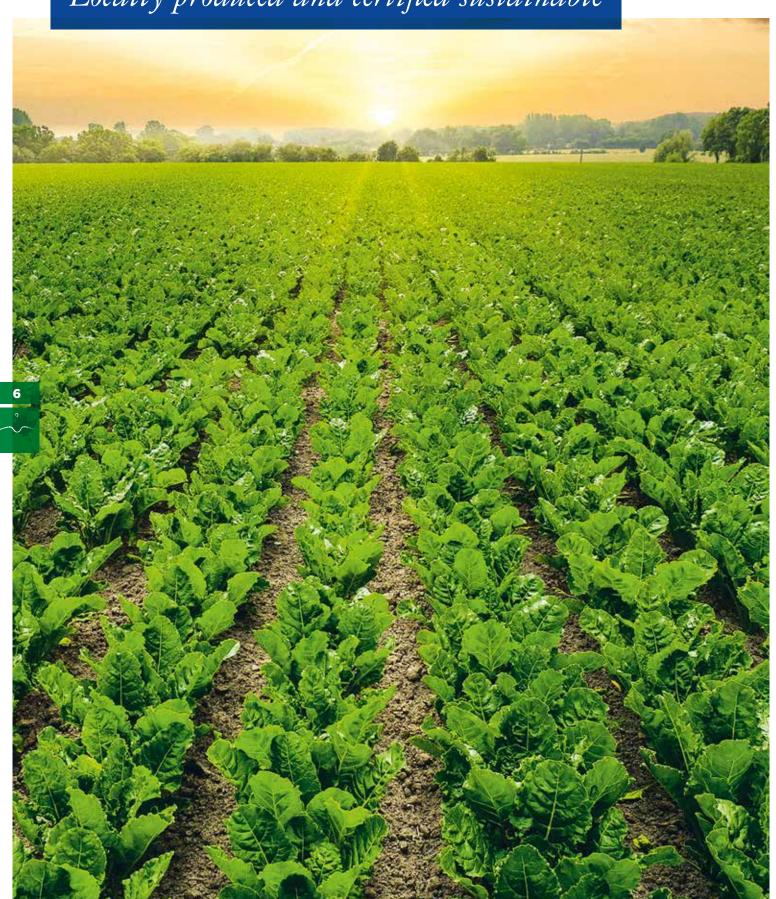




- Locally produced and certified sustainable
- _ For beet and the environment
- _ Sustainable crop protection
- _ Strengthening biodiversity
- 16 _ Sugar beet beats sugar cane
- _ Committed to the circular economy

- _ The path to climate neutrality
- _ Ideally unpackaged
- _ For sustainable nutrition
- Growing together
- Our European journey
- _ Bearing responsibility shaping the future

Locally produced and certified sustainable



So close - so good

We focus on a regional approach and sustainable beet cultivation – not only in Germany, but at all of our sites throughout Europe.

Locally produced from the outset



We process our beet in the place where it grows.



Our sugar is a **regional product** – just like our feedstuff.



Our average mileage between field and factory is 50 km in Germany and Poland and 77 km in Ukraine.



We cooperate with approx. 12,700 contract farmers in Germany, Poland and Ukraine.



We make an important contribution to the rural area, as 80% of jobs are based in the respective growing region. Each site provides many upstream and downstream jobs, such as in craft trades and haulage.¹

1) Multitalent Zuckerrübe; WVZ; 2020.

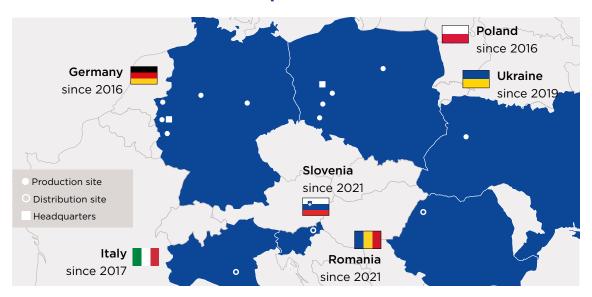


Sustainable beet sugar

Thanks to our REDcert² certifications, we can offer sustainable beet sugar to our customers. REDcert² is a certification system for sustainable biomass from arable crops in the food sector. It is based on criteria from the Sustainable Agriculture Initiative (SAI), a global initiative created by the food industry to promote sustainable agriculture.



Our REDcert² certifications in Europe



Sustainable beet sugar at Pfeifer & Langen

Interview with agricultural economist Hendrik-Benjamin Lerbs, Business Development Manager at REDcert GmbH and an expert in REDcert² certifications:

What is REDcert² all about at Pfeifer & Langen?

