

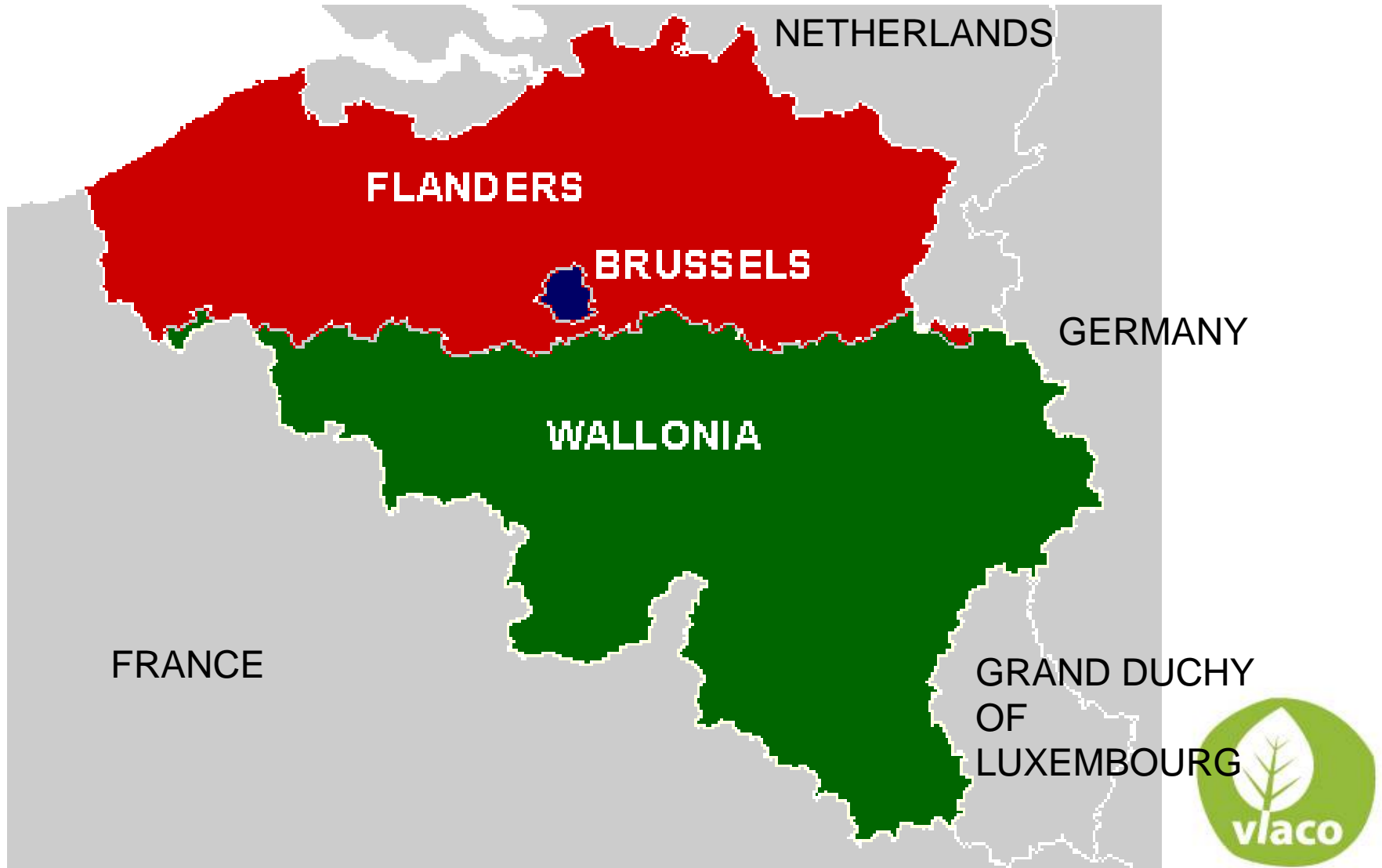


**Compost and digestate in organic farming in
Flanders: quality control and research to
create opportunities**

Kristel Vandenbroek – Elke Vandaele

Composting and Compost use in Organic Farming - Estonia

Flanders - Belgium



1970-1980

How can we get rid of our waste in an environmentally sound way?



Landfill



Separate collection



1990

- Start separate collection and treatment of greenwaste and vfg-waste

1992

- Establishment of Vlaco npo: organisation to promote the production and use of quality compost in Flanders

1998

- Promotion home composting
- Start education of compost masters



Vlaco npo

- ✓ Flemish Compost and Digestate Quality Organisation
- ✓ Established in 1992, non-profit, independent organisation
- ✓ Members
 - More than 90 members, with activities related to organic waste management
 - Prevention
 - Collection
 - Waste treatment
 - Representatives of the Flemish Government, together with public and private stakeholders:
 - OVAM (Public Waste Agency of Flanders)
 - Treatment plants (composting, anaerobic digestion)
 - Intercommunalities, some municipalities



