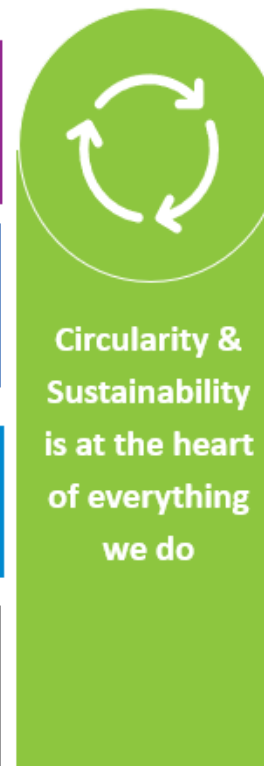


# Quality assurance and certification of tailormade compost and advise for policy makers

Wim Vanden Auweele, Vlaco and European Compost  
Network



# European Compost Network



66 Members from 28 European Countries

≈ 48 M tpa Treatment Capacity

> 4.500 Composting & Anaerobic Digestion Plants

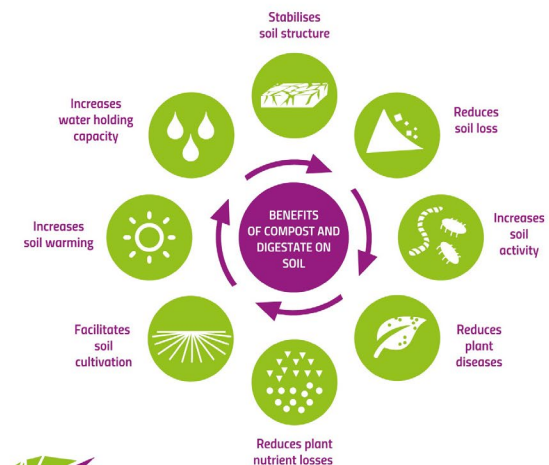
## Comprehensive survey in 2021



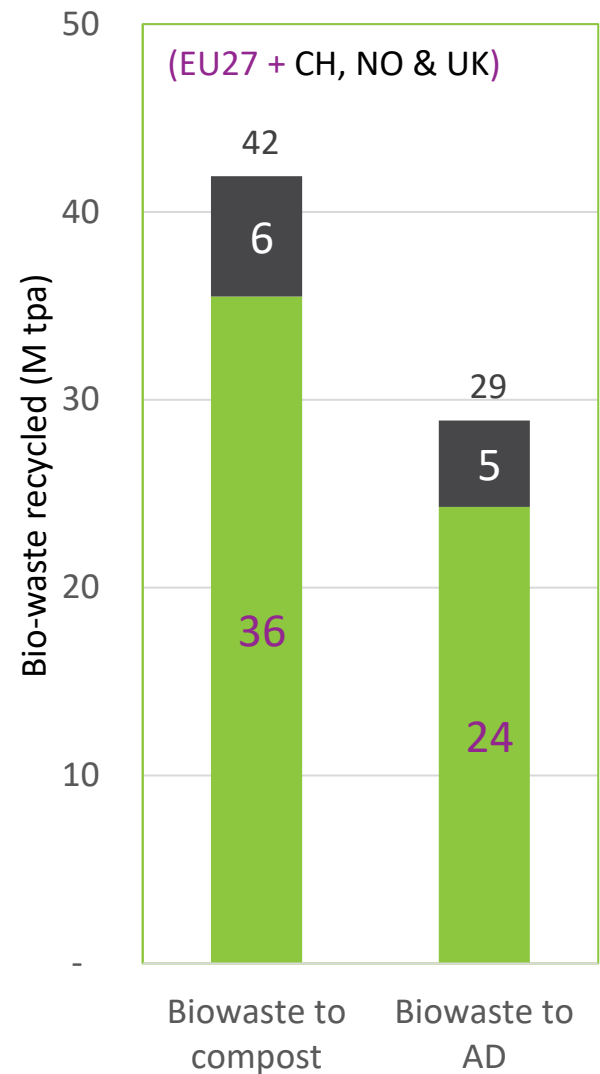
## ECN DATA REPORT 2022

### COMPOST AND DIGESTATE FOR A CIRCULAR BIOECONOMY

Overview of Bio-Waste Collection,  
Treatment & Markets Across Europe



# Biowaste Collection – Compost & Digestate Production



**71 M tpa**  
BIO-WASTE RECYCLED

**21 M tpa**  
COMPOST PRODUCED

Surface area (million ha)	Fraction of Arable Land	Fraction of Mod./ Severely Eroded Land
2.1	2%	16%

1.2 million tonnes CO<sub>2</sub>-eq  
sequestered on agricultural  
soils every year

