

Compost from bio-waste

> reterra.de



Agenda

RETERRA Introduction / Facts and figures

Description of Business / products

Market

Drivers / Technical – economic – social – environmental – legal / regulatory

Barriers / Technical – economic – social – environmental – legal /regulatory

Way forward / Recommendations

Swot Analytic

Q /A

RETERRA – Offering expertise, specialized services and products from recycling of organic materials within REMONDIS Group

> 500

Employees



Fields of business



Bio-waste flow management



Operation of Composting, Anaerobic digestion plants



Product finishing and marketing

>70

Plants, facilities



- Composting (46),
- Digestion-/co-digestion (21)
- Production of soils / growing media (3)

> 2,5 Mio. t

Organic raw materials per year



> 2,0 Mio. m³

Compost Products and substrates / year



RAL-Quality Certificate

Compost products



RAL-Quality assurance system and product control by BGK e.V.

> 35

years of experience



- Recycling operations
- Process developing
- Product trade & services

Treatment of organic waste – A state-of-the-art organic material treatment facility – production of biogas, compost and soil/growing media – Lippe Plant Lünen, Germany



Treatment of organic waste – Co-digestion and composting of bio-waste, Lippe Plant

How the anaerobic treatment works in the digester



01 Once the organic material has been shredded, screened and freed of contaminants, it is placed in the digester. This is the name given to the bioreactor, in which the fermentation process takes place.



02 The material remains in the hermetically sealed digester for 14-21 days. During this time, microorganisms transform the organic material into methane.



03 Once this stage has been completed, the methane – also known as biogas – is piped to the combined heat and power plant (also at the Lippe Plant) where it is converted into electricity.



04 The amount of electricity produced can be increased and decreased as required.

How the aerobic treatment works in the composting tunnels



01 Low-energy digestate from the digester and organic material are placed in the composting tunnel. This is a dark, tubular space in which the old air is continuously being removed and fresh air added.



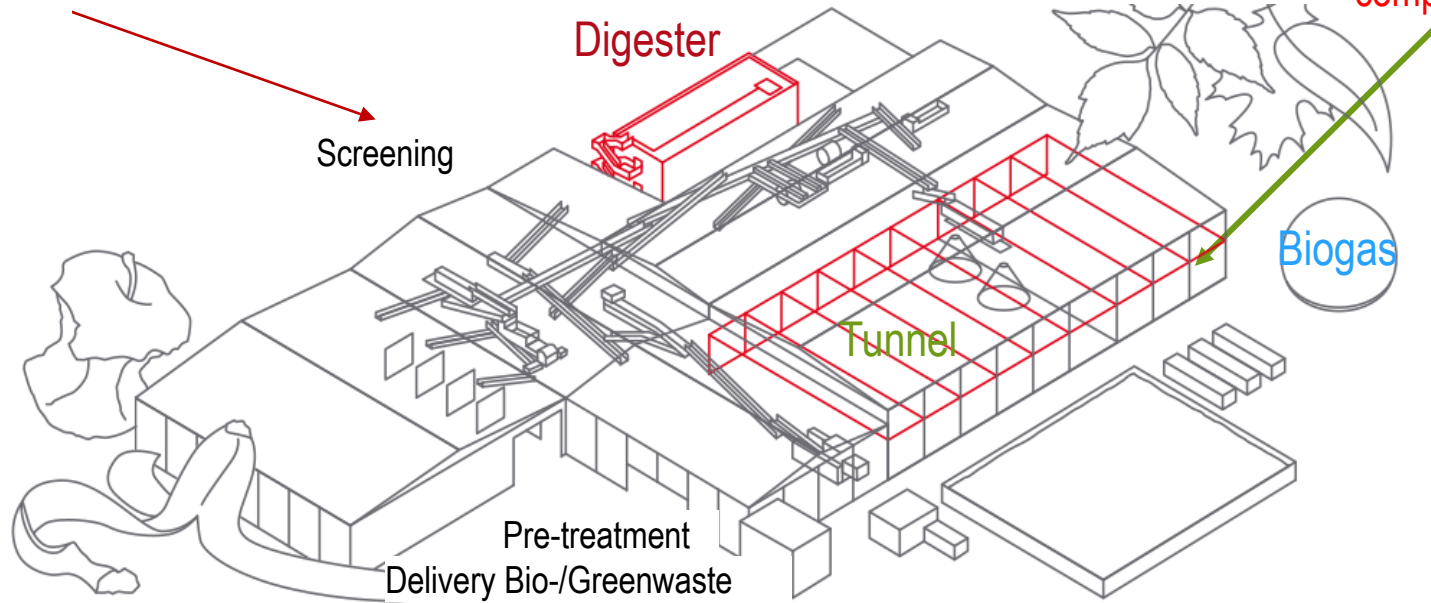
02 The biological reaction between the different materials creates heat which facilitates the drying process.



