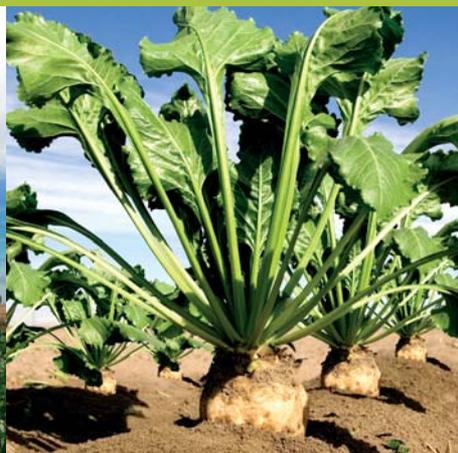


The EU Beet and Sugar Sector:

A MODEL OF ENVIRONMENTAL SUSTAINABILITY



Growers' and Industry's Joint Commitments to:

- Respecting biodiversity
- Soil conservation
- Water management
- Climate change:
adaptation and mitigation

This leaflet summarises the joint CIBE-CEFS efforts to assess and improve the environmental sustainability of the EU beet and sugar sector, with the aim of sharing their results. A more comprehensive publication, providing further details and examples, will be available from CIBE's and CEFS' websites, from which you can also download this leaflet.

www.cibe-europe.eu and www.cefs.org



CIBE



CEFS



IMPROVING AGRICULTURAL AND INDUSTRIAL PRACTICES

- In the EU, no fewer than 11 national technical institutes dedicated to sugar beet cultivation and production are carrying out research to constantly improve sustainable practices.



DID YOU KNOW?
44 km is the average transport distance between beet field and factory in the EU!

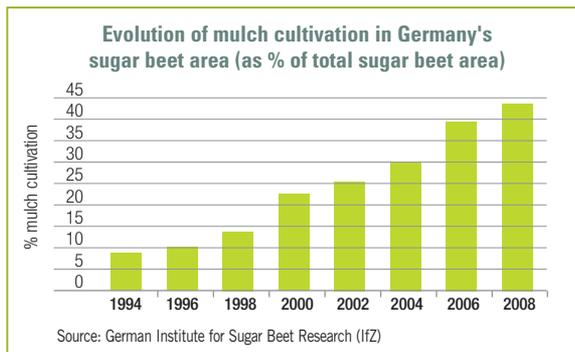
- The EU sugar industry constantly works with local partners (e.g. rural communities, transport companies, local authorities) to optimise **transport and logistics**, with the aim of reducing environmental impact (e.g. searching for the best combination of transport distance, lorry weight and loads, use of rail transport). Overall, **local processing** of the raw material remains, from an ecological perspective, a characteristic and significant feature of the European sugar industry.

- **Specific commitments and initiatives** have improved performance vis-à-vis the environment. Examples include contracts between growers and processors such as the Sugar Beet Assurance Scheme in the United Kingdom, the Integrated Chain Quality Management "GIQF" in Belgium and the Integrated Food Safety Management System in the Netherlands.

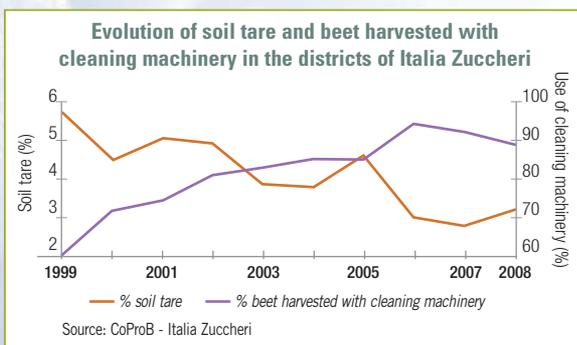
- **Integrated Management Systems** are designed to combine environmental protection, occupational safety and quality assurance into a single binding concept. Many of the systems introduced by the European sugar industry also cover the production of the raw material on the farms. All sugar companies have detailed management systems. In many cases these conform to EMAS (Eco-Management and Audit Scheme), ISO 14001 (environment), ISO 9001:2000 (quality), ISO22000 (food safety), or OHSAS 18001 (Occupational Health and Safety Advisory Services).