=

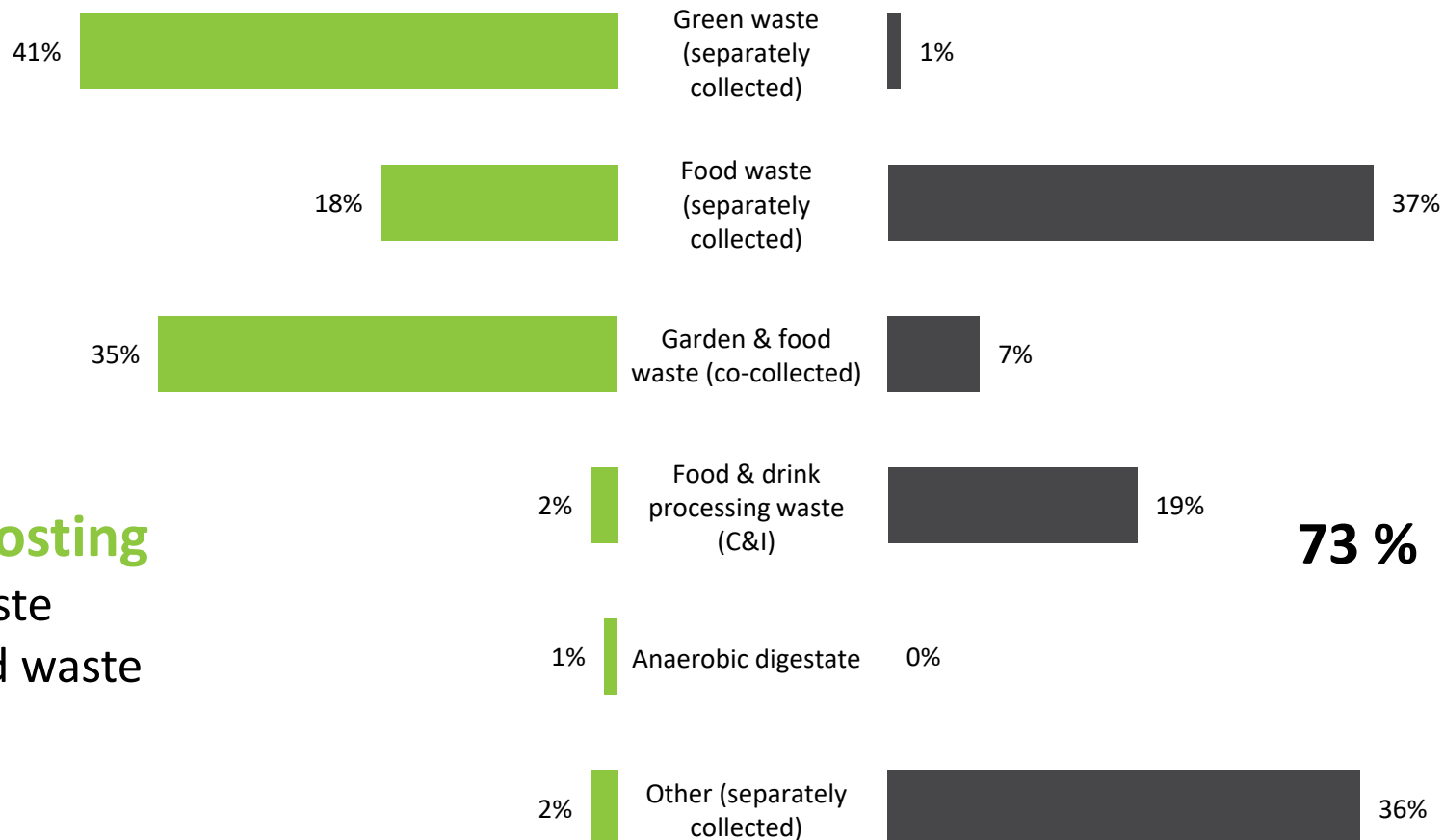


19.1 million  
urban tree  
seedlings grown  
for 10 years

# Biowaste – TYPES - COMPOST & DIGESTATE PRODUCTION

## Composting

## Anaerobic Digestion



**76 % Composting**

Green waste  
Garden & food waste

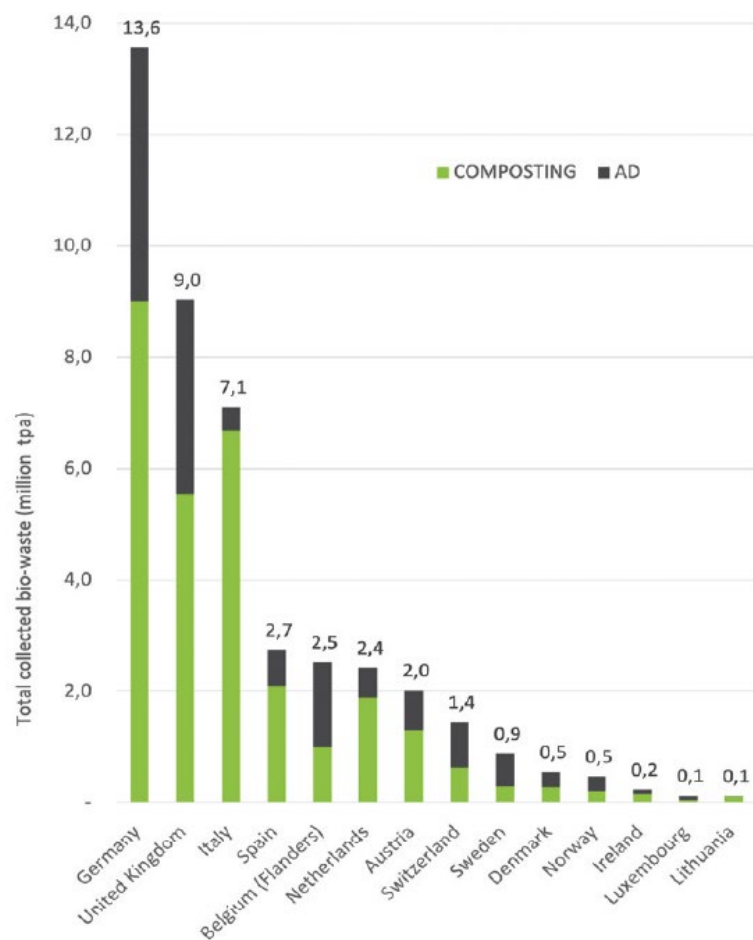


**73 % Anaerobic Digestion**

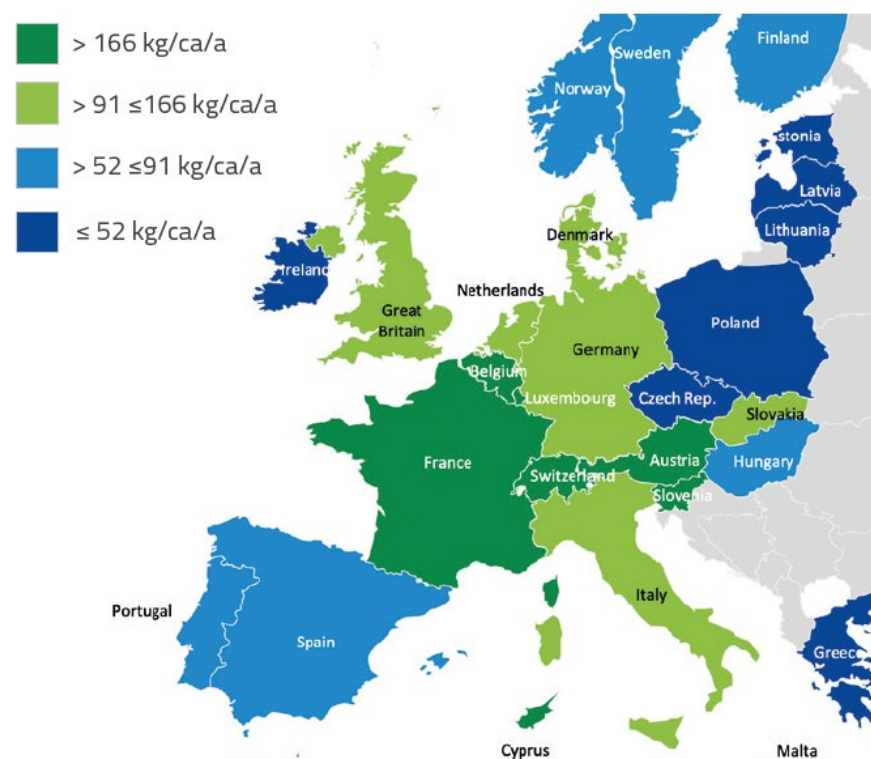
Food waste  
Other