03 The composting process in the tunnel takes approximately three weeks. During this time, both microorganisms and the constant supply of oxygen transform the material into compost.



04 Once completed, the material is freed of contaminants such as metals, stones, glass and plastics before being stored for collection. This material is now premium, quality-assured compost.



Input material –
Pretreated greenwaste,
fermented bio-waste

Composting

Screening

Compost – fresh – matured,
RAL quality assured



Bio-waste: Material flow - treatment – products / RETERRA Group 2023



Input

- **1.400.000 t/a bio-waste**
separate collection private households
- Delivery of bio-waste from commercial, industry and trade

Treatment

- Composting
 - 19 plants with closed systems
- Digestion / Co-digestion
 - 21 plants

Bio-waste



Products

- Compost (fresh /matured)
- Liquid digestate
- Biogas / Bio-methane

Application areas

- Agriculture
- Recultivation
- Landscaping
- Soil and growing media



RETERRA Compost products for agricultural use

Organic NPK fertilizer

RETERRA Activ compost (Conventional farming)



RETERRA compost (Organic farming)



RETERRA Liquid

RETERRA Group – Production and marketing of compost for agricultural use in 2023:

- about 517.000 t compost for agriculture use; about 66% of the total quantity produced
- about 5% share of compost marketing in organic farming

Greenwaste: Material flow – treatment – products / RETERRA Group 2023



Input

- **595.000 t/a** greenwaste from public and commercial separate collection (recycling center)
- Commercial and private delivery (landscaping)

Treatment

- Closed / open Windrow-Composting
 - about 46 Composting locations
- Growing media / substrates production plants: 3

Greenwaste



Products

- Fresh and matured compost
- Substrat-compost
- Bio-fuels

Application areas

- Growing media / Soil manufactures
- Landscapers
- Hobby gardeners



RETERRA Compost products for landscaping and home-/professional gardening

Composts soils and growing media



RETERRA Garden Compost - classic / fine

RETERRA Humus soil; Raised Vegetable Bed Substrate, Universal Soil Substrate, Garden Soil etc.

RETERRA Special Products; Turf soil, Roof Garden Substrate, Protection for children

RETERRA Bagged Goods; Bio-Potting soil for flowers, Bio-potting soil, etc. (40, 60 liter bags)

RETERRA Group – Production and marketing of compost for use in landscaping, horticulture etc. in 2023:

- about **265.000 t compost** produced for use in landscaping, gardening, special sectors etc.
 - as corresponds to approx. **34% of the total quantity produced**

RETERRA Compost products for landscaping and home-/professional gardening

BIO Compost soils and BIO growing media

RETERRA Bagged Goods; Bio-Potting soil for flowers, Bio-potting soil, etc. (40, 60 liter bags)