With this certification system, Pfeifer & Langen made the decision for sustainability certification for the growing of sugar beet at an early stage. REDcert² is a practical audit system which, combined with the criteria of the Farm Sustainability Assessment (FSA), ensures the highest achievement levels in line with the Sustainable Agriculture Initiative.

Pfeifer & Langen Ukraine has been RED-cert²-certified since 2019. What had to be done here for implementation?

As Ukraine is not part of the European Union, the REDcert² check list for non-cross compliance is used for agricultural businesses. This relates to subjects such as the use of crop protection products and fertilisers as well as soil erosion,

which have been included in a countryspecific check list for Ukraine with an additional 16 FSA criteria.

How important is REDcert² in the food industry?

The trend among retailers and brand manufacturers towards greater sustainability continues to grow – and this is increasingly becoming a selling point for consumers. In the future, carbon footprint could also become an increasingly important factor for products.

What products are certified apart from sugar?

In addition to sugar, rapeseed, grain and other types of biomass for bioplastics are certified sustainably.



\sim

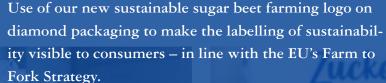
Certification is based on comprehensive test criteria:

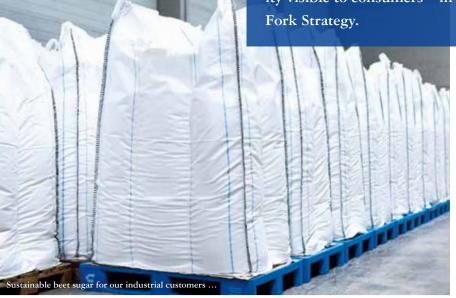


These include:

- ✓ Prevention of ploughing up of grassland and maintaining protected areas to preserve biodiversity
- ✓ Application of crop protection products and fertilisers as well as activities related to integrated crop protection
- ✔ Preservation of soil substance and structure
- ✓ Measures related to water protection and energy efficiency
- ✓ Implementation of sustainable business practices
- ✓ Testing of sugar beet processing in relation to mass balance
- ✓ Correct labelling of sustainable sugar on delivery documents

Outlook:







For beet and the environment



Hand in hand with agriculture

In close collaboration with our beet growers, we ensure maximum conservation of resources and protection of the environment in the growth of sugar beet.

The numbers speak for themselves



Continuous increase in percentage area with mulch sowing over the last ten years. This protects the soil from erosion:





Germany

Poland



In the form of a **rotation system**, sugar beet ensures less disease and pest infestation in subsequent crops.



Since 2004 less use of mineral nitrogen fertiliser through responsible fertilisation:





Germany

Poland



Increased sugar yields in the last ten years due to cultivation successes and optimised cultivation activities:







Germany Poland

Ukraine



Sugar beet leaves **50% less residual nitrate** in the soil than other crops and thus protects the groundwater. Due to its long roots, it optimally absorbs nitrogen even from the deeper layers of soil.¹



The finely ramified sugar beet roots extend about two metres deep and loosen the soil. In this way, they maintain **soil fertility** and promote the **yield of the following crop**.¹

Sustainable crop protection



We're on hand with help and advice

Our cultivation consulting team at Pfeifer & Langen supports beet growers in integrated crop protection – and has been doing so for the last 50 years.

Measures for integrated crop protection



Design of crop rotation



Careful soil cultivation



Choice of varieties



Plant disease and pest monitoring



Targeted crop protection – as little as possible, as much as necessary

Effective crop protection with modern technologies

By monitoring and conducting field studies and using modern technologies, we are actively working on reduction measures in relation to crop protection and fertilisers. In order to stay up to speed with the latest knowledge in relation to precision agriculture, we actively communicate with numerous research institutes and associations.



For more information, visit: www.liz-online.de

Outlook:



Application techniques such as line application and spot spraying are being expanded to enable even more precise and economical use of crop protection products.

Outlook:



Low in CO₂ and chemical-free against weeds: we test robotic solutions in beet fields. The autonomous robots scan the crops using sensors, identify weeds and remove them mechanically.

Outlook:



Expansion of our activities with flower strips: we need to gather further knowledge on biological pest control. Strengthening biodiversity



The more, the better

Diverse flora and fauna are essential in order to keep our environment in balance. This is why we promote biodiversity in sugar beet cultivation and beyond with projects at all of our sites.

We promote biodiversity

In beet cultivation:

A broad crop rotation in sugar beet cultivation provides shelter for ground-breeding lapwings, skylarks and bustards.