# Biowaste: separate collection in Europe

QUANTITIES OF TREATED BIO-WASTE IN  
SELECTED SURVEY COUNTRIES  
(tonnes per annum)



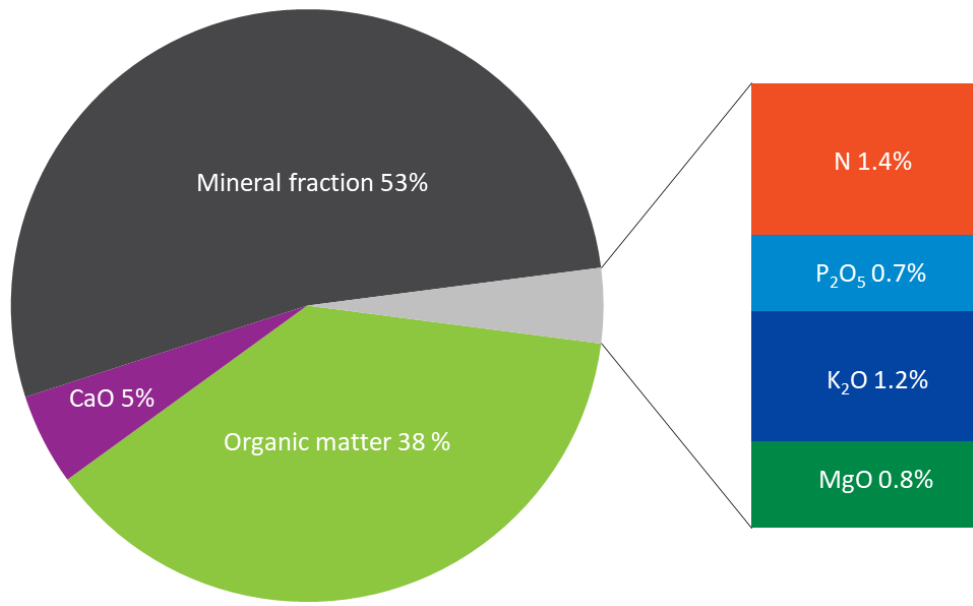
BIO-WASTE COLLECTED PER CAPITA IN SELECTED COUNTRIES  
GROUPED INTO QUARTILES  
(kg/capita/annum)



Sources: ECN & EEA data. Excludes derived estimates

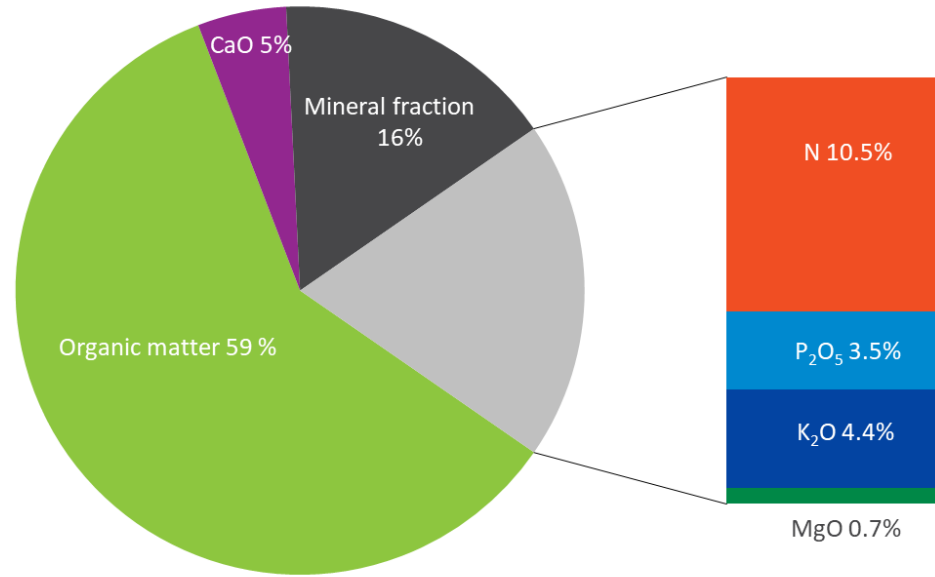
# Compost & Digestate – Nutrients and Organic Matter