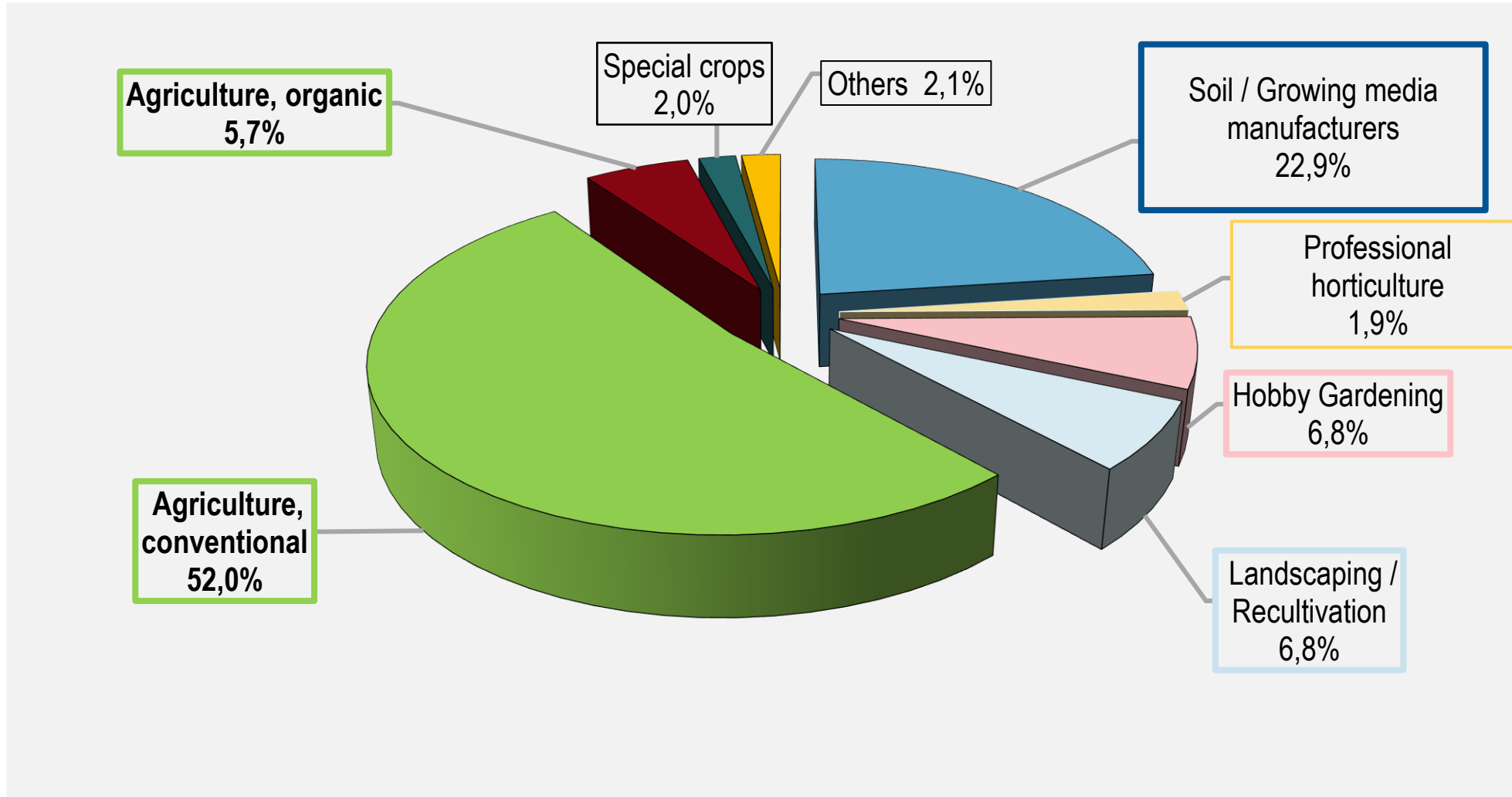


RETERRA Group – Production and marketing of compost in 2023:

- Trend: Increasing demand for compost especially as component for peat replacement in substrates and growing media
- Trend: Increasing demand for compost –certified as `Bioland/Naturland` quality-suitable in organic cultivation systems

