENSA members to produce non-dairy plant based foods such as soy drinks, desserts, variation to cream, variations to yoghurt, meat alternatives and more, using whole soybeans without any genetically modified material.

The founding principles of ENSA combine the belief in natural soy products and the use of sound science. ENSA seeks to raise awareness among EU citizens and promote the consumption of natural soy and plant-based products, which is an integral part of a healthy, balanced lifestyle.

ENSA is an association of internationally operating companies, ranging from large corporations to small, family-owned businesses.

List of abbreviations

BRIC	Brazil, Russia, India, China
BMI	Body Mass Index
ENSA	European Natural Soyfoods Manufacturers Association
EU	European Union
FAO	Food and Agriculture Organisation (United Nations)
GHG	Green House Gas
GMO	Genetically Modified Organism
IPCC	Intergovernmental Panel on Climate Change
OECD	Organisation for Economic Co-operation and Development
STOA	Science and Technology Options Assessment
TFP	Total Factor Productivity
VAT	Value-Added Tax
WWF	World Wide Fund for Nature
WHO	World Health Organisation



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