**Compost Typical Composition  
(% dry matter)**



**Organic Soil Improver**

**Digestate typical composition  
(% dry matter)**

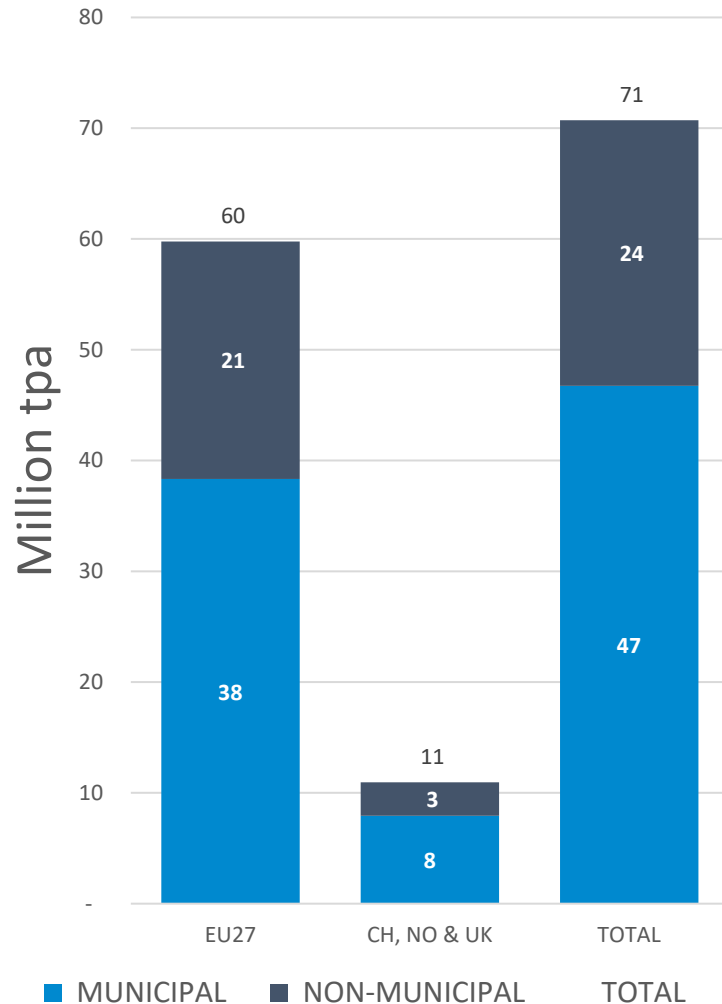


**Organic Fertiliser**

**and /or**

Source: ECN Status Report 2019

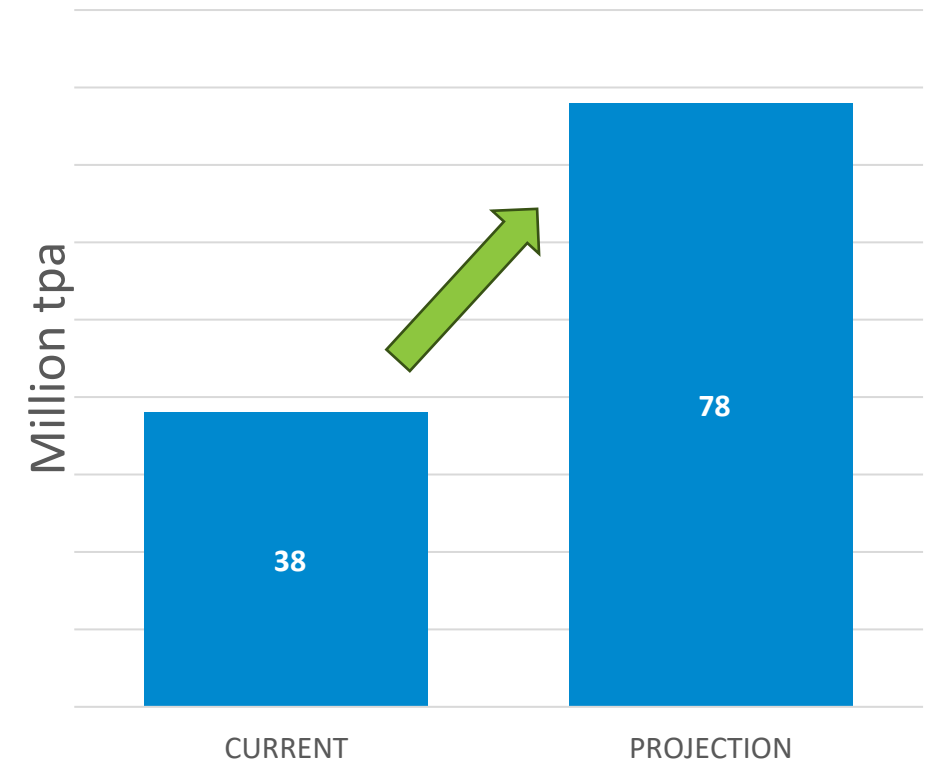
# Municipal Biowaste – RECYCLING POTENTIAL



**EU TARGET TO  
RECYCLE 65% MSW  
BY 2035**

**17% to 35%  
needed through  
bio-waste**

**Extra 40 M tpa  
MUNICIPAL  
BIOWASTE has to  
be separately  
collected!**





# Compost Stores Carbon in the Soil



BIO-WASTE



COMPOST



SOIL

- Soils can be improved through regular applications of quality compost
- A fraction of the organic matter in compost is converted into a stable form called 'humus' - this remains in soil for many years.