Marketing of RAL-quality compost in 2022 in GERMANY

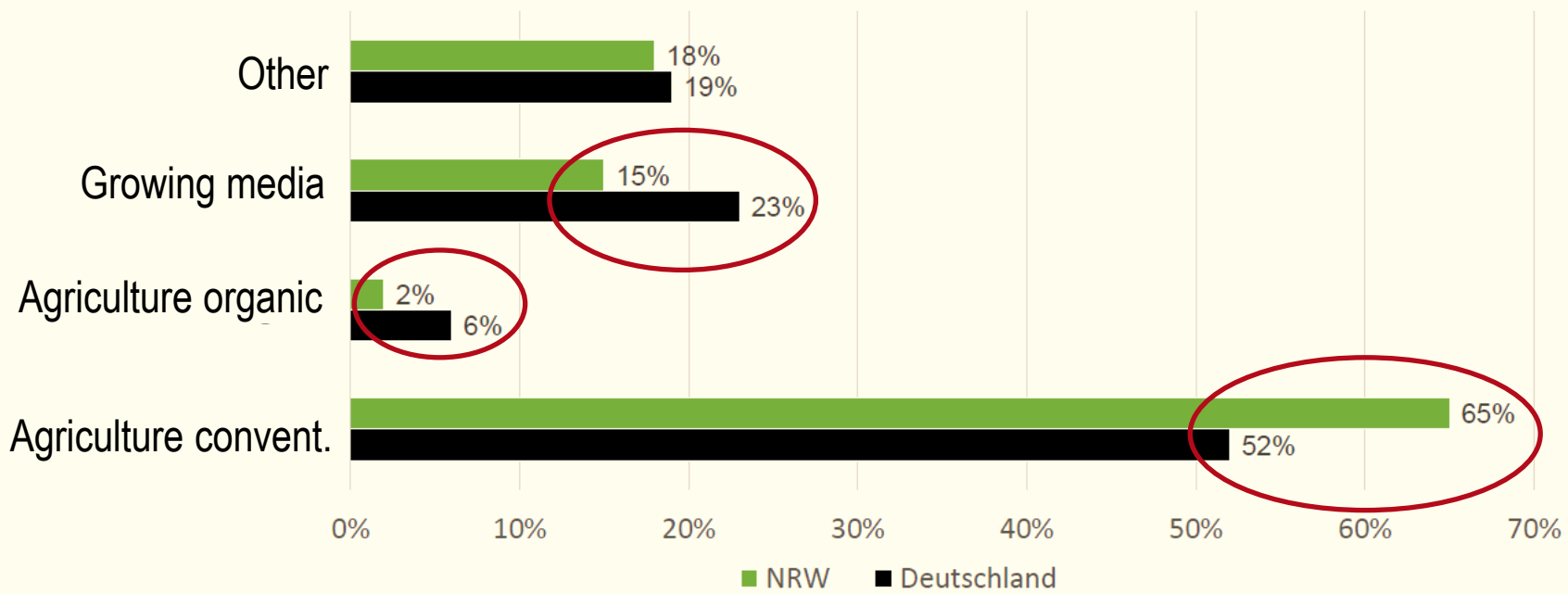
– differentiated according to application areas by BGK e.V



BGK e.V.- Quality Assurance Organization Compost

- 607 composting plants, 146 fermentation plants for biowaste, 42 renewable raw material digestion plants
- 14,3 million tons of processed input material

Comparison: Marketing of RAL-quality signed compost in 2022 Germany and Federal State of North-Rhine Westphalia (based on BGK – data, 2022)



Differences in compost marketing occurring to regional specifications in:

- land use,
- farming systems,
- horticultural industry,
- consumer behavior etc.

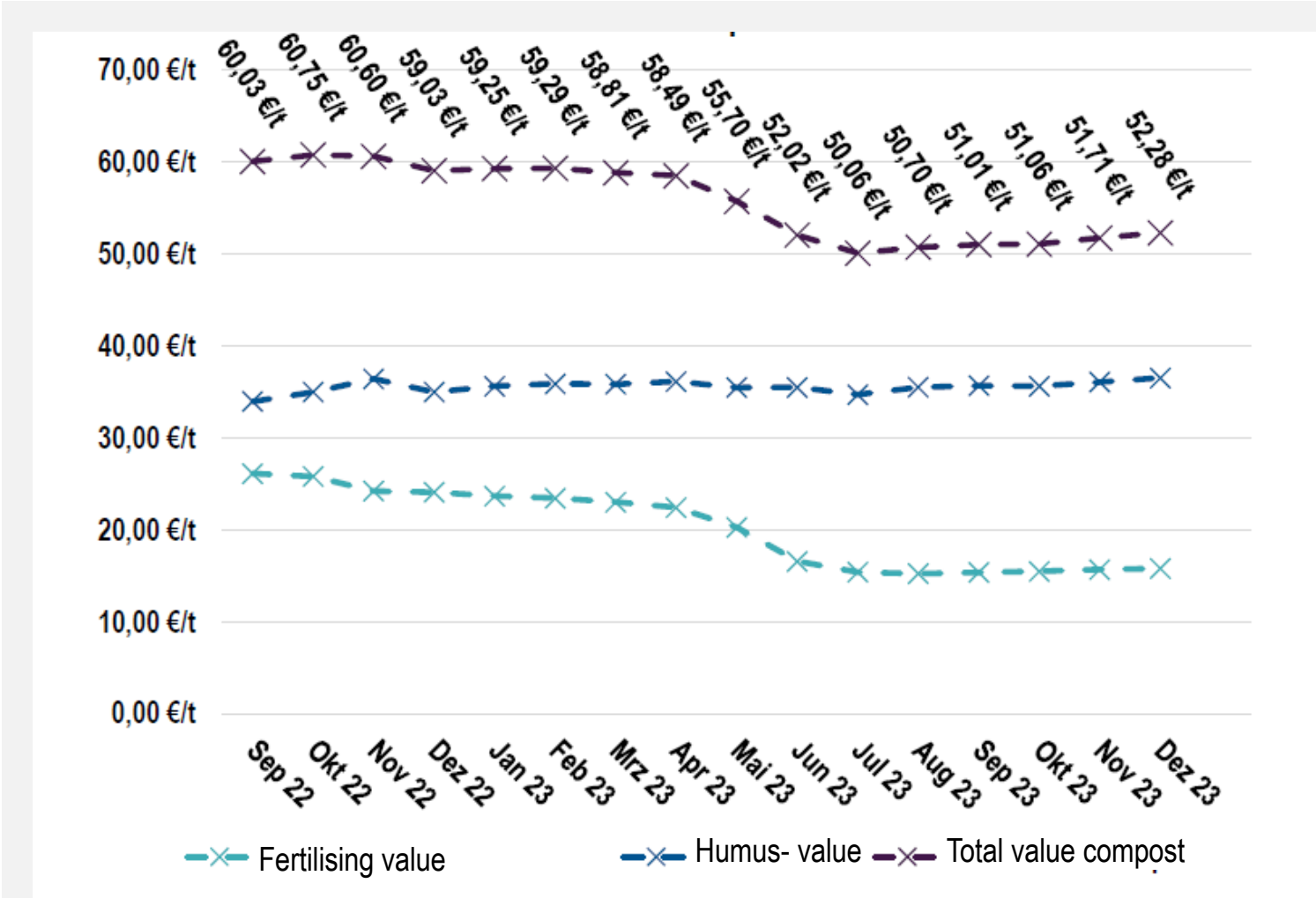
➤ **RETERRA marketing and sales areas with comparable allocation**

