

BIOBAG

The future of bioplastics in a circular economy

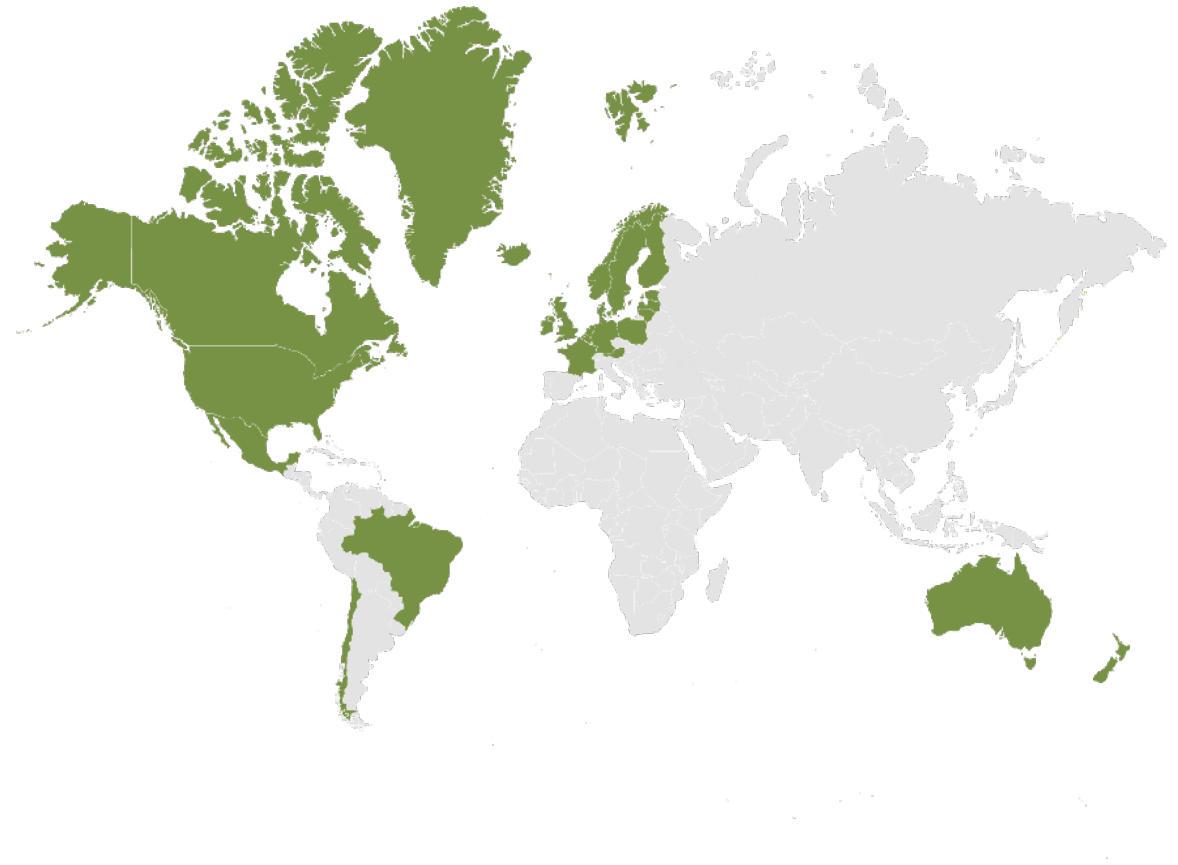
Birgitte Enghave

Nordic Bioplastics Conference
April 13th, 2023



WHO ARE WE?

- BioBag has more than 25 years of experience as a market pioneer in **compostable** and **biodegradable** solutions.
- We develop, manufacture and market **sustainable products** for waste management, food service, retail, industrial applications and agriculture.
- We are part of the Novamont Group, a world leader in the development and production of biodegradable and compostable bioplastics.
- The headquarters are located in Norway with subsidiaries in Europe, Australia, USA and partners representing BioBag International worldwide.
- We have our own production in Europe, close to our customers.