Mission of Vlaco



Recycling biowaste – circular economy

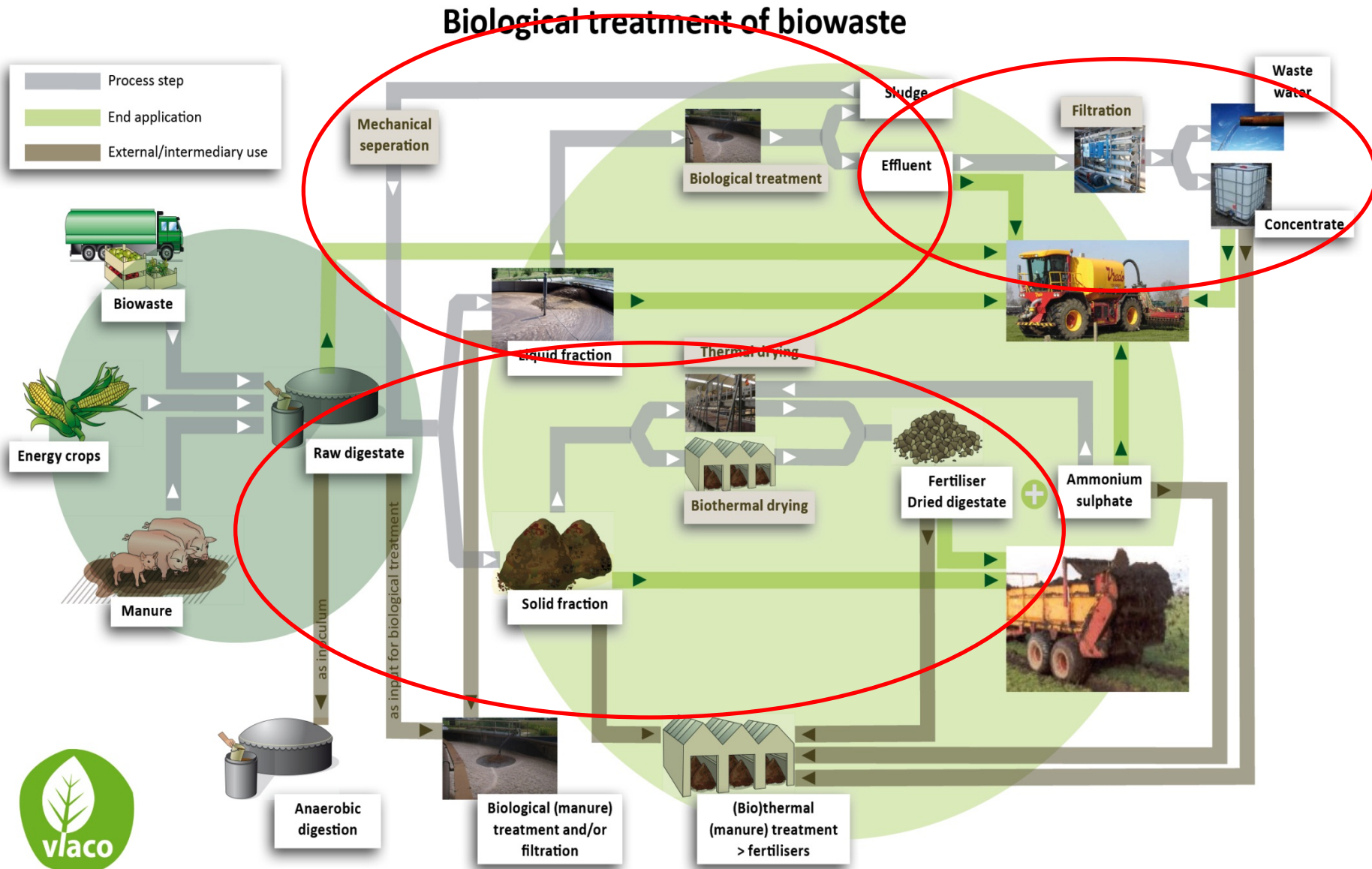


Post-treatment digestate ← legislation

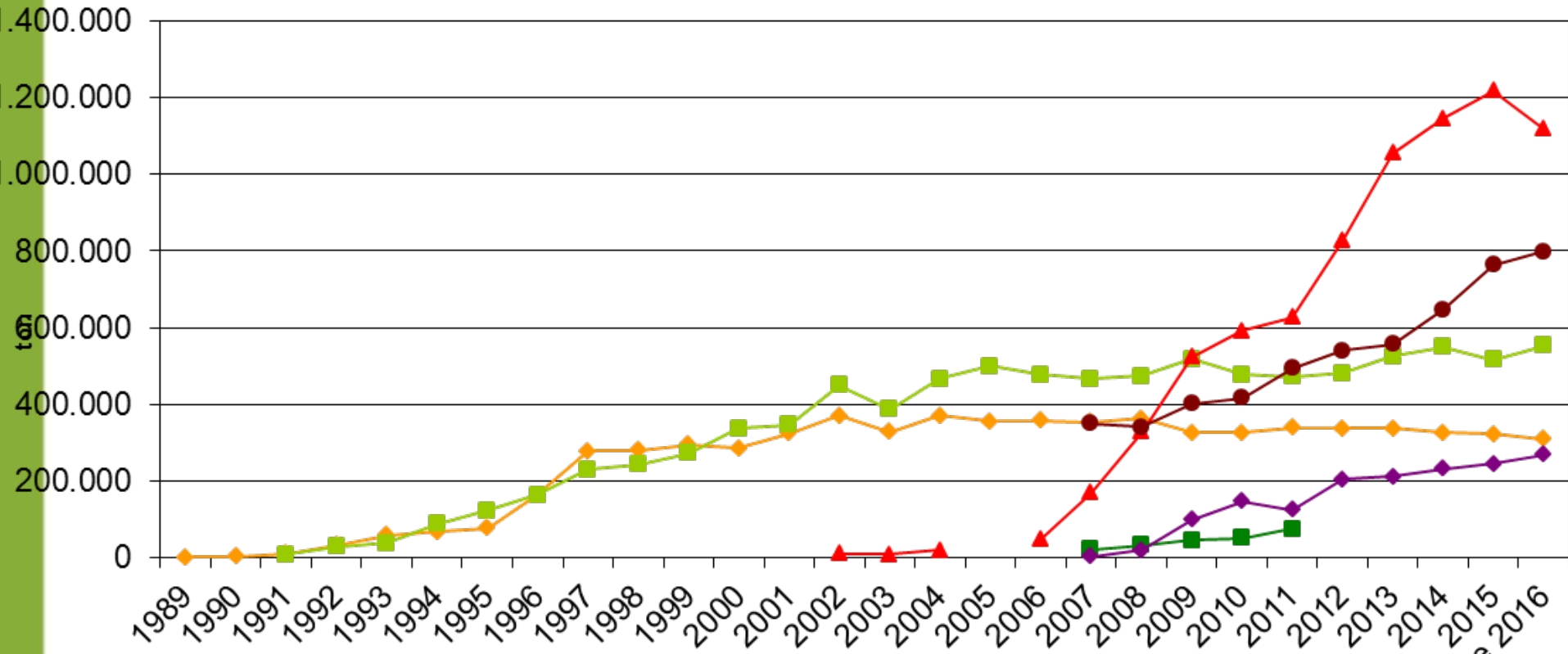
- Raw **digestate**: a high ratio of **nutrients**
 - Flanders is relatively small, densely built & populated + a lot of cattle → animal manure (**nutrient surplus**)
 - Decree on soil remediation & soil protection + European Nitrate directive: use ALL of the manure and digestate as fertiliser ↔ too much **nitrates** and **phosphates** in the soil and ground water
 - European Nitrate directive has been implemented in Flanders into a 'Manure-decree': **limited application** of nitrogen and phosphorus.
- fierce **competition**
- manure ↔ raw digestate (and compost)
- obligation for the **post-treatment** of manure and digestate
=> appearance of **new digestate products**