**1 tonne of compost (fresh mass)**

**sequesters**

**30 kg soil organic carbon**

**110 kg CO<sub>2</sub> equivalents**

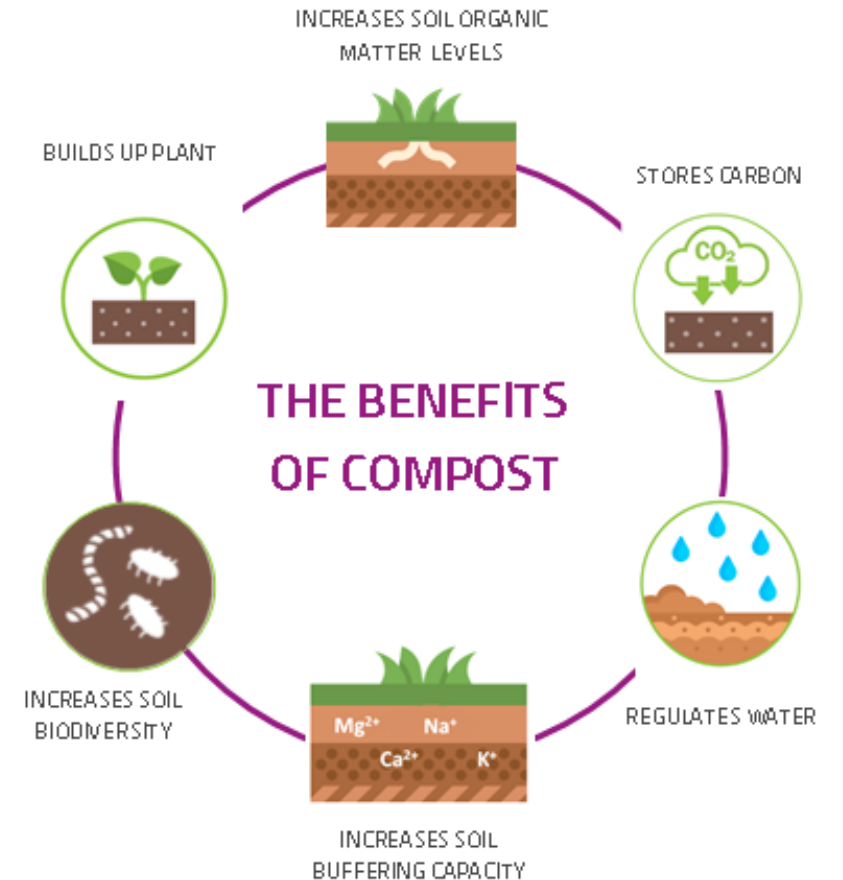
**(equivalent to 11% of its mass)**

Source: ECN Factsheet 1: Soil Structure & Carbon Storage. [www.compostnetwork.info](http://www.compostnetwork.info)

## AGRICULTURAL IMPACT ON SOIL ORGANIC MATTER DECREASES

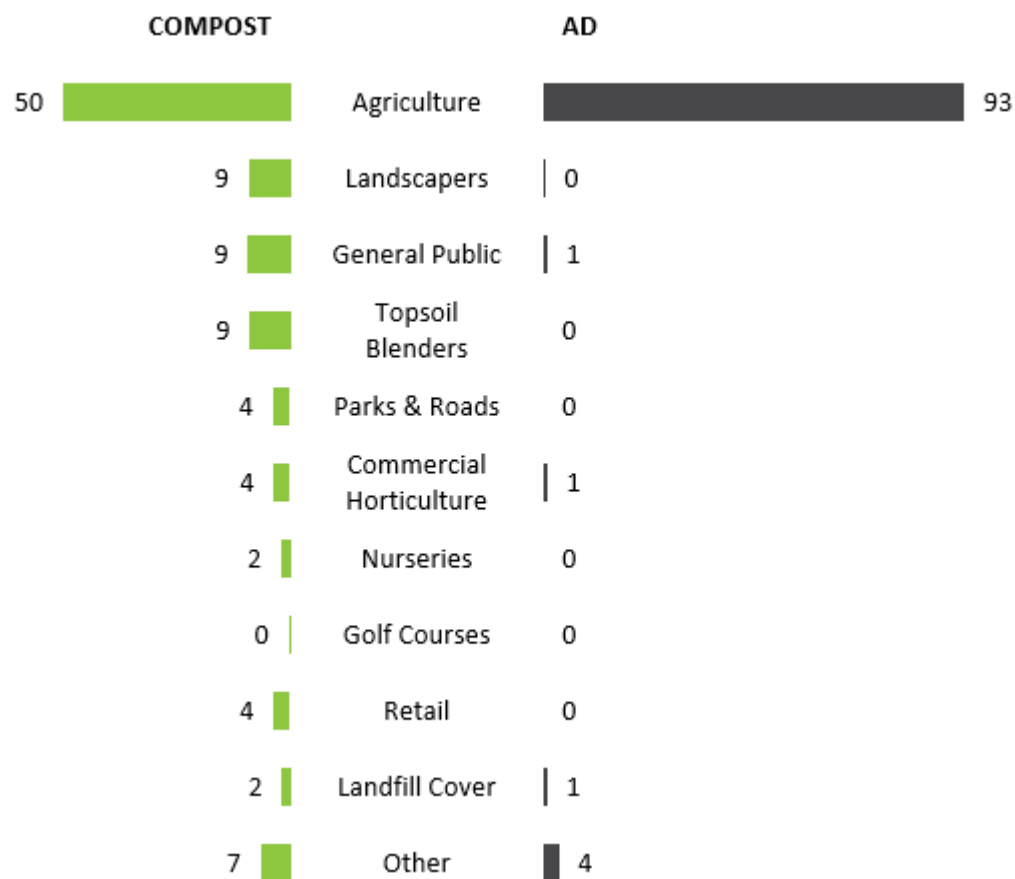
- Soils are less productive;
- Soils hold onto less water;
- Soils store less carbon and nutrients.

➤ Recycling of carbon and nutrients from bio-waste by applying high-quality compost and digestate plays a key role in improving soils keeping soils healthy and productive and to contribute to climate change by saving primary resources and carbon sequestration.