IMPROVING SOIL CONSERVATION

- **Enhancing soil fertility:** by developing an extensive and deep root network, sugar beet naturally improves soil structure and soil biological status. Advanced cultivation techniques, including precision fertilisation, further enhance soil fertility.
- **Avoiding soil erosion** by the extended use of soil conservation techniques such as: sowing into the residue of the preceding crop (mulch) - 30% of beet area in Austria and over 40% in Germany - using cover crops and minimum tillage.
- **Reducing the risk of soil compaction** as a result of continuous progress in machinery and equipment technology at each step of cultivation as well as in the training of operators.
- **Reducing soil tare** during harvesting and transport: soil tare is drastically reduced through better harvesting techniques and the widespread use of cleaning machinery in the fields.



- **Re-claiming/treating the soil** as a valuable product. Soil can be directly returned to the fields by land spreading or stored in settling ponds to dry out and form high quality arable soil. This is then used in a wide range of applications (e.g. agricultural land improvement; building and sports' amenity construction).
- **Improving soil structure and reducing soil acidity** by providing farmers with sugar factory lime, a natural soil fertiliser obtained from the sugar extraction process. Vinasse from beet alcohol production can also be recycled as a fertiliser, which is ideally suited for soil conservation due to its high organic content.



CLIMATE CHANGE: ADAPTATION AND MITIGATION

Adapting EU beet growing to climate change

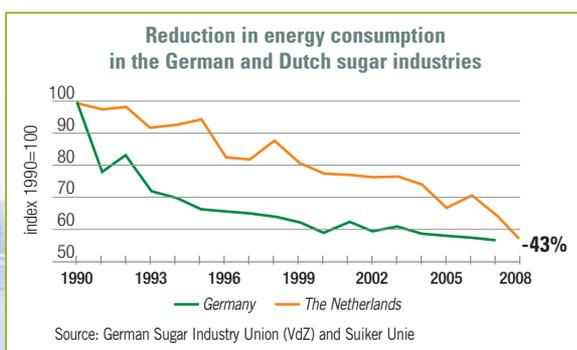
Through continuous research on new varieties and cultivation techniques, EU beet growers constantly adapt to the adverse effects of climate change and maximise opportunities. This includes turning to higher sugar content varieties tolerant or resistant to new diseases, with the aim of producing more on less land. In the last 10 years, while EU-27 beet area has almost halved, average EU-27 sugar yield has risen by 30%! Today, on average around 10 tonnes of sugar are produced from 1 hectare of beet.

Mitigating climate change through the reduction of energy use and net GHG emissions...

... in EU beet growing: beet growing naturally sequesters carbon from the atmosphere acting as a carbon sink. Moreover, EU beet growing reduces the greenhouse gases (GHGs) emitted from the production of agricultural inputs, such as fertilisers and plant protection products, mainly in two ways:

- sugar beet being a key rotational crop means that its cultivation reduces the use of agricultural inputs in the rotational cycle
- the use of agricultural inputs in EU beet growing is continuously being reduced and is increasingly efficient.

... in EU beet processing: processing more beet while using less energy has been a constant objective in the EU beet sugar industry, for which the German and Dutch sugar industries provide an excellent example.

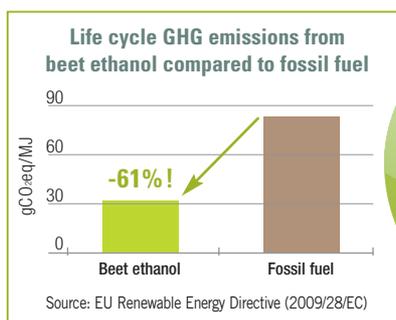


DID YOU KNOW?
Biogas produced on 1 hectare of sugar beet provides 1 household with electricity for 3 years!