Products of (wet) anaerobic digestion



Separate collection and treatment 2016



prognose 2016



Composting



Green composting





Biowaste composting

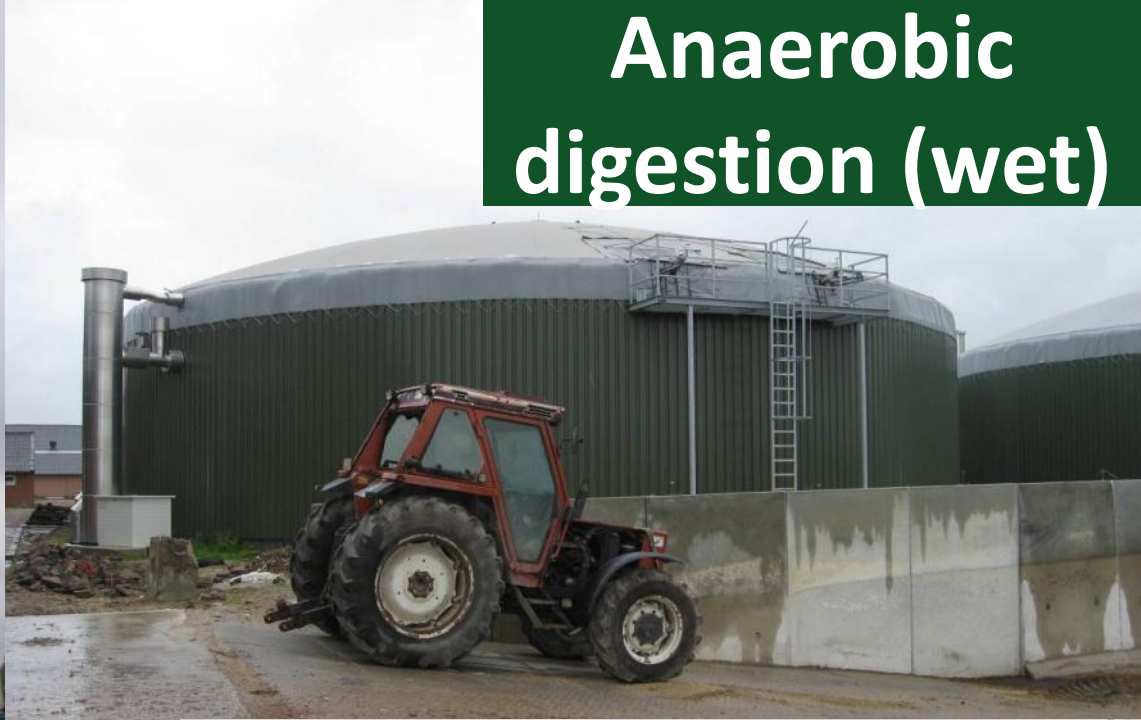




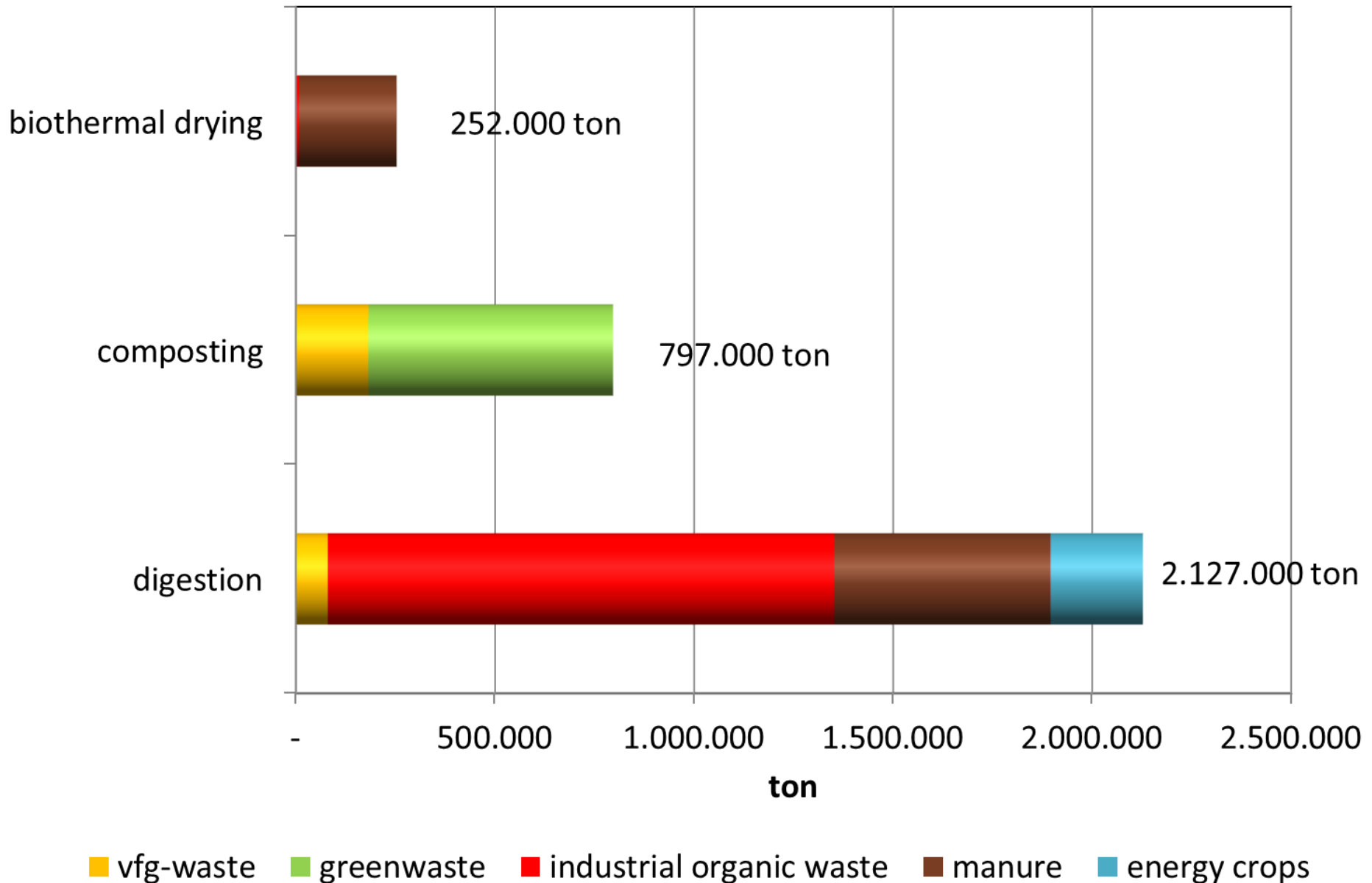




Anaerobic digestion (wet)



Inputs for biological treatment 2016



Quality Assurance: the Vlaco QAS

- Legal obligation
- Compost and digestate products
- Clear end-of-waste criteria included
- Input / process / output / reasoned use
- Sampling and analysis under recognition
- Benchmarked with ECN-QAS
- Extra quality: label



Certification in 2016

| | # plants | # audits | # samplings | # certificates |
|-----------------------------|----------|----------|-------------|----------------|
| Composting green waste | 37 | 35 | 106 | 45 |
| Composting vfg-waste | 8 | 8 | 42 | 9 |
| Anaerobic digestion | 39 | 36 | 295 | 140 |
| Other treatment of biowaste | 5 | 5 | 10 | 5 |
| Others | 21 | 20 | 53 | 32 |



Professional treatment: Quality Assurance

✓ 'Good practice'

✓ Based on self control

by treatment plant

- Internal quality system
- Protocol of acceptance for input
- Process control
- Quality control of the end-products
- Reasoned use of the end-products

- Agricultural value
- Input requirements (standard)
- No dilution
- Registration and traceability
- Risk Assessment through sampling + analysis protocol (recognised labs)
- Screening of suppliers of biowaste

- Optimising of the process
- Minimal process time, tracing
- Critical process factors
- Monitoring and steering

- Recognised labs (external control)