Late-harvested sugar beet fields serve as breeding grounds and food sources for many animals. Plant residues left in the field after harvesting serve as a source of food until winter.







At our sites:

Recultivation project:

Our sugar plant in Könnern is a food and regeneration habitat for insects, reptiles, small mammals, small game and birds.

Bee pastures:

At our Elsdorf and Lage sites, numerous insects and birds live in our bee pastures.

Repurposed basins:

More than 30 species of birds nest and breed at our Euskirchen sugar factory, including teal and mallard ducks, jack snipes, water pipits and kingfishers.

Not just attractive, but also useful

On the flower strips at the edge of the sugar beet field, corn poppy, camomile, red clover and other flowers make an important contribution to biodiversity as home to numerous bird and insect species.

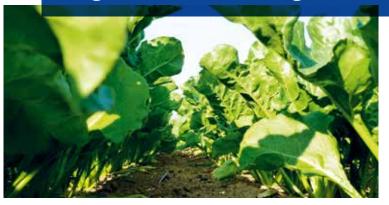
Outlook:







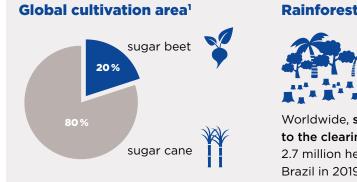
Sugar beet beats sugar cane





Which one is more convincing when it comes to sustainability?

Beet sugar and cane sugar are practically identical in their composition. However, there is a clear winner when it comes to environmental aspects.



Rainforest destruction²



Worldwide, sugar cane cultivation contributes to the clearing of forest areas. For example, 2.7 million hectares of land were deforested in Brazil in 2019, for sugar cane and other crops.

Alternating culture vs. monoculture³



Compared to sugar cane:

- ✓ better soil structure
- ✓ higher soil fertility
- ✓ less weeding
- ✓ less disease and pest infestation



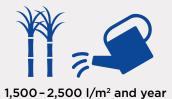
- 1) F. O. Licht: International Sugar & Sweetener Report, Vol. 152 No. 6. 24.02.2020.
- 2) Obidzinksi et al.: Taking the Bitter with the Sweet: Sugarcane's Return as a Driver of Tropical Deforestation. 2015. Cifor; Jusys: A confirmation of the indirect impact of sugarcane on deforestation in the Amazon. 2017; https:// www.globalforestwatch.org/, 21/12/2020.
- 3) https://www.pflanzenforschung.de/de/pflanzenwissen/lexikon-a-z/monokultur-786; CIBE & CEFS: Der europäische Zuckersektor: Ein Modell der ökologischen Nachhaltigkeit. 2009.

Water demand ...

... in cultivation4



 $550-750 \text{ l/m}^2$ and year



- ✓ sufficient precipitation in growing areas
- ✓ deep root system for optimal water absorption
- ✓ ability to regenerate after drought

... in production⁵

In contrast to sugar cane mills, **sugar beet factories need very little additional water**, as almost **100**% of the required water **comes from the sugar beets** themselves.



Nutrition⁶



Nutritionally and chemically, there is **no difference between beet sugar** and cane sugar.

Brown cane sugar contains scarcely any more minerals or vitamins than white beet sugar and therefore does not contribute to nutritional requirements in any additional way.

