

# FACTSHEET

## SUSTAINABLE USE OF COMPOST AND DIGESTATE TO IMPROVE SOIL ORGANIC MATTER

### RECYCLING BIO-WASTE AND THE CIRCULAR ECONOMY

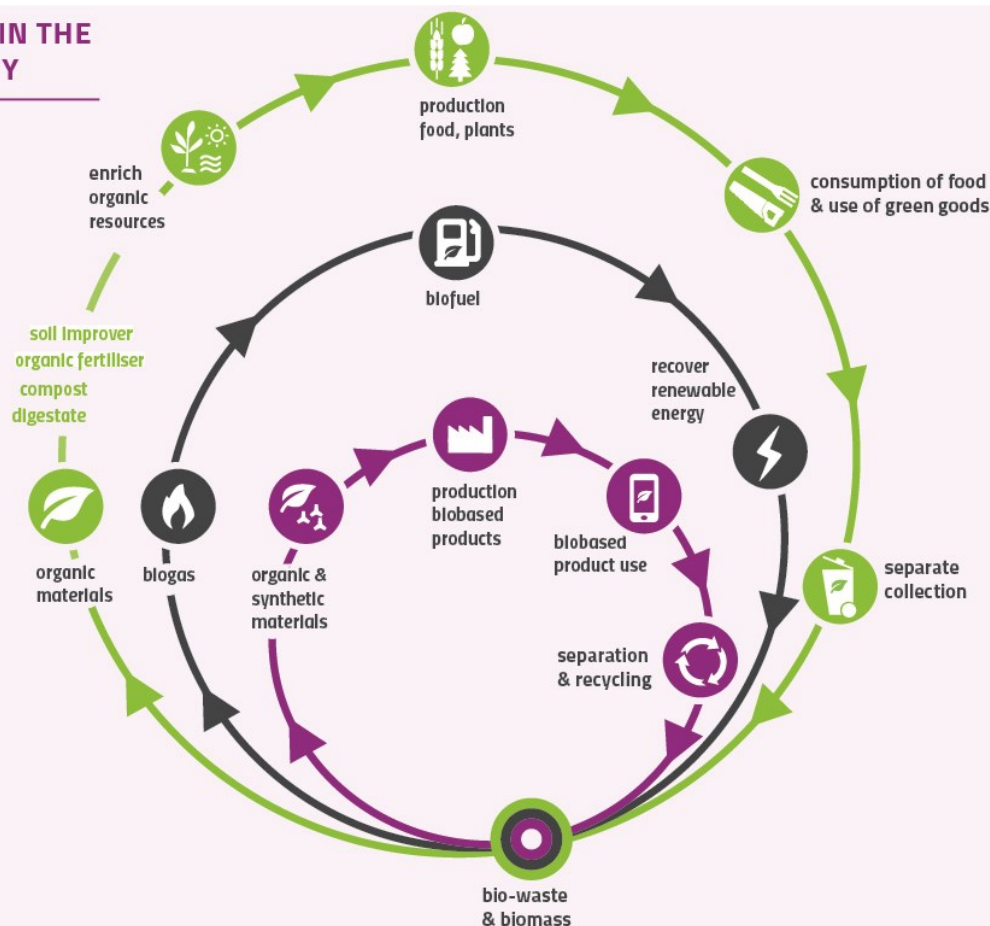
Bio-waste is made up of discarded plant and animal residues, and includes garden/park and food waste. Between 118 and 138 million tonnes of bio-waste is generated across the EU every year, but less than 40% is currently recycled into useable products.

Recycling bio-waste is central to Europe's developing circular economy, of which composting and anaerobic digestion are both proven techniques.

Together, they help:

- Reduce the environmental impacts of landfilling/incineration;
- Return organic matter to soils - this helps maintain/restore soil quality and sequester carbon;
- Produce bio-based products, such as compost, biogas, peat substitutes, fibers and chemicals; and
- Recycle plant nutrients such as nitrogen and phosphorus.

### BIOLOGICAL CYCLE IN THE CIRCULAR ECONOMY



## COMPOSTING AND ANAEROBIC DIGESTION

Recycling bio-waste into compost and anaerobic digestate harnesses natural biological cycles, converting leftover plant and animal residues into useful products that can be returned to the soil.

**Compost** is the end product of the composting process and is a valuable soil improver as it contains stable organic carbon that can help (maintain and/or) increase the content of soil organic matter. It also contains a diverse range of micro-organisms that form an essential part of a healthy soil ecosystem.

**Digestate** is the end product of the anaerobic digestion process and is a valuable biofertiliser as it contains, besides organic matter, useful quantities of plant nutrients that can help farmers reduce artificial fertiliser use.

## SOIL ORGANIC MATTER

Soil is made up of many different components, but it is the organic matter fraction that is so important. Soil organic matter helps to:

- Provide structure and hold onto water;
- Store plant nutrients;
- Provide a medium and nutrient source for microbes and invertebrates to live; and
- Store carbon.