✓ Independant control

by VLACO npo on the self control of the company

- Sample taking
- Analysis
- Audits + admin. controls

- Product information document
- Composition + application

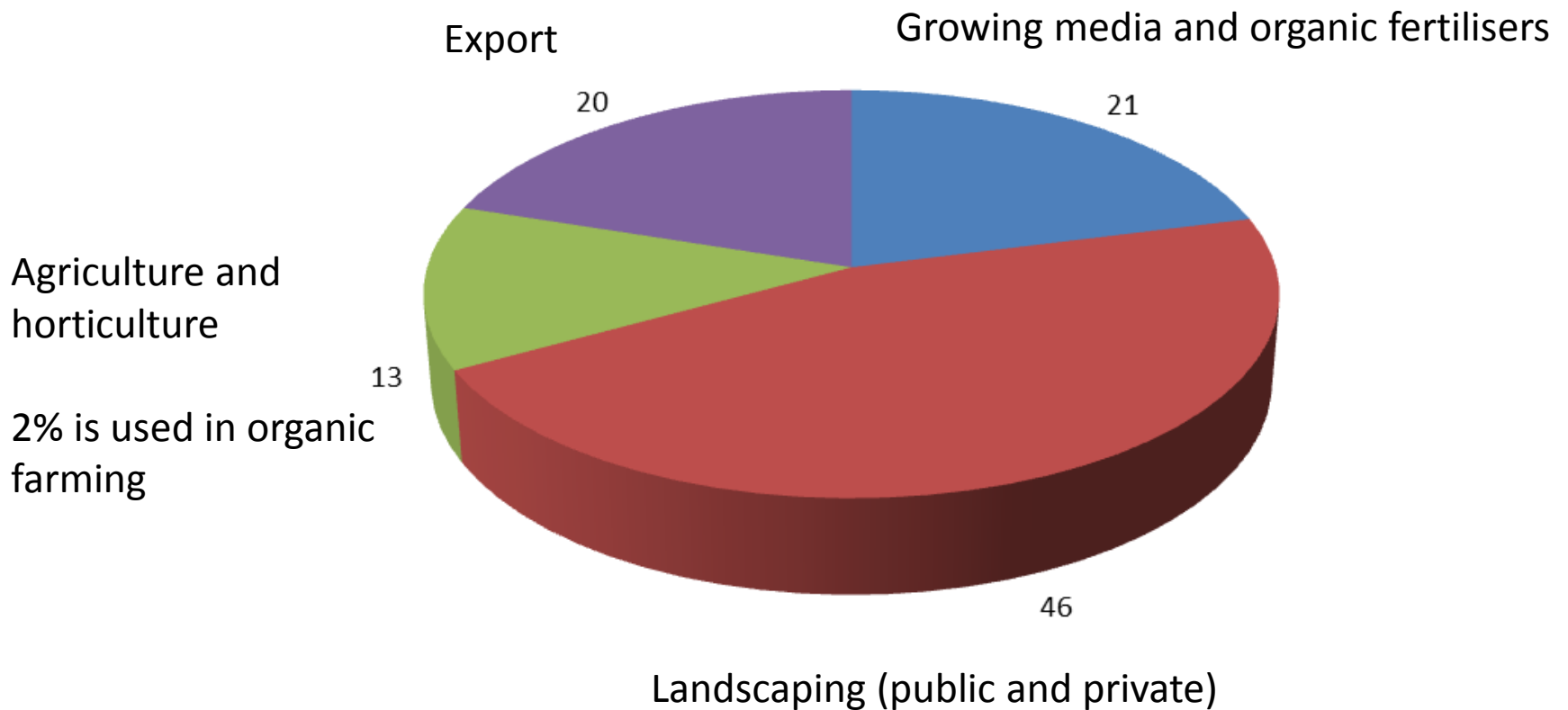


VLACO-certificate

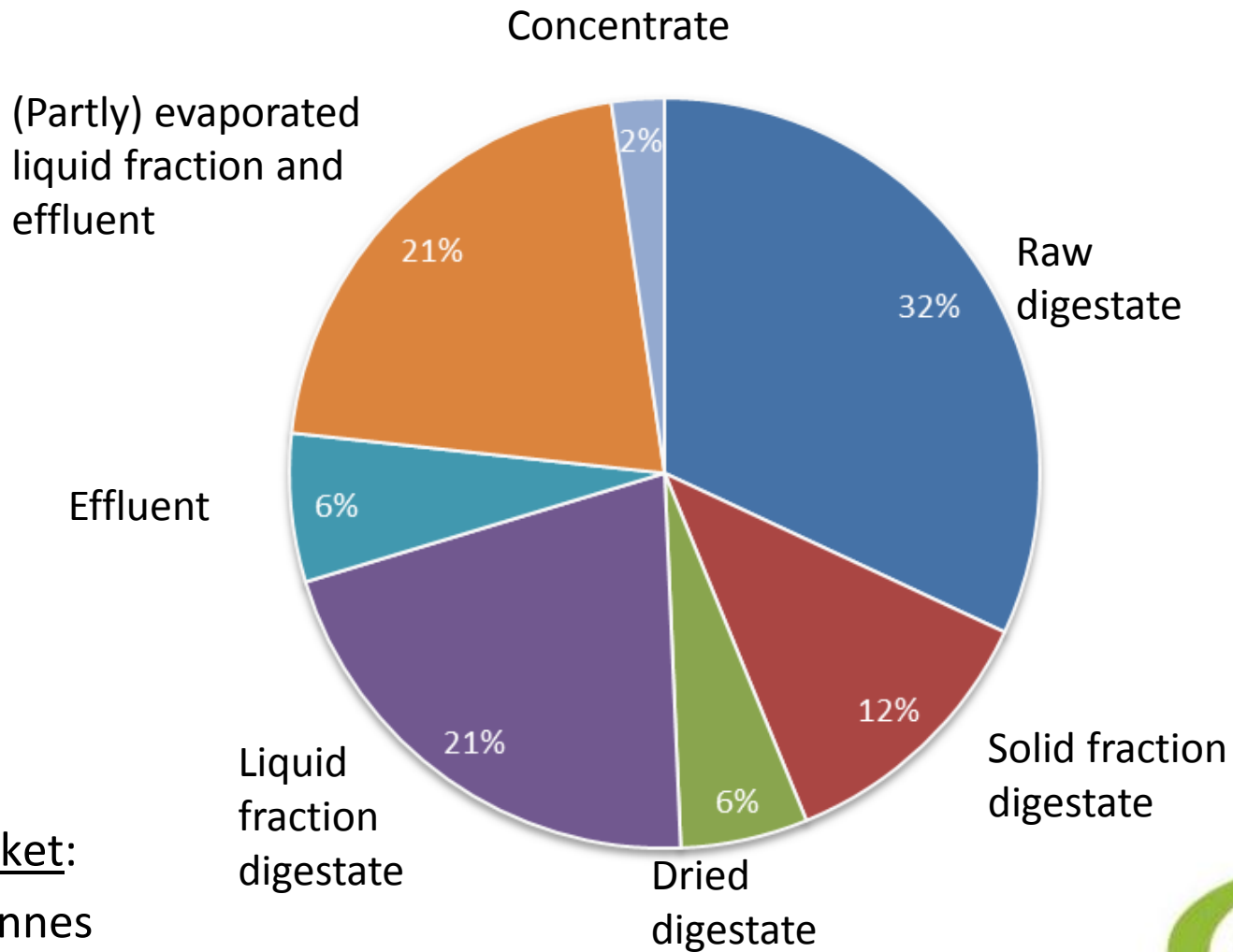


Compost market 2016

Bulks and bags: 425.000 tonnes



Digestate products 2016



Digestate market:

1.3000.000 tonnes

>99,99% in agriculture

Opportunities for dried digestate as or in commercial organic fertilisers



One size fits all?





Product differentiation - compost

Development of sustainable potting soil based on green compost and other organic recycled materials

- Need for better valorisation of green compost
- Ecological constraints about use of peat
- Increasing consumer awareness for sustainable garden products



➔ Challenge is to pursue the quality and specifications of traditional potting soil



Product tailoring – digestate: DIMA-project



- IWT-VIS project 140995 ('15-'17)
- **Development of specific digestate (-based) end products by customer specifications and matchmaking**
- **Thereby stimulating revenues from AD-plants**



AM-Power



Biogas Bree

Bio-Electric



Bio N.R.G.Y



Compost in organic farming



Meer halen uit de biologische kringloop

KEURINGSATTEST

ATTEST N° 3179660368

VOOR DE PRODUCTIE VAN:

GROENCOMPOST

Attest afgeleverd aan: Ivarem
Schoutetstraat 2
2800 Mechelen

Plaats van productie: Mechelsesteenweg 285, 2500 Lier

Geldigheid van het attest (van - tot): 01.07.2017 - 30.06.2018

REIKWIJDTE VAN HET KEURINGSATTEST - GARANTIES:

Status: keuringsattest met Vlaco-label