Conclusion: sugar beet beats sugar cane (per kg sugar)⁷

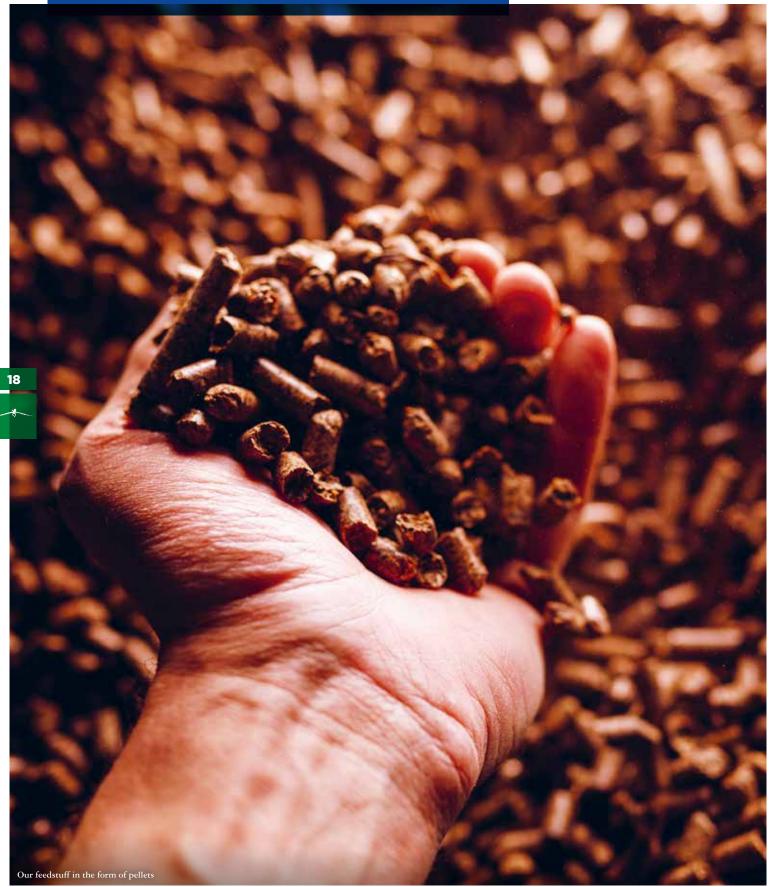


- Less land use
- Lower water consumption
- ✓ Shorter transport distances
- Lower CO₂ emissions

The production of sugar from sugar beet is significantly more environmentally friendly than sugar production from sugar cane.

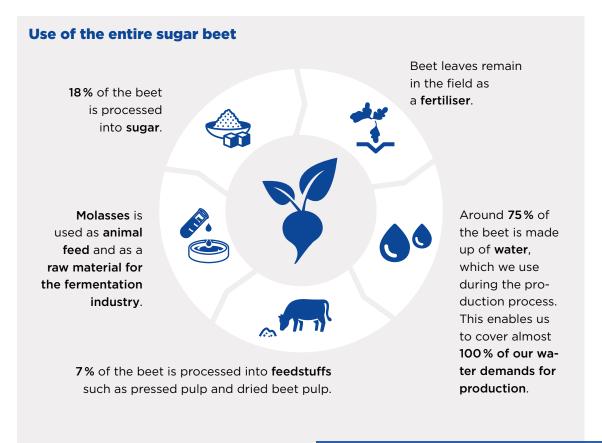
- 4) http://www.fao.org/land-water/databases-and-software/crop-information/sugarbeet/en/, 15/12/2020; http://www.fao.org/land-water/databases-and-software/crop-information/sugarcane/en/, 15/12/2020; Nachhaltigkeitsbericht Pfeifer & Langen. 2018.
- 5) Gerbens-Leenes & Hoekstra: The water footprint of sweeteners and bio-ethanol from sugar cane, sugar beet and maize. 2009.
- 6) aid Infodienst: Zucker, Sirupe, Honig, Zuckeraustauschstoffe und Süßstoffe. 2014.
- 7) Wissenschaftlicher Beirat für Agrarpolitik, Ernährung und gesundheitlichen Verbraucherschutz: Gutachten Politik für eine nachhaltigere Ernährung. 2020; Ifeu: Ökologische Fußabdrücke von Lebensmitteln und Gerichten in Deutschland. 2020; https://waterfootprint.org/en/resources/interactive-tools/product-gallery, 3/9/2020.

Committed to the circular economy



Completely happy

We utilise 100% of our beet in the production of sugar. In this way, a functioning circular economy and efficient waste prevention make a contribution towards the EU's Farm to Fork Strategy.



Zero waste

Sugar is a natural product with no best-before date and can be stored indefinitely if stored correctly. In this way, nothing needs to be discarded, contributing to the prevention of food waste. According to the Federal Ministry of Food and Agriculture, 52 % of food waste occurs in private households.

Outlook:



At our Innovation Centre in Elsdorf, new ideas for the future are constantly being developed in cooperation with our partners - such as films, insulating materials and compostable tableware made from beet pulp.







Systematically reducing emissions

To reduce CO₂ emissions as much as possible and achieve climate-neutral production by 2040 at the latest – we are investing in sustainable energy sources and the latest technology with these goals in mind.

Our beet: a champion in CO₂ savings

When it comes to CO₂ savings, our beet is a champion across the board compared to other crops: no other crop binds as much CO₂ as it does.

To build up and maintain humus, we utilise organic fertilisation, catch crops and mulch sowing. This permanently binds CO_2 in the soil. For example, CO_2 emissions in sugar beet cultivation in the Rhineland have been reduced by around 35 % since $1990.^1$

Good for the climate

36 tonnes of CO₂ per hectare are bound each year - **corresponding to 180,000 kilometres driven by car.**



In addition, one hectare of beet **produces 26 tonnes of oxygen** per year – **enough**for **100 people** to live on.