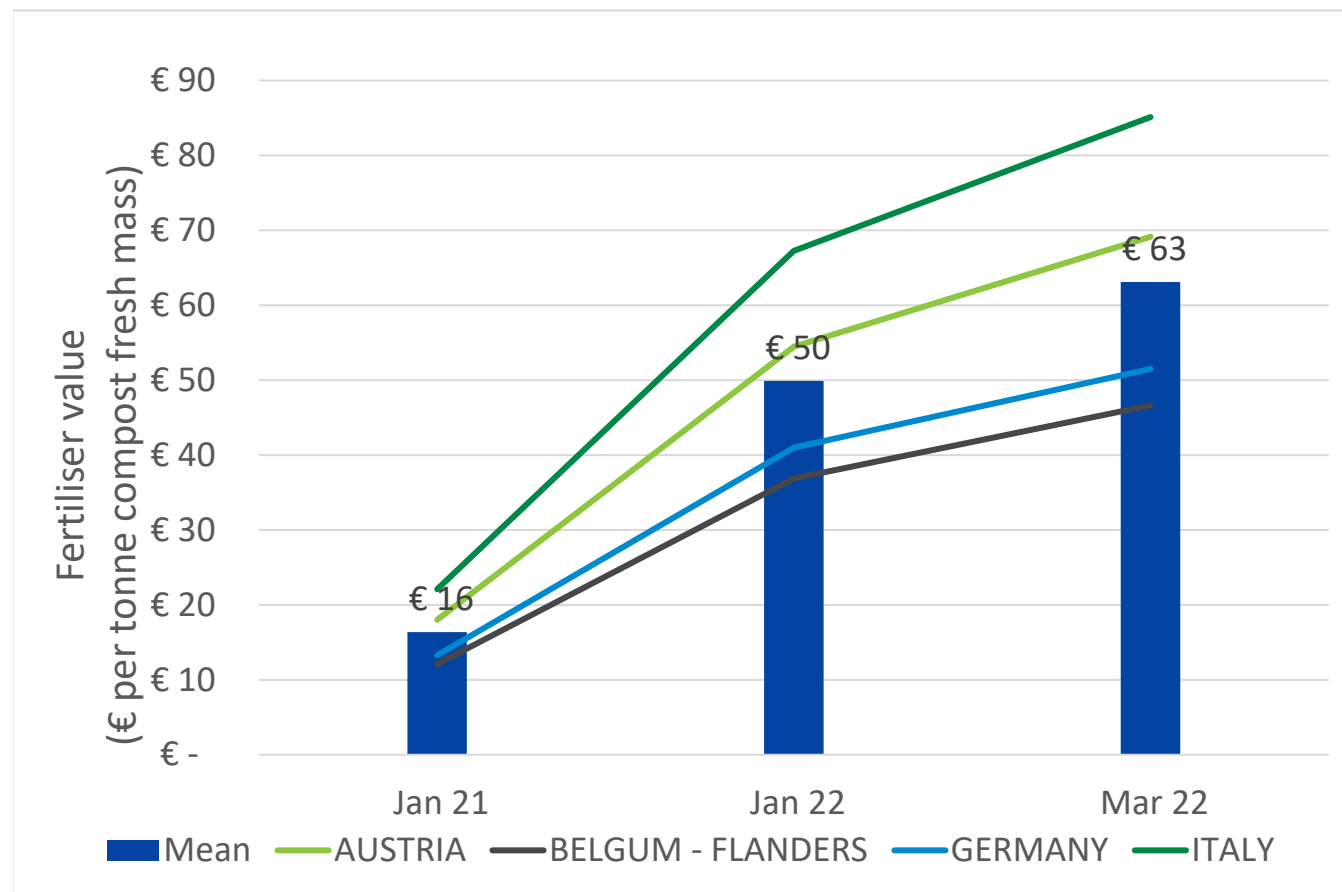


# Compost & Digestate – MARKETS & FERTILISER VALUE

## Markets (%)



## Fertiliser Value



# Compost: not just a single product

- Compost is a source of stable organic matter – beneficial effects
- Compost delivers nutrients to the plant/soil system
- Compost production will increase (EU policy)
- “Tailor-made compost”: compost comes in many forms/composition
- Safe use of compost:
  - Biological safety: pathogens, weed seeds, ...
  - Physical safety: stones, impurities (plastic)
  - Chemical safety: contaminants
- The answer: **Quality Assurance** and Certification of product and process

# Quality assurance and conformity assessment

## FROM WASTE TO PRODUCT



Quality Assurance is a pre-condition for placing compost- or digestate-based fertilising products on the European Market