[Datengrundlage: RAL-gütesicherte Komposte, 2022]

M. Schneider u. A. Schumacher • MUNV • Bio- u. Grüngut • Iserlohn 23.05.2023



RETERRA Activ Compost; Calculation of fertilizer- and humus-reproduction value in 2023



RETERRA Activ Compost

0,89 % N_{total} (fresh mass)
 0,49 % P₂O₅
 0,84 % K₂O
 Humus-C: 74,5 kg/t



Marketing revenues:

RETERRA Activ Compost for agricultural use

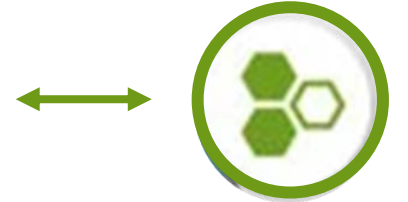
- bulk material
- free delivery from composting plant
- depending on quantity and time of delivery
- individual specification

Price range is approximately half of the fertiliser value.

Source: Bröker, Mathias, REMONDIS SmartRec GmbH, 2024

Drivers for / in the compost products market

- **Technical:** Availability of various technologies and processes for composting /digestion of bio-waste; established and well-running
- **Economic:** Adaptation of the processing capacities to the available amounts of pure bio-waste for increasing biogas/biomethane production in combination with high-quality compost production / Additional income due to biogas marketing / Price-development of compost/digestion products due to an increased demand market / More Public procurement
- **Environmental:** Lower consumption of mineral, fossil resources through more sustainable, local recycling, regional offering of products (additional price-effects)
- **Social:** Increasing awareness of the population, municipalities, administrators etc. in recycling, resource conservation, climate issues, environmental foot-prints from products in general
- **Legal / Regulatory:** Existing Waste-, Fertilising Products, Soil- and Emission -/ Immission regulations
 - Climate protection plan 2030 of the German Federal Government; abandonment of peat in hobby gardening sector by 2026// extensive substitution in commercial horticulture by 2030
 - Future GAP requirements; determination of Eco-schemes, agri-environmental measurements (Carbon farming)
 - HORTICERT - Certification: THG – emission calculation, social economic factors for alternative growing media