¹⁾ Entwicklung der CO₂-Emissionen im Rheinischen Zuckerrübenanbau; www.liz-online.de, 17/02/2020.

Beet logistics 4.0

Our 'Field to Factory' logistics portal groups all of the processes together. All stakeholders are closely connected by means of an app. In addition to optimised beet logistics, lighter vehicles enable higher payloads, which means fewer journeys.

Intermodal transport

By increasing the use of rail as the primary mode of transport, especially for more remote destinations, we continue to drive the reduction of ${\rm CO}_2$ emissions.

Reducing beet transportation

In 2020, **615 fewer trips** were needed to **transport 1,000,000 tonnes of beet,** compared to 2015.



Rail is the way forward

In 2020, we carried out

more than 50%

of all sugar transportation from Germany to Italy **by rail**.



By optimising the payload for the long term, the number of trips necessary is constantly reduced. For example, in 2020, our own logistics subsidiary acquired tractor units that are significantly lighter than the previous generations. We engage in dialogue with our customers to continuously coordinate order quantities so we can optimally utilise payloads.



Energy sources of the future

The production of sugar is dependent on thermal energy. Highly efficient combined heat and power plants at our sugar factories are used to supply our own electrical and thermal energy. The surplus electricity goes into the public grid.

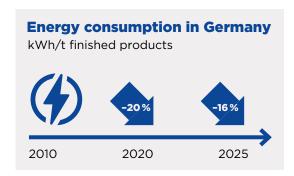
However, in order to achieve greenhouse-neutral sugar production, we need a realignment of energy production and energy sources. We invest at our sites to create optimal conditions for energy savings and reduced CO₂ emissions. This includes the latest digital technologies.

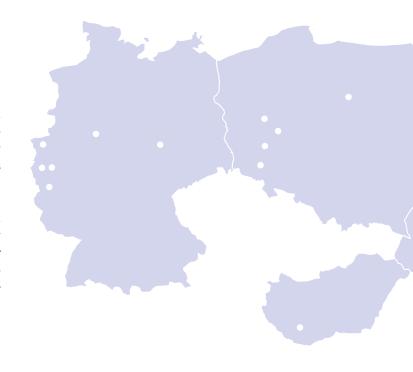
Germany:

After the phase-out of coal at our plant in Jülich in 2021, this will also happen at our plant in Euskirchen in 2023 and in Könnern by 2030 at the latest.

The EU is planning to reduce CO_2 emissions by 55% by 2030 as part of the Green Deal. Compared to 1990, we will reduce our CO_2 emissions by 76% by 2030.

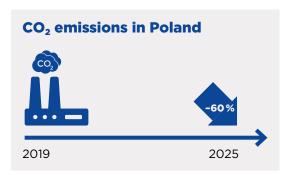
CO₂ emissions in Germany -60% -40% 1990 2020 2030





Poland:

By replacing coal with gas, we will further reduce our CO2 emissions in the future.







n re-er Our plant in Radechiv 22.



Ukraine:

We have low- ${\rm CO_2}$ energy supply through gas, as in all of our plants. Khorostkiv has been using alternative energy sources such as wood and sunflower pellets since 2019.

Hungary:

Our site in Kaposvár has been using solar energy on the roof of the production facility since 2014. This energy acquired from this covers up to 30% of our daily energy demands.

Greece:

We are planning to cover the energy demands of our Greek site in Thessaloniki through solar panels in the future. As part of the process, unused energy can be fed into the supply grid.

Outlook:

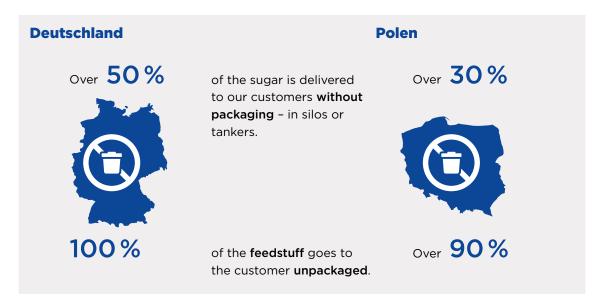
We are setting ambitious targets for ourselves and aim to achieve climate-neutral production by 2040 at the latest.





Better without

'Unpackaged' is more than just a trend for us. We have been living and breathing this principle for decades. We prefer paper when it comes to packaging for retail.



FSC® – we go a step further

We are increasingly using FSC®-certified materials for our paper packaging. In so doing, we are already taking into account the goals of the standard for each processing stage in the supply chain to have its own independent certification. Our FSC® licence code is C146232. In this way, we are making a significant contribution to responsible forestry.