- Een keuringsattest wordt afgeleverd na controle door Vlaco vzw. Vlaco vzw is voor deze controle krachtens de bepalingen van VLAREMA aangeduid door de OVAM. Deze controle doet evenwel geen afbreuk aan de productaansprakelijkheid van de producent. De gebruiker dient daartoe geïnformeerd te worden over productsamenstelling en gebruiksmogelijkheden.
- Dit keuringsattest attesteert dat het resultaat van regelmatige controles bij de producent voldoet aan de eisen met betrekking de productkwaliteit, de bijkomende certificeringsvereisten zoals beschreven in het Algemeen Reglement van de Certificering, en de certificeringsvereisten die door Vlaco vzw worden gesteld. Het keuringsattest is geldig voor een periode van 1 jaar, waarin minstens 1 bijkomende bedrijfsaudit en meerdere staalnames zullen worden uitgevoerd
- Aan het keuringsattest is het Vlaco-label toegevoegd omdat de producent zich vrijwillig heeft geëngageerd tot het behalen van het hoogste kwaliteitsniveau bij de productie van compost. Na controle is gebleken dat de producent aan alle daartoe geldende voorschriften voldoet.
- Het eindproduct 'groencompost' wordt als grondstof beschouwd wanneer het wordt toegepast als meststof of bodemverbeterend middel.
- Dit keuringsattest is slechts volledig indien het vergezeld is van een officieel geaccepteerd document dat de gebruiksmogelijkheden van dit product afbakt.
- Bij eventuele wijzigingen in de certificeringsvereisten kan het keuringsattest onderhevig zijn aan herevaluatie.
- Het eindproduct is geproduceerd in overeenstemming met het ECN-QAS.
- Dit product voldoet aan de bijlage I van Verordening (EG) 889/2008 en is toegelaten als meststof of bodemverbeterend middel in de plantaardige biologische landbouwproductie.