Mitigating climate change through the sustainable production of renewable energy and materials from beet

Renewables produced from beet mitigate climate change by replacing fossil energy and products. In particular, beet ethanol is one of the most sustainable sources of energy available for the transport sector in the EU, because:

- It leads to significant GHG emission savings: at least 60% less GHG emissions than fossil fuel, based on a lifecycle assessment, thus well beyond the minimum 35% reduction required by the EU Renewable Energy Directive.



DID YOU KNOW?

From the same 1 hectare of beet you can produce:

- enough ethanol to drive over 60 000 km!
- and animal feed co-products corresponding to 1.3 hectares of soy meal!

- It has high energy balance: one unit of energy is used to produce 2.5 units of renewable energy.
- It has high land use efficiency: with on average 6 500 litres per hectare, beet has the highest bioethanol yield in Europe.
- It does not compete with food: only 100 000 hectares of beet (7% of total EU beet area) are currently used for ethanol in the EU, while the total EU beet area has decreased by around 800 000 ha since 2005. In addition, some co-products from sugar production can be used to produce ethanol.
- It provides many valuable co-products (animal feed, biogas, fertiliser, heat and electricity) which further increase the land use efficiency of beet ethanol.
- It complies with the highest environmental sustainability standards, as set by the EU Renewable Energy Directive, including EU cross-compliance (on-farm requirements for environmental protection).

Biogas: an emergent contribution from EU sugar beet to the mitigation of climate change

As shown by recent developments in many EU countries, sugar beet is ideally suited for biogas production (fast fermentation, high yield, cost effective substrate). Beet biogas is highly valuable for heating and as a transport fuel, thus reducing fossil energy consumption and hence associated GHG emissions.



RESPECTING BIODIVERSITY

Increased genetic diversity

For 220 years progress in research and breeding techniques, including pest and disease resistance, has greatly contributed to the improvement in sugar beet productivity and to a turnover of a great pool of varieties.

DID YOU KNOW?
Sugar beet originates from a variety of wild beet chosen in 1786 for its naturally high sugar content.

Benefits for crop rotation

Sugar beet is only grown on the same field once in every three to five years. As a valuable rotational crop, it breaks up the main cereal-based crop rotations and prevents the build-up of disease, thus reducing the amount of fertilisers and pesticides needed in the following crops.

Benefits for wildlife

Birds are a good indicator of biodiversity. Stubble from the previous crop and late-harvested sugar beet fields create important resources for wildlife, in particular for birds. The nature of the sugar beet crop means that fields retain an open vegetation structure and areas of bare soil until late spring. An official study conducted in the UK shows that this attracts many ground-nesting birds, in particular the stone curlew, lapwing and skylark, as well as overwintering pink-footed geese.



A key parameter for industrial activity

- Birds are especially attracted to lagoons used for water storage and treatment by sugar factories, which are located in rural areas. At some factory sites in Spain, the water resulting from biological and extensive water treatment processes is used to create wetlands. These beneficial habitats show how European sugar manufacturers operate side by side with the environment.
- In partnership with local communities and environmental conservation organisations, the EU sugar industry makes considerable investments in applying the strictest environmental criteria when renovating facilities, or in the event of factory dismantling, to guarantee that biodiversity is respected.



SUGAR BEET: A KEY ROTATIONAL CROP

Sugar beet is a rotational crop. It is never grown for continuous monoculture. As a root crop, sugar beet plays a key role in breaking up the common cereal-based crop rotations. The cereal yield after beet is 10-20% higher than after two successive years of cereals. Because sugar beet is not a host to pests or diseases which generally affect combinable crops, the cultivation of sugar beet reduces the level of weeds, diseases and pests and therefore reduces the amount of pesticides applied. Once emerged, sugar beet is less vulnerable to climatic variations than other crops. This relatively low year-to-year variability facilitates input management.

