

ISSUE BRIEF: SOIL

HOW DOES THE EU BEET SUGAR SECTOR HELP SECURE THE LONG-TERM VIABILITY OF OUR PRECIOUS SOILS?

ABOUT THE ISSUE

Soil is an irreplaceable resource, vital to the production of food, fuel and fibre; and an essential support system for the services provided by nature. Topsoil, the upper 5 to 20 cm, has the highest concentration of organic matter and microorganisms and is where most of the Earth's biological soil activity occurs. Plants generally concentrate their roots in, and obtain most of their vital nutrients from, this thin layer of the Earth's crust. That fertile soil can take thousands of years to develop and only a few seasons to be destroyed. Therefore, farmers take particular care in maintaining as well as in improving soil fertility and structure.

ON THE FARM

Keeping the soil in good condition is vital to ensure crops can continue to be grown into the future. Excessive tilling leads to loss of topsoil. We advocate the use of mulch, reduced tilling, use of intermediate cover crops and green manure, which can all help promote soil biodiversity and fertility. Sugar beet is always grown in rotation with other field crops, thus mitigating the depletion of crop-specific nutrients and the accumulation of crop-specific pests and diseases.

IN THE FACTORY

The process of producing sugar creates numerous valuable products, some of which are used to enhance soil quality and fertility, returning value to the field season after season. Sugar factory lime is a recycled product coming from the sugar extraction process. It constitutes a sustainable soil amendment that is used to manage soil pH and to provide

calcium, vital for healthy plant growth. Use of sugar factory lime helps minimize the need for these materials from quarried sources. Beet leaves and tails, and other plant material not used in sugar processing can be returned to the soil as compost. Similarly, any field soil or stones removed from the beets in the factory (if not already removed during cleaning in the field) can also be returned directly to the land.

REDUCING IMPACTS, IMPROVING PERFORMANCE

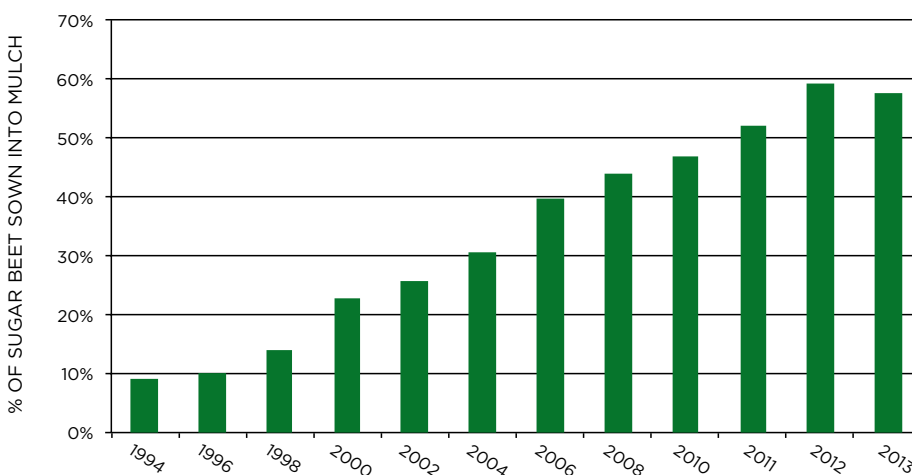
Farmers are actively working to maintain soil quality. We maintain the soil's organic matter by incorporating crop residues, compost and manure, and reducing the use of tillage wherever possible. Seed can be sown directly into mulch or green manure crops in order to minimize loss of organic matter.

Sugar beet's role as a rotational crop itself helps reduce levels of soil-borne pathogens and thus reduces the requirement for plant protection products. The combination

of different crops in the rotation and the use of cover crops and green manures reduces the level of pests and diseases. This also helps conserve soil fertility, increases soil biodiversity and keeps a balance between beneficial microorganisms and soil-borne pathogens. This measure is combined with the use of varieties selected for their resistance to various pests and diseases, such as Rhizomania, nematodes, *Cercospora beticola* or *Rhizoctonia*.

DIAGRAM: EVOLUTION OF SOWING INTO MULCH IN GERMANY, 1994-2013

Source: Institute for Sugar Beet Research (IfZ), Göttingen (Germany)



A range of practices helps prevent erosion and compaction of soils. These include reduced tilling, especially in areas vulnerable to erosion. We can also plant cover crops after the sugar beet, and these cover crops may remain in place during the winter – this helps to stabilize the soil structure, add organic material, enhance the action of beneficial microorganisms, and other benefits.

The machinery we use in the field can also have an impact on the soil. We advocate the use of appropriate machinery for different degrees of soil moisture, and use of low-pressure tyres on field vehicles that will result in reduced compaction.

In the factory, sugar factory lime (SFL) is produced as a result of purifying the raw juice. Its high calcium carbonate content makes SFL a good material for use as a fertiliser/conditioner to improve soil structure and reduce soil acidity. SFL also contains other useful nutrients such as magnesium, phosphates and nitrogen. SFL is therefore used as a fertiliser directly on the field (as well as several other valuable uses).

The closed-loop production processes we advocate mean sugar factories return organic residues – notably beet leaves and tails and field weeds – straight back to the field as compost. Furthermore, sugar beets are often pre-cleaned in the field to allow processing to commence in the factory without delays but also to conserve the organic matter and structure of the soil in the fields. In the event that some non-beet materials, primarily stones and soil, arrive at the factory with beets, they are generally returned to the fields or used in other sectors such as landscaping and building materials.

CASE STUDY: BRITISH SUGAR'S LIMEX: MANAGING SOIL ACIDITY

Each year approximately 300,000 tonnes of liming material is produced by British Sugar's factories, as a product of the sugar manufacturing process, marketed under the LimeX brand.

LimeX provides a sustainable option for soil pH correction, significantly reducing the volume of limestone and chalk that would otherwise be quarried and crushed for agriculture and other lime markets.

British Sugar is the largest supplier of liming products to UK agriculture and the LimeX range has Soil Association approval for use in organic farming systems. LimeX has been used as a sustainable soil-forming material in brownfield restoration, and is used by the mushroom-casing industry for mushroom production.

KEY STATISTIC **2 MILLION TONNES**
of sugar factory lime are recycled every year in the EU

CASE STUDY: USE OF COVER CROPS IN FRANCE

The use of cover crops to minimise erosion is a key practice, and in France, this practice is being extended. In recent years use of cover crops in three French regions (Normandy, Picardy and Nord-Pas de Calais)



has nearly trebled. In 2000, cover crops were used on 20- 30% of the beet area; now they are used on 80-90%. Furthermore, low-till and no-till planting techniques have been in practice in France since the late 1990s. These initiatives help to protect the soil against climatic assaults – particularly erosion – but also enhance soil biodiversity.

WHAT'S NEXT

The emerging study of natural capital is being developed to take account of the value of the services provided by natural systems such as biodiversity and soil fertility. The role of soil conservation as a natural carbon sink – capturing and retaining carbon that would otherwise contribute to climate change – is a key topic in climate science.

MORE INFORMATION

See Good Practices

Part A – Cultivation:

3. Soil Fertility
 - 3.1 Maintaining the organic matter
 - 3.2 Protecting beneficial organisms
 - 3.3 Control of soil-borne pathogens
 - 3.4 Preventing erosion & compaction

Part B – Processing:

1. Resource Efficiency
 - 1.1. Co-production
 - 1.2. Closed-loop (material cycles)