Barriers for / in the compost products market

- **Technical:** Requirement of sufficient size of fermentation /composting plants for economic operation / more demanding operational management and business of biogas marketing
- **Economic:** Uncertainty in the calculation of the amount of available pure bio-waste input due to competition for use as bio-fuels, reduction targets for food wastage avoidance and option to generate suitable bio-waste remaining in residual, municipal waste in future
- **Environmental:** Stricter regulation for compost use in vulnerable zones in agriculture according to nitrate leaching issues / discussion about potential risks of CH₄, N₂O emissions by compost/ digestion production and application / microplastic issue occurring from unclean bio-waste
- **Social:** Expectation that recycled products must be cheaper than primary products / lack of knowledge, willingness to adapt crop cultivation management in a proper way – especially in hobby gardening
- **Legal / Regulatory:** Counteracting regulations of promoting bio-waste recycling on one hand and increasing restrictions on the other hand for plant operation (emission protection) and material use (Fertilising Regulations) / lack of implementation of existing legal requirements by local authorities / no sanctions for municipalities for failure to take actions for a mandatory, fully implemented separate collection of bio-waste from households

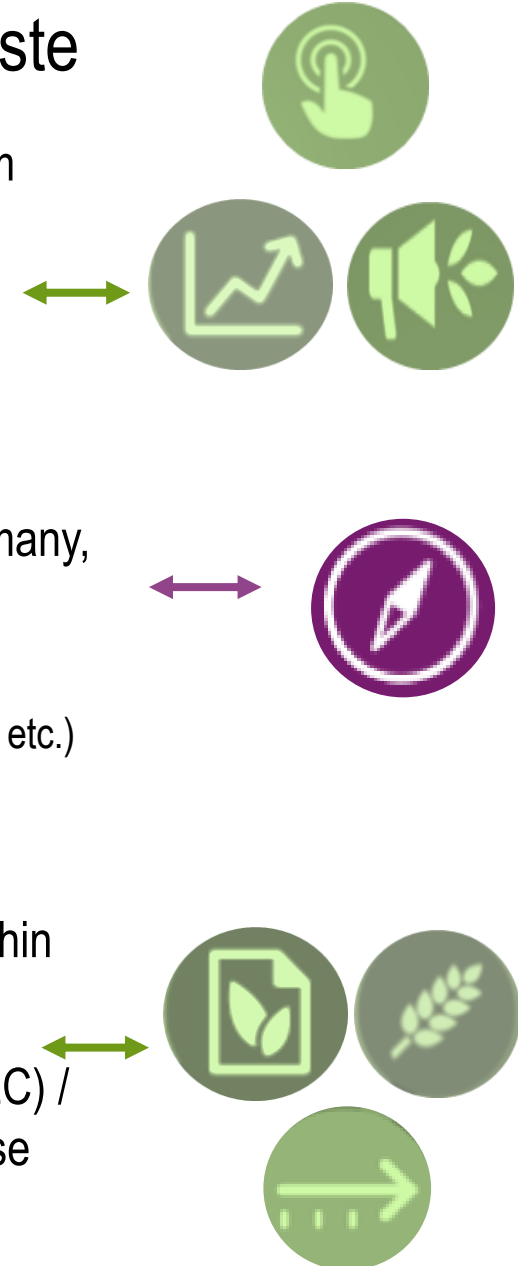


Way – forward recommendations in the market for compost from bio-waste

- Input material: Capture and collection of more clean bio-waste input from households, greenwaste from garden and parks, catering/restaurants, retailers and food production industry for the composting and fermentation to produce more high – quality compost
 - Educate the public more about clean bio-waste, the need for cascade use for biogas/compost production, the properties of compost products and the correct use for soil and plant demand

- Product status: Necessity of product status for compost; no national regulation has been made in Germany, CE Certification according to EU FPR (EU)2019/1009 with end-of-waste status currently not feasible
 - (EU) 2019/1009: Urgent need for adjustment due to existing inherent uncertainties, outstanding clarifications and evaluations (Hygienic requirements for ABP, permissible input material, conformity assessment procedure Modul D1 etc.)

- Application rules:
 - Promoting the compost use in agriculture through determination as “sustainable measurement” within Carbon farming (GAP strategic plans) and support Certification of Carbon Removal
 - Re-evaluation of compost use in vulnerable zones according to EU – Nitrates Directive (91/676/EEC) / Correct assessment of the N-mineralization potential of different types of compost in agricultural use
 - Stringent implementation of peat reduction targets in the growing media sector