Germany: 1%

Poland: **21%**

Plastic



Germany: **99**%

Poland: **79**%

Paper

Reduction in grammages over the last 10 years

White paper:



90 g/m²

80 g/m²



Solid cardboard/folding cartons:



280 g/m²

230 g/m² -18%



Paper bags 25 kg and 50 kg: Removalof a complete layer of paper in the material composite - from 3-ply to 2-ply.



90 g/m²

80 g/m²





For sustainable nutrition



All of this in a packet of beet sugar

Beet sugar is not only impressive in terms of sustainability, but also meets numerous other needs for a conscious, individual diet.

Sustainable

Our sugar comes from sustainably certified beet cultivation.

Locally produced

Sugar beet is processed where it grows.

100 % natural

Sugar beet is our real sugar factory.

4 kcal per gram

The energy content of sugar is the same as that of other carbohydrates and protein. However, fat provides 9 kcal/g.

No alternative

Sugar is not so easy to replace. And it doesn't need to be, because sugar alternatives don't offer any benefits.

Energy supplier

Sugar provides the body with the energy it needs for all situations.

Free of additives

Sugar does not need E-numbers.

Unlimited shelf life

Sugar has no bestbefore date.

Good for the environment

Sugar has an impressive environmental record. In terms of ${\rm CO}_2$ emissions as well as land usage and water consumption.

Vegan

Sugar is ideal for vegan diets.

Cultural assets

Sugar from the sugar beet has been providing good taste since the early 19th century.

Lactose-free

Sugar is naturally lactose-free.

Halal

Sugar is suitable for halal diets.

Kosher

Sugar is suitable for a kosher diet.

All-rounder

Sugar is used in various industries – in the food, chemicals and pharmaceutical industry.

Gluten-free

Sugar is naturally gluten-free.

For good taste

Sugar provides good taste all year: whether during gelling season or for Christmas baking.

Divers

Sugar takes on many important technological functions. It provides consistency, durability and browning, among other things.

Eating sustainably means enjoying a variety of foods while not excluding any nutrient from the outset. The same applies to sugar. Beet sugar performs numerous functions in food. It's not just about sweetness, but more about consistency, shelf life and browning.

Sustainable nutrition

Nutrition is about more than just food intake. This is also shown in the current Farm to Fork Strategy from the EU. In addition to health policy measures, sustainability is having an increasing effect on our eating habits.

Comparison with other sweeteners



Supposedly healthier alternatives such as coconut blossom sugar, agave syrup and date syrup are often said to be good replacements for beet sugar. However, they offer no health benefits, as they are metabolised in the same way. Ultimately, they also consist of sugars. And when you consider the environmental balance of the products in question, beet sugar emerges in a much better light, in part due to the short transport distances involved.



Sustainability is also becoming increasingly relevant in dietary advice; what people want to eat no longer depends solely on calories and nutrients. The sugar beet surprises many Nutrition Scientists with its sustainability values, especially in comparison with other sucrose sources.

Dr Andrea Lambeck on the subject of sustainable nutrition

*

Latest scientific findings



No correlation can be found between the intake of free sugars and body weight and the development of obesity in European adolescents.¹



If sugar is exchanged for other carbohydrates with the same energy intake, body weight does not change. The decisive factor is calories.²



People react very differently to the same meal, e.g. in their blood glucose levels. Universal dietary recommendations that divide foods strictly into good or bad are therefore not helpful. An individual approach through personalised nutrition is preferable.³



Lack of physical activity is on the rise in Germany. According to information from the Robert Koch Institute, only 54% of girls and 63% of boys are active for 1.5 hours per week.⁴

- 1) Flieh et al.: Free Sugar Consumption and Obesity in European Adolescents: The HELENA Study. Nutrients. 2020.
- 2) Te Morenga et al.: Dietary Sugars and body weight: systemtic review and meta-analysis of randomised controlled trials and cohort studies. BMJ. 2012.
- 3) Zeevi et al.: Personalized Nutrition by Prediction of Glycemic Responses. Cell. 2015.
- 4) Krug et al.: Sport- und Ernährungsverhalten bei Kindern und Jugendlichen in Deutschland Querschnittsergebnisse aus KiGGS Welle 2 und Trends. Journal of Health Monitoring. 2018.

Nutrition is individual

Consumers should choose an individual diet tailored to them – and enjoyment should play a part in this. This calls for nutritional expertise based on scientific facts. And that is exactly what we strive for.

Outlook:



With our newly developed sugar allulose, which is still to be approved as a novel food, we are well on the way to contributing towards calorie reduction in food. This is because it has practically no calories.