**It is the organic matter content that helps support the productivity of soil and human's ability to grow food.**

## AGRICULTURAL IMPACT ON SOIL ORGANIC MATTER

Intensive agricultural practices mean that the organic matter content of most of Europe's arable soils is decreasing. This has important implications, as these soils:

- **Are less productive** – that is, they grow fewer crops;
- **Hold onto less water** – this means that they dry out quicker in the summer months when water is scarce, and are not as good at absorbing water when it does rain, therefore increasing the likelihood of flooding;
- **Store less carbon** – this is because soil organic matter is mostly carbon, and it can stay in the soil for many decades if not centuries.

**Sustainable and productive agriculture is therefore dependent upon both adequate levels of soil organic matter and the supply of plant nutrients.**

## COMPOST CAN INCREASE SOIL ORGANIC MATTER LEVELS

The composting process is complex and involves the degradation of plant and animal residues into a stable, sanitised product called compost. The process transforms the woody parts of plants into humus, which forms the main component of the soil organic matter fraction.

Adding compost to soil therefore increases a soil's organic matter content, and this has been shown in numerous long-term trials. It is also thought that once applied to soil, the organic matter fraction is further transformed by soil microbes into more stable forms, meaning that it stays in the soil for longer.

## COMPOST CAN STORE CARBON

Compost can be considered as a temporary carbon store. Providing that the composting process has been carried out effectively, a fraction of the organic carbon in the bio-waste will have been converted into stable humic substances (humus). Once applied to soil, this can then remain there for many decades, if not centuries.

A summary of studies has shown that, on average, 24% of the organic carbon applied to soil as compost remained as soil organic carbon after 8 years\*.

Applying compost to soil year-on-year can therefore not only improve a soil's functionality, but also sequester carbon.

## COMPOST QUALITY IS IMPORTANT

It is important to keep bio-wastes separate from other wastes to prevent contamination with items such as metals, plastics and glass. These items have the potential to end up in recycled compost and may be harmful to soil, crops and wildlife. Separate collection systems are therefore an important first step to deliver clean bio-wastes to composting facilities for recycling.

The European Compost Network e.V. (ECN) runs a European-wide compost quality assurance scheme (ECN-QAS), which monitors the effectiveness of a number of national compost quality assurance schemes. The ECN-QAS is based on the following principles:

- That there is a positive list of suitable input materials (like source-separated bio-waste) that can only be accepted for composting;
- Requirements for the biological treatment process;
- Quality criteria for compost; and
- Labelling requirements for the sustainable use of compost.

ECN oversees the ECN-QAS in a number of EU member states. The scheme is important to ensure that:

- **Composting facilities are operated effectively** – to ensure that the compost has been hygienised so that weed seeds and pathogens are killed, and that sufficient degradation has taken place;
- **The compost meets defined quality criteria** – to ensure that the compost doesn't contain unacceptable levels of contamination so that it can be applied to soil safely.