Keuringsattest uitgereikt door Vlaco vzw op 29 juni 2017 te Mechelen.
Kristel Vandenbroek, Certificeringsmanager Vlaco vzw



Greencompost is allowed in organic farming

➤ indicated on the quality certificate



Quality criteria greencompost

| | QO | Percentile | Standard | Unit |
|--|------|------------|-----------|----------|
| GENERAL PARAMETERS | | | | |
| Entrance through a 40 mm sieve | - | - | >99 | % |
| Dry matter | >50 | 20 | >45 | weight % |
| Organic matter | >16 | 20 | >14 | weight % |
| pH (water) | - | - | 6,5 - 9,5 | - |
| HEAVY METAL CONCENTRATION | | | | |
| Arsenic | <15 | 75 | <20 | mg/kg DM |
| Cadmium | <1,5 | 75 | <2 | mg/kg DM |
| Chromium | <70 | 75 | <70 | mg/kg DM |
| Copper | <90 | 75 | <150 | mg/kg DM |
| Mercury | <1 | 75 | <1 | mg/kg DM |
| Lead | <120 | 75 | <150 | mg/kg DM |
| Nickel | <20 | 75 | <30 | mg/kg DM |
| Zinc | <300 | 75 | <400 | mg/kg DM |
| IMPURITIES, STONES AND VIABLE SEEDS | | | | |
| Impurities > 2 mm | <0,5 | 75 | <0,8 | weight % |
| Stones >5 mm | <2,0 | 75 | <4 | weight % |
| Viable seeds | <1 | 90 | Max. 1 | #/l |
| STABILITY/MATURITY | | | | |
| Decomposition degree (temperature) | <30 | 90 | <40 | °C |

Compost in organic farming: field trial

- Long term field trial at an agricultural research center (Inagro) 2003 – 2017
- 6 fertiliser strategies are tested (incl. object 5 with greencompost)
- Traditional organic crop rotation: summerwheat with clover, cauliflower or broccoli, potatoes followed by grass-clover, leek, carrot



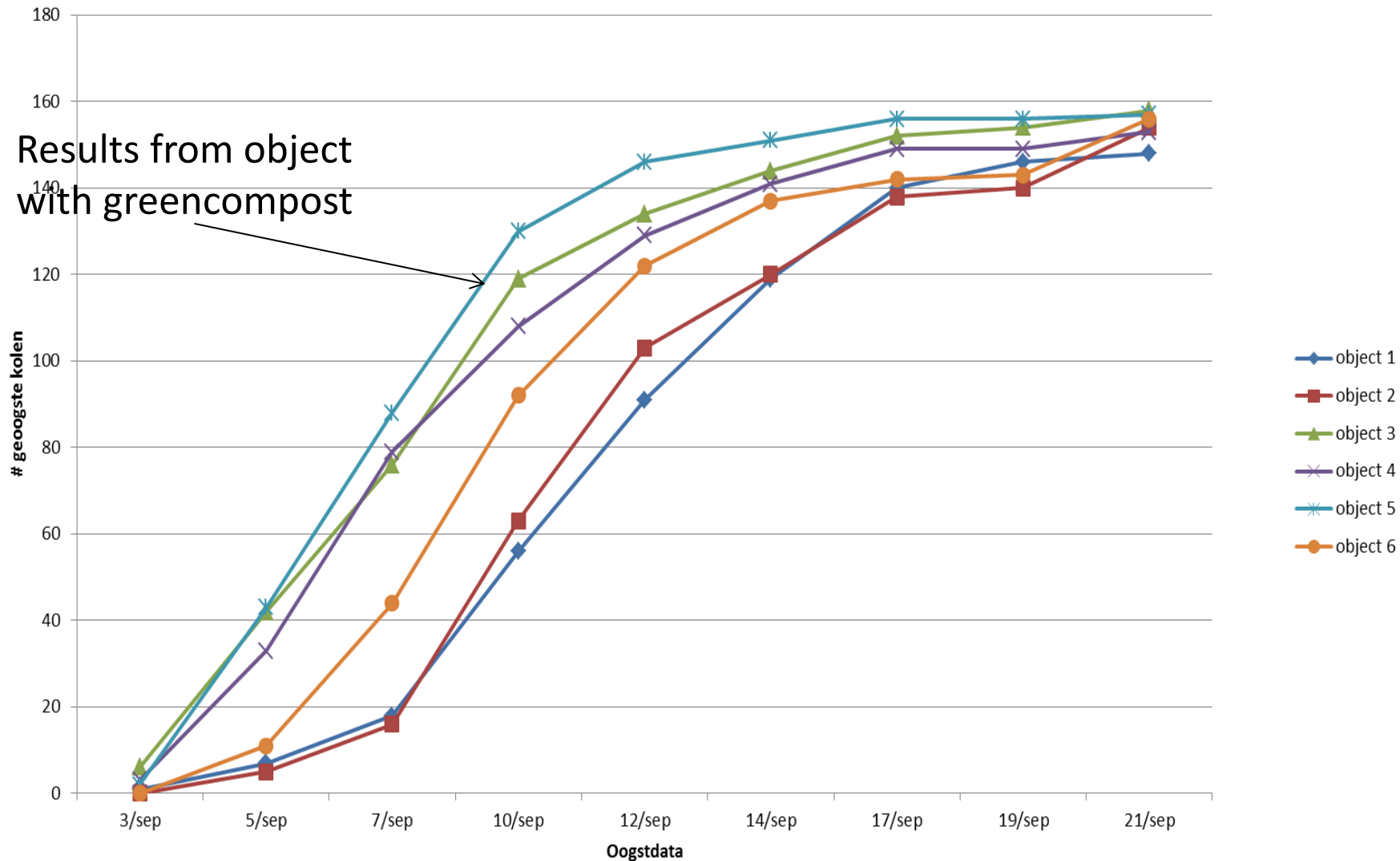
Compost in organic farming: field trial

- f.e.: broccoli (2012)
- Greencompost (20 tonnes/ha.y): the soil has a significant higher organic carbon content

| Measurement | 1 | 2 | 3 | 4 | 5 | 6 |
|--|-----------|------------|------------|------------|----------|-----------|
| C in % (lab Inagro) (P (F _{th} > F) : 0,006 VC : 5,53 % | 1,08 c | 1,24 bc | 1,17 bc | 1,29 bc | 1,7 a | 1,38 b |