Pfeifer & Langen at B2Run in Colog



Balanced calorie intake is crucial with regard to body weight. If you take in more calories than you consume, you will gain weight, no matter where those calories come from. Exercise helps us to regulate our personal calorie balance.

Our goal is to promote physical activity through a sustainable lifestyle through our collaboration projects. As result, we are involved in competitive and amateur sport throughout Europe.



We have been an official partner of the State sports federation of North Rhine-Westphalia since 2020 and also support clubs in the region.



In Hungary, we sponsor the 1st MCM Diamant Kaposvár women's volleyball team in the top division of the national league.



In Poland we support marathons, half marathons and trekking tours with Diamant Pro Sport.

Pfeifer & Langen in dialogue

We actively strive to combat obesity and secondary diseases. For this, a science-based approach to consumer education is essential.

We organise 5,000 factory tours a year around the motto 'Experience the sugar beet'.



... are in close contact with consumers at regional and national events, such as the North Rhine-Westphalian Garden Show.



... are a corporate member of the Professionals in Nutrition Science Association (VDOE).



... are in communication with health insurance companies.



... currently have site-specific school partnerships in Jülich and Euskirchen.



... cooperate with colleges and universities.



... are a member of Bio-Innovation-Park Rheinland e. V., a network for the bio-economy and green technology.



Outlook: To raise aware



To raise awareness, we are expanding our communication campaign for our beet sugar as part of a sustainable diet – with short videos, sweet facts, on our packaging and through personal communication at events.





Responsible family-owned company

We are one of Europe's leading sugar manufacturers, with a 150-year family tradition. And we owe this in particular to our 2,450 employees in Europe. We have a special responsibility towards our employees.









For our employees - strong together

We want to move into the future together with our employees. This is why we offer them an exciting, attractive working environment and give them long-term support for their professional development.



Fair payment according to collective agreements and special social benefits



Open, transparent team culture



Hybrid working



European Works Council



Work-life balance



Company suggestion scheme



Occupational health management



Company medical service



Company reintegration management



Company pension scheme



European training, such as in the field of sugar technology



Apprenticeships and internships

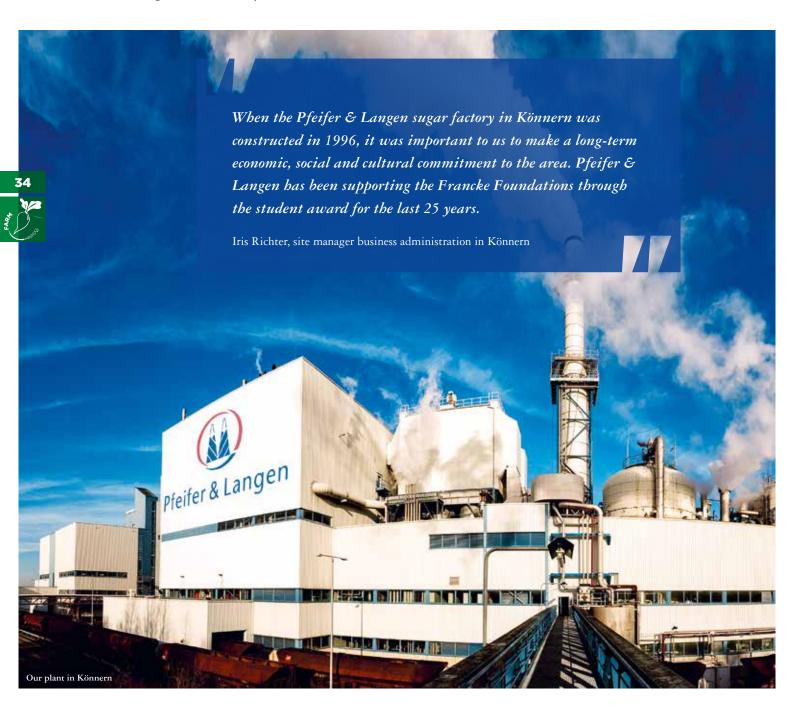
We promote responsible cooperation

With this in mind, we revised our Code of Ethics and Conduct in 2020. In addition, as a member of the global online platform Sedex (Supplier Ethical Data Exchange), we are committed to continuously monitoring our responsible business practices.

In addition to our Polish sites, we have now also had SMETAs (Sedex Members Ethical Trade Audits) carried out at our German sites since 2020. Working conditions, safety at work, environmen-

tal protection and company ethics are reviewed in accordance with the SMETA four-pillar principle.

We have been involved in the CSR ranking from the EcoVadis sustainability rating system since 2017 and have improved by 30% during this time.