IMPROVING WATER QUALITY AND MANAGEMENT

Minimal water needs

Sugar beet has moderate water requirements - 50% less than sugar cane. Over 90% of EU beet area is either not irrigated at all or minimally. In fact less than 10% of EU beet area needs irrigation. All irrigation systems are strictly monitored and controlled to comply with the relevant regulations.

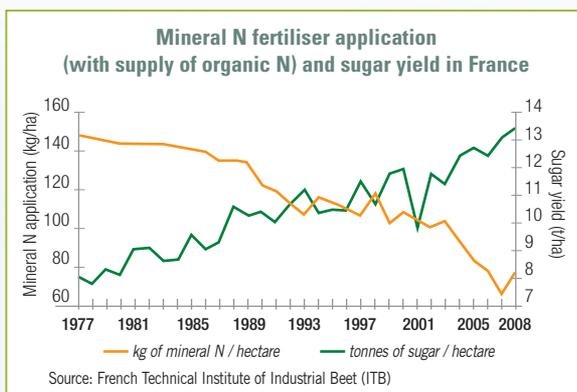
DID YOU KNOW?
According to a recent Dutch study, sugar beet is the most efficient crop in terms of water needs for producing bioenergy!



Avoiding water contamination in beet cultivation

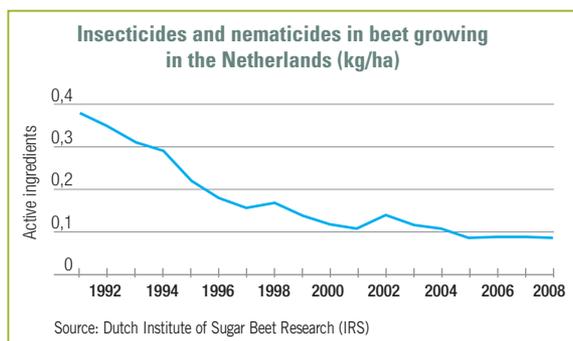
■ Reduction of mineral nitrogen (N) fertiliser applications:

Thanks to moderate N needs, global N management systems, and improved and optimised application techniques, less and less fertiliser is being applied. In major EU producing countries a 30% reduction has been achieved over the last 10 years. And, as yields have continued to increase, N use efficiency has improved dramatically. Moreover, being a deep-rooting crop, sugar beet captures nitrogen and other nutrients very efficiently compared to other arable crops. Sugar beet is therefore ideal for extracting nitrogen from the soil, thus preventing ground water pollution due to leaching.



■ Reduction of plant protection product applications and use of safer products:

The use of plant protection products has been substantially reduced over the past ten years in all major EU beet producing countries. In the Netherlands, the environmental impact of crop protection products used for sugar beet decreased by more than 50% between 2002 and 2007!