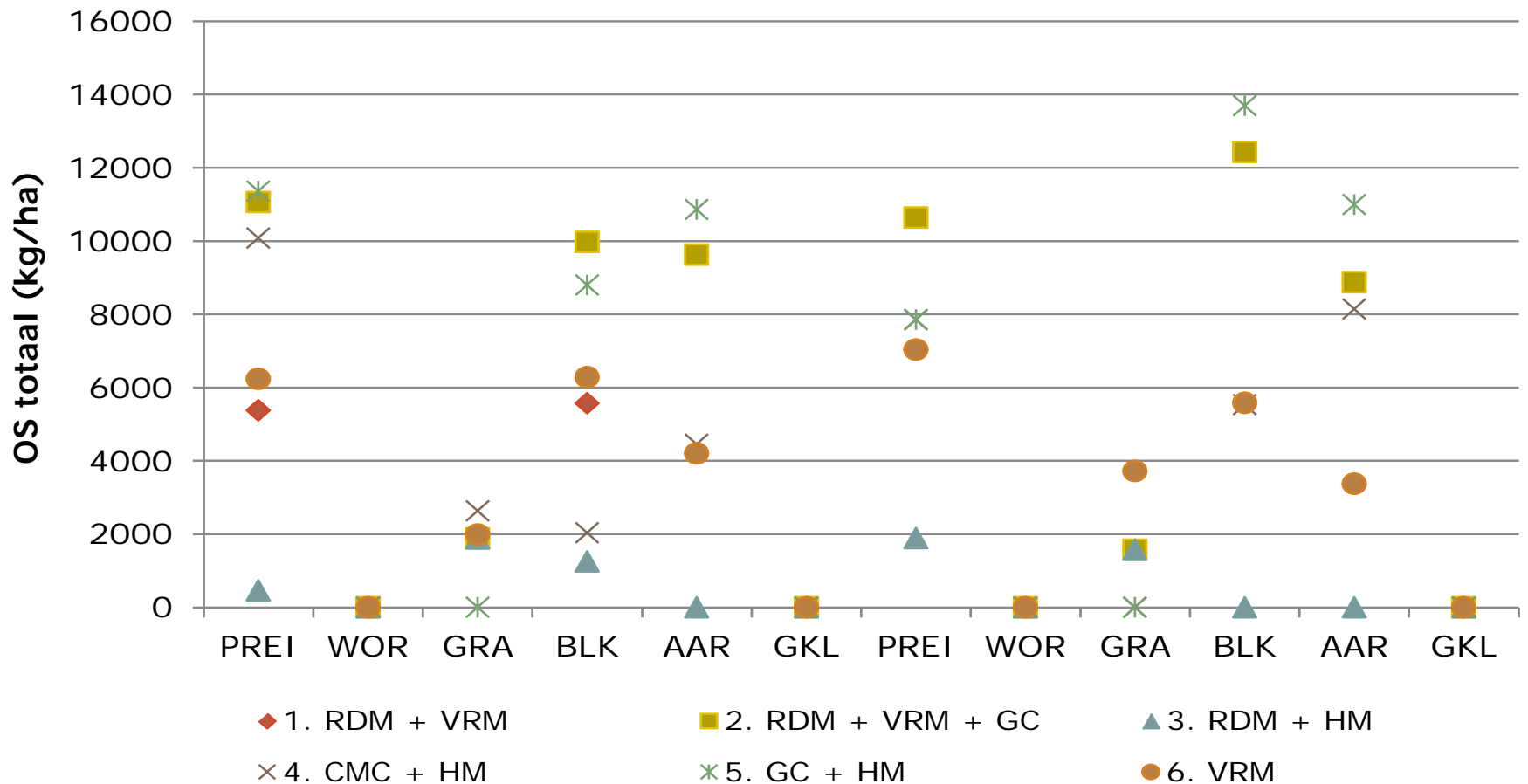


Compost in organic farming: field trial

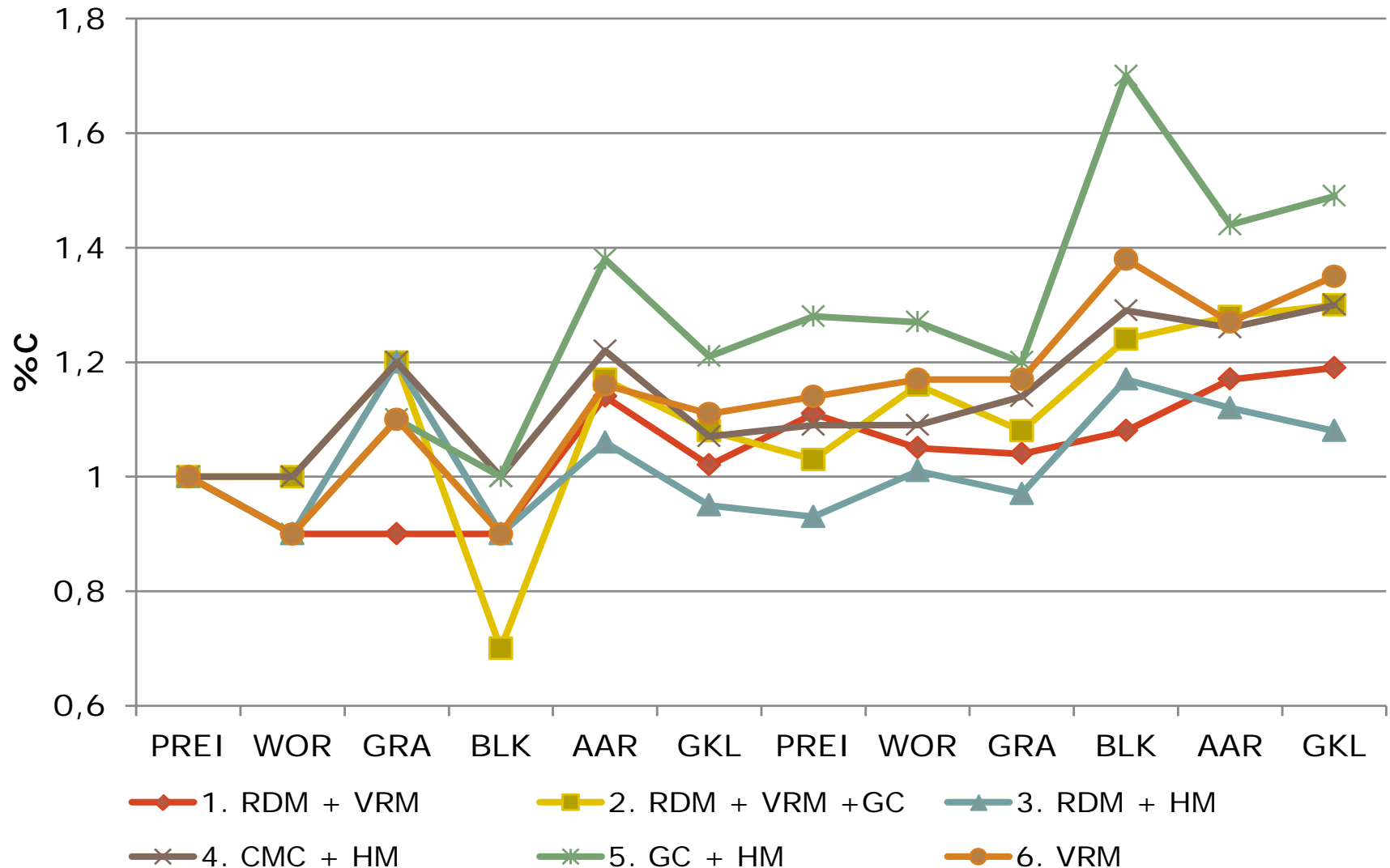


Yield of broccoli in 2012

Compost in organic farming: field trial



Compost in organic farming: field trial





Digestate in organic farming

- Organic farmers have interest in organic fertilisers such as digestate
- **EU legislation:** COMMISSION REGULATION (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control + amending 2014
 - Composted or fermented mixture of vegetable matter:
Product obtained from mixtures of vegetable matter, which have been submitted to composting or to anaerobic fermentation for biogas production.
 - Biogas digestate containing animal by-products co-digested with material of plant or animal origin as listed in this Annex



Digestate in organic farming

- Availability of digestate from vegetable input only
- Quality of those products is certified