SWOT – Analytic; Marketing of compost from bio-waste

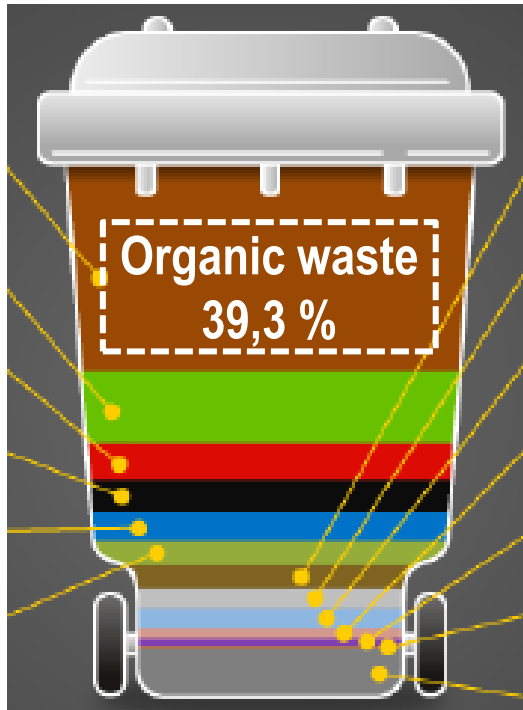
	Strengths	Weakness
Internal factors	<ul style="list-style-type: none"> ▪ Experiences of manufacturers in the production of quality compost /digestates ▪ Long-standing RAL-Quality Assurance systems for compost products by BGK e.V. (third party system) ▪ Existing internal quality management system for input control, production and final products ▪ Development of production lines for compost products according to Organic farming standards (Bioland/Naturland) –approved by BGK e.V. ▪ Increase production of compost suitable for growing media sector ▪ New markets development and access to new group of customers 	<ul style="list-style-type: none"> ▪ No legal end-of-waste-status for compost in Germany (restrictions, documentations, etc.) ▪ Existing uncertainties and non-fulfillment of requirements of (EU) 2019-1009 for bio-waste with ABP ▪ Estimation of medium to long-term market demand for CE products from customers ▪ Costs: unknown price structure for CE-certification; additional payments of national RAL- Certification ▪ Development of production costs; energy, transport, storage, additional CO₂-taxes for screen-overflows due to content of fossil plastics, etc. ▪ Availability of personnel

SWOT – Analytic; Marketing of compost from bio-waste

	Opportunities	Threats
External factors	<ul style="list-style-type: none"> ▪ Political willingness within EU Green Deal boosting recycling for increased substitution of mineral, fossil fertilizer and substrates /growing media based on peat <ul style="list-style-type: none"> – Need to become more independent from external mineral resources and fossil energy ▪ Re-evaluation of EU GAP measures (Eco-Schemes, Carbon Farming, Organic farming) ▪ Opening new sales markets (growing media, bio economy, organic farming), ▪ Generating additional market revenue (CO₂-taxes for fossil based fertilizer versus CO₂-credits for native carbon products) 	<ul style="list-style-type: none"> ▪ Counteracted legislation ▪ Long lasting procedure for implementing necessary legal amendments /clarifications / revisions in EU-Regulations / Directives - inclusive harmonized methods for analytical testing) ▪ Uncertainties according to increased environmental, operating, and application requirements in national and EU legislation ▪ Insufficient national administration procedure and implementation measures to booster bio-waste collection from households ▪ Competition for priority use of biowaste –fractions- for the production of bio-flues

Opportunities and challenges placing compost / digestate on the German market

	Opportunities	Challenges
Compost from garden-/parkwaste		
Compost from bio-waste as Animal-by-product material		



Composition of household waste in Germany,
Study UBA 2020, -modified graphic

President Dirk Messner of the German Environment Agency (UBA):

“...Organic waste has a lot of potential – for example as compost or for energy production.

*However, this potential can only be used if the waste is collected separately before recycling.
Too much organic waste still ends up in the wrong bin.*

We have to do better in this area so that, in future, we can also recycle the large amount of biowaste that now ends up in the residual waste bin and being incinerated.

That is what active climate and resource protection is all about. ...“

*...
Around 39 per cent of the content of the residual waste bin contains improperly discarded biowaste – where it is irreversibly lost as a recyclable material.*

<https://www.umweltbundesamt.de/en/press/pressinformation/municipalities-say-thanks-for-separate-collection>



Take home message

Call to utilize the unused potential of suitable, recyclable organic material in residual waste through the mandatory and nationwide, comprehensive separate collection of clean bio-waste for high-quality compost production and where possible in combination with biogas/bio-methane generation.

THANK YOU.

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