**KBVÖ Austria**



**BGK Germany**

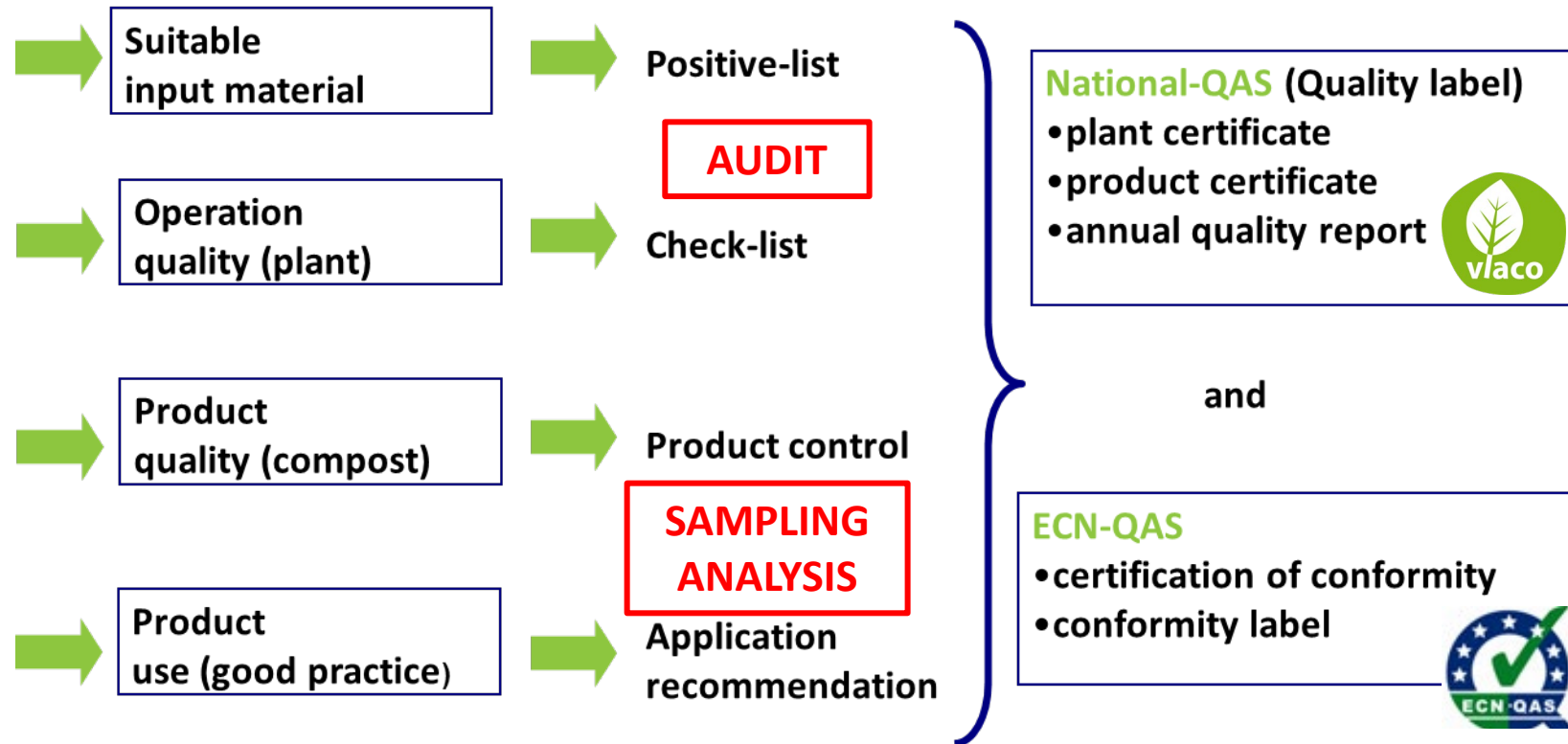


**VLACO Belgium**



**CIC Italy**

# ECN-QAS for Compost and Digestate



# Quality criteria for compost and digestate

	Parameter	Assessment
<b>Soil improvement</b>	Organic matter	≥ 15 %, declaration
	Alcaline effective materials (CaO)	Declaration
<b>Fertilisation</b>	Nutrients (N, P, K) (S, NH <sub>4</sub> -N, NO <sub>3</sub> -N only for digestate)	Declaration
<b>Material properties</b>	Plant compatibility	Benchmark accord. to the test on germinable plants, declaration
	Water content /dry matter content	Declaration
	Bulk density/volume weight	Declaration
	Grain size	Declaration
	pH-value	Declaration
	Electric conductivity	Declaration
<b>Stability (EU Fert. Reg.)</b>	Oxygen uptake rate (OUR)	25 mmol O <sub>2</sub> / organic matter*h
	Rotting degree (only for compost)	≥ III
	Residual Biogas potential (only for digestate)	0,25 Liter biogas / g volatile solids

# Comparison of limit values in Europe (heavy metals)

Limit value [mg /kg DM]	Cd	Cr <sub>total</sub>	Cu	Pb	Hg	Ni	Zn	As
EU Fertiliser Regulation	(2) / 1.5	2 (CrVI)	300	120	1	50	800	40
EoW Criteria	1,2	100	100	120	1	50	400	
ECN-QAS	1,5	60	300	130	0,45	40	600	-
Avg composition [mg /kg DM]								
Compost (green waste)	0,36	18,35	30,70	26,00	0,09	11,55	140	4,9
Compost (bio-waste)	0,38	19,80	42,80	29,00	0,08	12,00	168	6,7



# Limit values for physical impurities in compost

Standard	Parameter	Unit	Limit value
EU level			
ECN-QAS	Impurities > 2mm (sum)	w/w% DM	0,5
ECN-QAS growing media	Impurities > 2mm (sum)	w/w% DM	0,25
EU Fertilising Products Regulation	Impurities > 2mm (sum)	w/w% DM	0,5
EU Fertilising Products Regulation	Plastics, glass, metal >2mm	w/w% DM	0,3
EU Fertilising Products Regulation 16.07.2026	Plastics >2mm	w/w% DM	0,25
EU Countries			
National QAS Schemes	Impurities > 2mm (sum)	w/w% DM	0,2 - 0,5
	Plastics > 2mm	w/w% DM	0,06 - 0,4
	Visual assessment of plastics by determination of the surface area	cm <sup>2</sup> /l	10 - 25

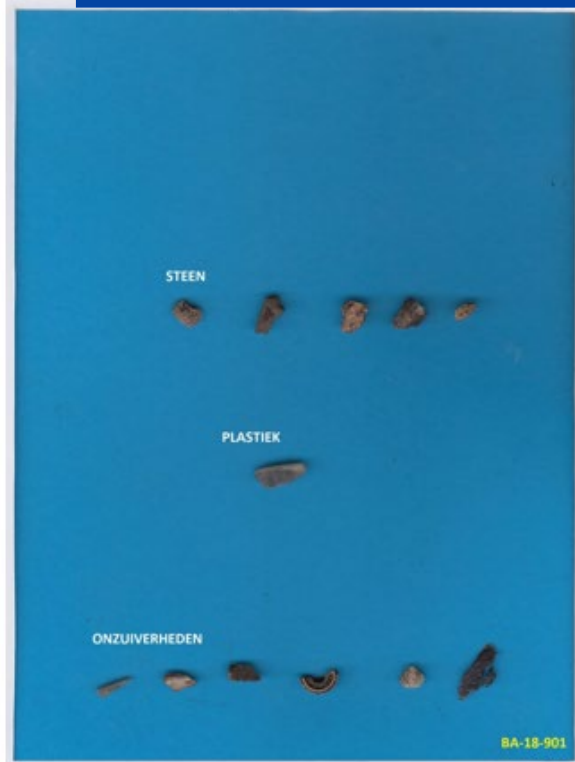
- Limit values become more strict
- Start from clean input materials
- Sieving: organic matter and compost production < > impurities
- Specific attention for plastic / micro-plastics (EEA, 2020)
- Analytical issues: weight fraction versus visual impurities (light fractions)
- SOILCOM: propose visual assessment of plastics quality target of 20 cm<sup>2</sup>/litre