- AD plants are willing to limit inputs in return for the option to sell to organic farming

BUT still not allowed by competent authorities



Digestate in organic farming: field trial

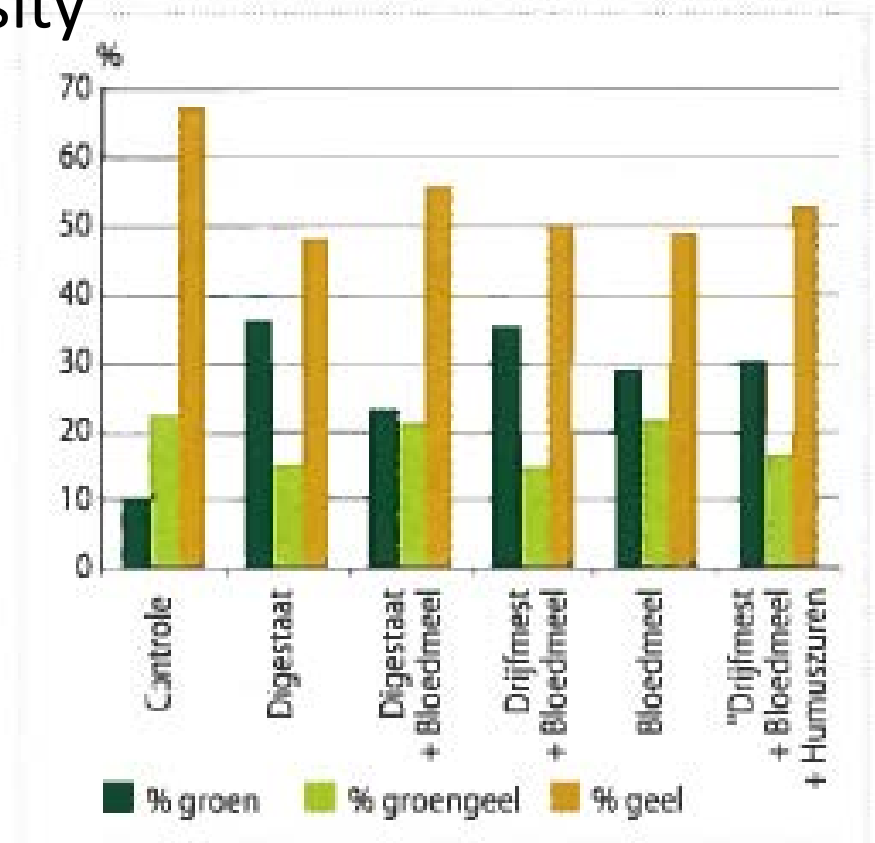
- PCFruit (agricultural research center for fruitcrops) tested digestate used by pears from 2014 – 2017
- Comparison with manure and bloodmeal
- Digestate gives same quality of pears as manure and blood meal
- Blood meal additional to digestate gives no added value
- Fertilising with only blood meal: negative effects on soil on long term (less organic carbon in soil)



Digestate in organic farming: field trial

- No negative effect on soil biology
- Also other field trial show no negative effect of digestate on soil biodiversity

This graph indicates that there are no significant differences between digestate and other fertilising strategies





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