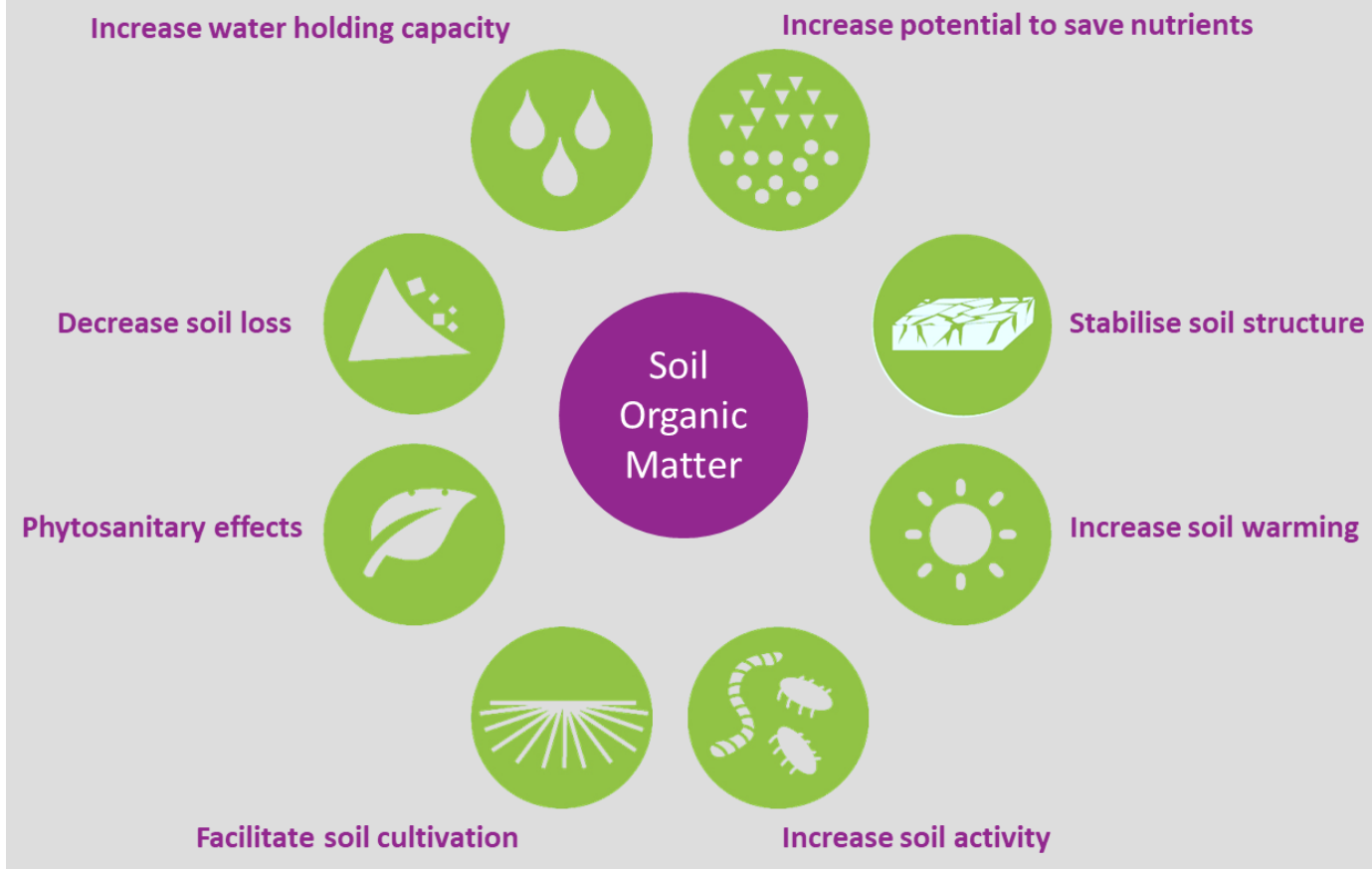
## THE ECN-QAS QUALITY MARK

The ECN-QAS is registered as a trademark for certified quality assurance organisations, compost and digestate products with the European Register of Community Trade Marks ('OHIM 2012/210: TM No 011007168').



\*Median values of five published trials (source: ISWA 2019; In Press)

# THE FUNCTIONS OF SOIL ORGANIC MATTER



## COMPOSTING AND THE EU LEGAL FRAMEWORK

Composting is a perfect fit with a number of EU legislative frameworks:

- **The Circular Economy Package (2015)** – to promote recycling and save primary resources;
- **The Waste Framework Directive (2018)** – to recycle 65 % of municipal waste by 2035 and introduce the separate collection of bio-waste by 2023;
- **The Fertiliser Regulation (2019)** – to allow the sale of CE marked organic fertilisers, soil improvers and growing media on the EU market; and
- **Reform of the Common Agricultural Policy** – to enable efficient soil management

## THE 4 PER 1000 INITIATIVE

Launched by the French Ministry of Agriculture and Food in 2015, the initiative aims to increase soil organic matter and carbon sequestration through the implementation of agricultural practices adapted to local environmental, social and economic conditions.

Consisting of a range of stakeholders from both the public and private sectors, it seeks commitment to transition towards productive and highly resilient agriculture, based on the appropriate management of lands and soils, creating jobs and incomes and consequently promoting sustainable development.

The initiative is based on the assumption that by increasing the levels of carbon in the top 30-40 cm of soil by 0.4%, or 4 % per year, the annual increase of carbon dioxide (CO<sub>2</sub>) in the atmosphere would be significantly reduced.

The 4 per 1000 initiative proposes sustainable soil management for both food security and the climate.

[www.4p1000.org](http://www.4p1000.org)



## THE MAIN PRIORITY GOALS

To encourage policy makers to develop instruments to move Europe towards implementing sustainable, climate-proof land management practices, according to the priorities:

### INCREASING

Soil organic matter in arable soils

### PROTECTING

The existing stock of carbon in soils

### ENCOURAGING

The use of recycled nutrients and a more efficient management of nutrients on agricultural land

### MAINTAINING

A high level of organic fertility in soil by applying stable organic matter from biomass

This would not only benefit the climate but also be particularly beneficial to improve water and air quality

### MINIMIZING

Further losses of carbon from cultivated carbon rich soils

### ENSURING

That the European Commission adopts a Soil Framework Directive

## ABOUT ECN

The European Compost Network (ECN) is the leading European membership organisation promoting sustainable recycling practices by composting and anaerobic digestion of organic resources and guarding over the quality and safe use of the recovered organic fertilisers/soil improvers.

The European Compost Network is a membership organisation with 63 members from 28 European Countries. Members include all European bio-waste organisations and their operating plants, research, policy making, consultants and authorities. ECN represents more than 4500 experts and plant operators with more than 45 million tonnes of biological waste treatment capacity.