Commitment at our sites



We have been supporting the Francke Foundation's student award, presented each year to students for cultural and social commitment, for the last 25 years. This is a milestone that we can be proud of.



We support local events such as Knollenfest in Euskirchen, Bulldogs for Kids in Appeldorn, and farm and harvest festivals. We provide sponsorship to ensure excellent Christmas lighting in Euskirchen and Jülich.



We donate sugar to food banks in Germany each year.



In Hungary, we support the Somogyi Kosár association, which promotes local and sustainable food production in the Kaposvár region.



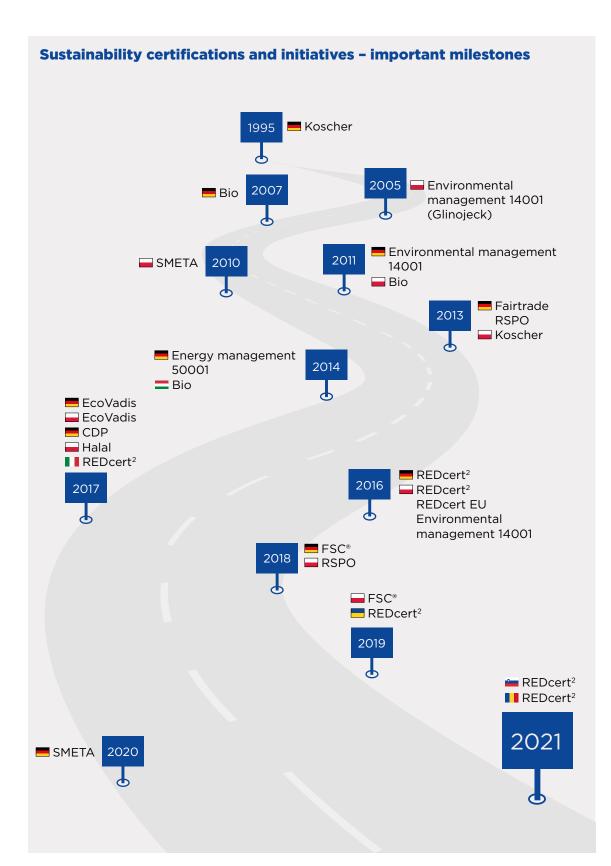
In 2021, we entered into a collaboration with SOS Wioski Dziecięce in Poland, part of the international organisation SOS Children's Villages.

Our European journey

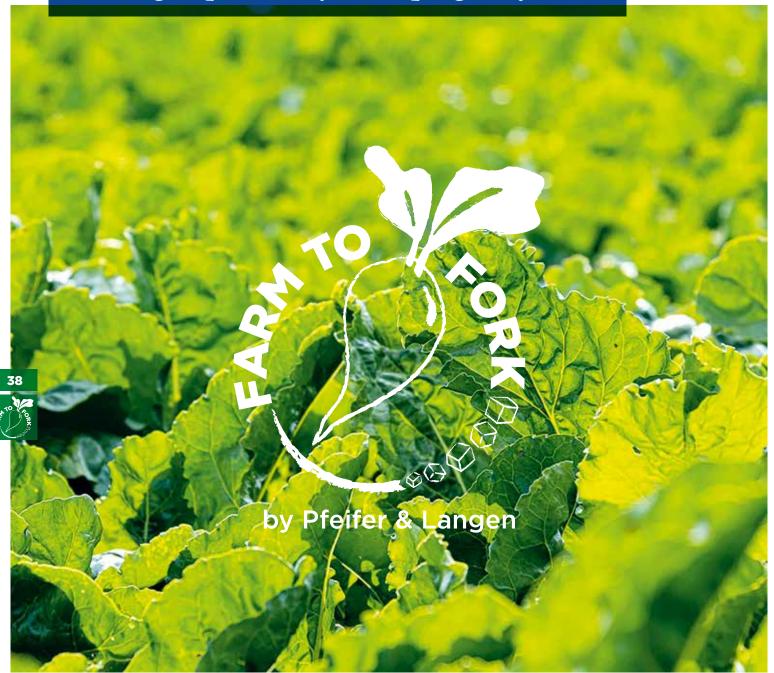


Continuously more sustainable

Our European path is shaped by numerous sustainability certifications and initiatives, from agriculture and production to packaging and nutrition. In so doing, we are consistently pursuing one goal – to become better every day.



Bearing responsibility — shaping the future



'Farm to Fork' - Pfeifer & Langen has been following this value creation principle for 150 years. And we've got a lot more planned for the future.