# Surface area of impurities: visual assessment

0,07 gew%	>>>>>>	0,02 gew%
1,9 cm <sup>2</sup> /l	<<<<<<<	16,5 cm <sup>2</sup> /l

As a weight fraction

But visual assessment  
(photo) and calculation of  
the surface area



## Conclusions:

- 2 analytical methods are complementary
- knowledge about the different fractions (glass, metal, plastic, other)

# Biowaste & The Circular Bioeconomy

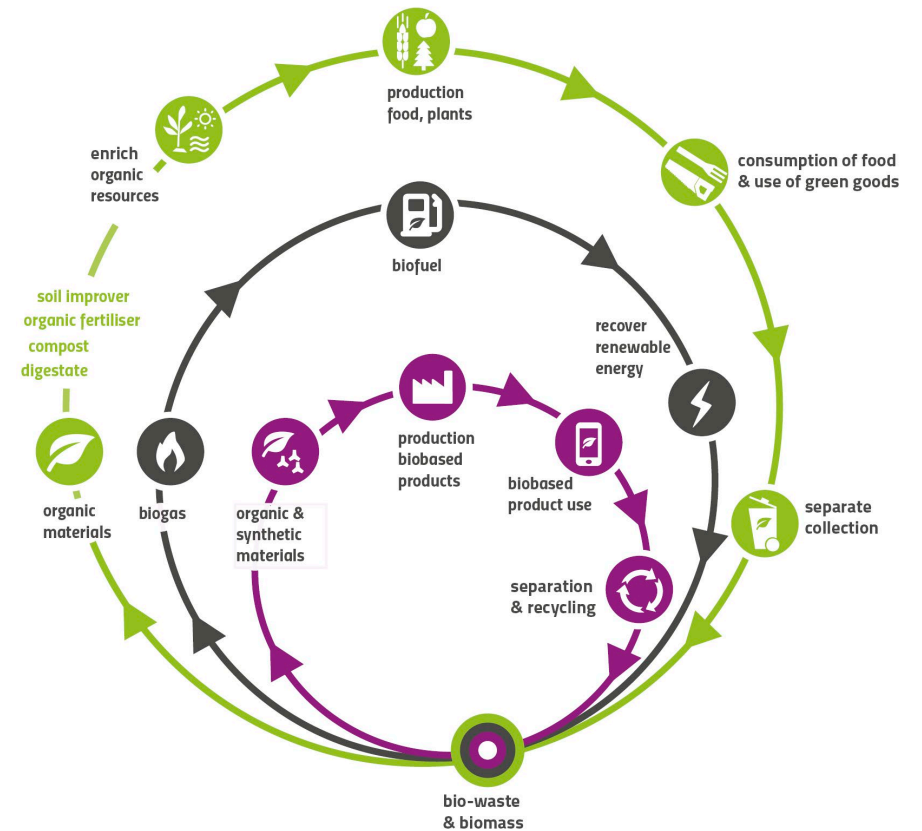
## BIOWASTE



## A Cross-Cutting Resource



## BIOWASTE in the Circular Bioeconomy



# EU Green Deal & CE

- 65 % recycling target for municipal waste by 2035
- Mandatory separate collected or separated at source by 2023
- Ban on Mechanical biological Treatment from Recycling by 2027
- Landfill target Maximum 10 % of municipal solid waste by 2035

## Waste Framework & Landfill Directives

## Fertilising Products & Animal By-Products Regulation

- Boosting organic matter (biowaste) recycling from biowaste
- Integration of organic fertilising products into the scope of the new Regulation
- Introducing harmonised EU rules for products diverting from organic waste materials
- CE marking and free trade for organic fertilising products across EU
- Optional harmonisation
- End point in the manufacturing chain for ABP-derived materials

- Integrated Nutrient Management Action plan (INMAP)
- Reduce nutrient losses by at least 50 % without deterioration in soil fertility
- Reduction of fertiliser use by at least 20 %
- Carbon farming practises & carbon removal schemes

## Farm to Fork & Sustainable Carbon Cycles

## Soil Health Law Biodiversity strategy & CAP

- Soils should be in a healthy condition by 2050
- 60-70 % of soil ecosystems in the EU are unhealthy and suffering from continuing degradation
- 12,7 % of Europe is effected by moderate to high erosion
- EU Soil Health Law by 2023
- Identifying Soil health indicators & Soil Health Certificate
- 30 % restoring land and increasing organic farming (25% organic farmland by 2030)

# EU Fertilising Products Regulation - (EU) 2019/1009

- CE marked fertilising products: free trade on the EU market
- Boost for circular economy in Europe: Waste materials => end-of-waste status included
- Quality Assurance and Certification is the basis (audit, independent sampling+analysis, certificate)
- Limit values for biological, physical and chemical hazards can be met
- Existing quality assurance can do the job
- However: some elements in the current Regulation are not supportive for compost and digestate (alternative hygienisation of ABP, nutrient concentrations, sludge food/feed industry, strict tolerance rules ⇔ organic products, complex conformity assessment procedure, ...)
- Free market ⇔ local use of compost and extra costs => CE label for some markets ?

# To conclude

- Compost is there
- More **recycling** will boost compost production in Europe
- Need for stable **organic matter** and **nutrients** => compost is a solution
- **EU Policy** encourages the use of compost (EU Soil Strategy, CAP subsidies, ...)
- Good quality compost is needed
- **Quality Assurance and Certification** is essential to support the markets for compost (agriculture, landscaping, topsoil blending, growing media)
- Apply compost in a **sustainable** way

# Thank you for your attention !

Sign the manifesto

‘Save Organics in Soil’:

[www.saveorganicsinsoil.org](http://www.saveorganicsinsoil.org)



Vlaco Homepage:

[www.vlaco.be](http://www.vlaco.be)



Visit ECN Homepage:

[www.compost-digestate.eu](http://www.compost-digestate.eu)



Further questions ?

[wim.vanden.auweele@vlaco.be](mailto:wim.vanden.auweele@vlaco.be)