Increasing water efficiency and recycling in the sugar factory

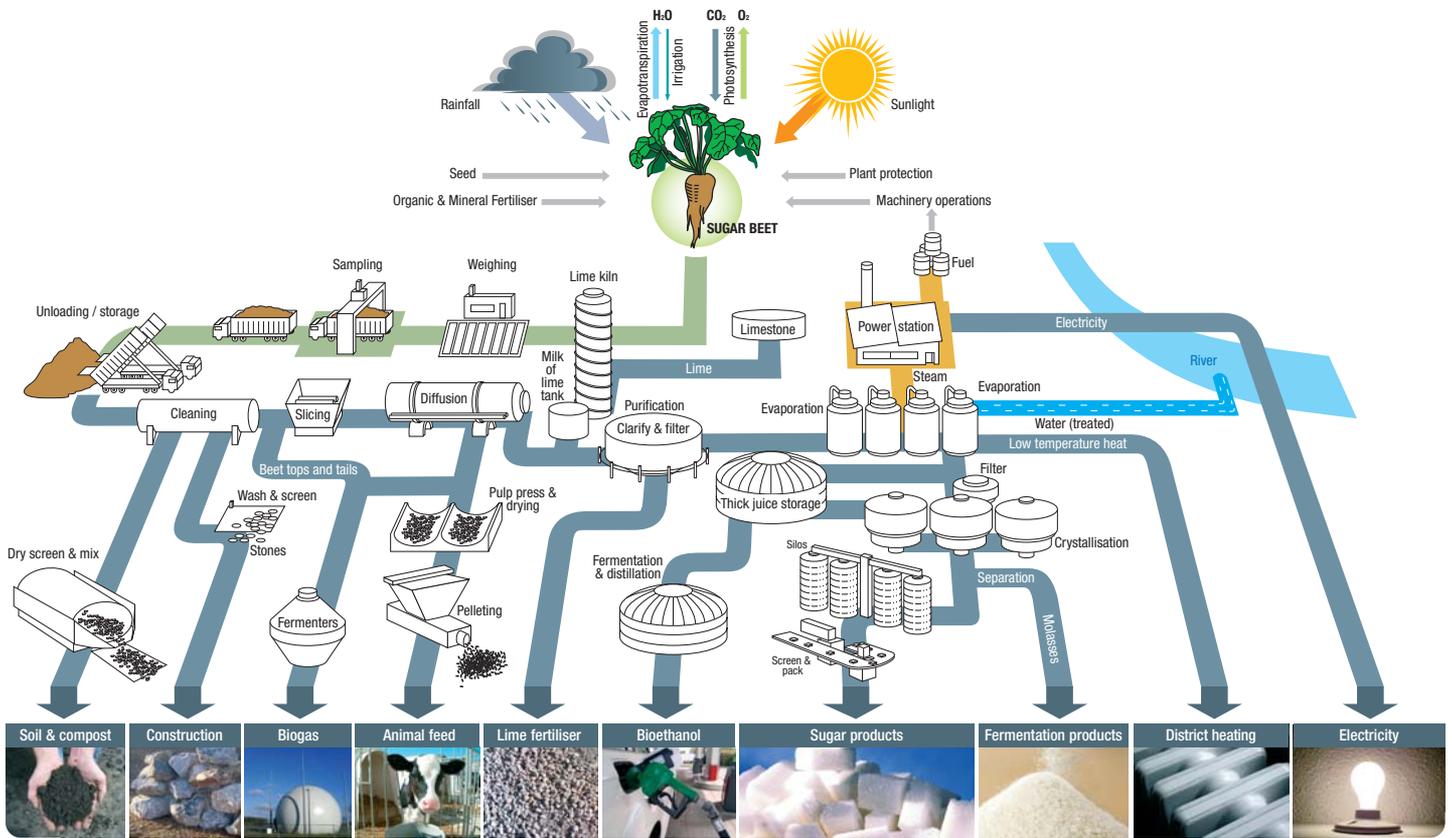
The most important source of water for factories is the sugar beet itself which contains around 75% water. Most of this is turned into steam, which is condensed and recycled several times. Consequently, the processing of beet and the extraction of sugar require minimal fresh water, making beet sugar factories net water producers.

DID YOU KNOW?
Beet sugar factories are net water producers!

Efficient biological water treatment in the sugar factory

The sugar industry has developed efficient water treatment systems which reduce the organic load of all the effluent water by more than 90% before it is reused in agriculture or returned to local water courses.

From Beet Field to Sugar Factory: a Model of Environmental Sustainability



CIBE, founded in 1927, represents 440 000 sugar beet growers from 16 EU sugar beet producing countries (Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, the Netherlands, Poland, Romania, Slovakia, Sweden and the United Kingdom) plus Switzerland and Turkey.

CEFS, founded in 1953, represents all European beet sugar manufacturers and cane sugar refiners, covering sugar production in 20 EU countries (Austria, Bulgaria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Lithuania, Portugal, Romania, the Netherlands, Poland, Slovakia, Spain, Sweden and the United Kingdom) plus Switzerland.



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