DID YOU KNOW THAT:

87%

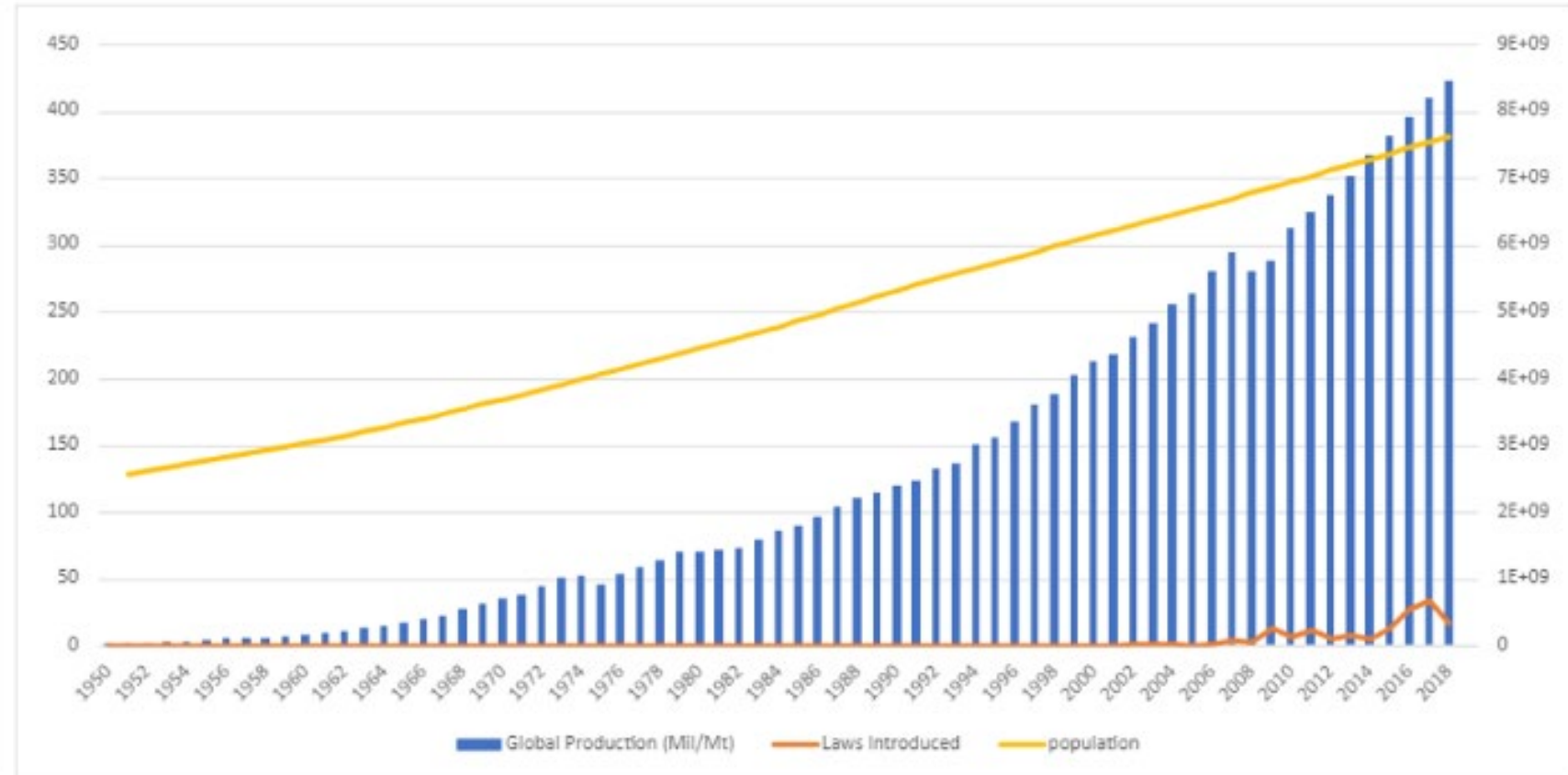
of Europeans are worried about the impact of plastic products on the environment?



WHAT'S THE PROBLEM?

The plastic timeline

- Over 400 million tons of plastic produced every year.
- Expected plastic production in 2025 exceeds 600 million tonnes annually.
- More than half of all plastic ever produced has been produced since 2000.
- Single use plastic, especially packaging, is a huge waste of resources and energy.
- Approx. 1.5-4% of the world's plastic production ends up in the ocean.

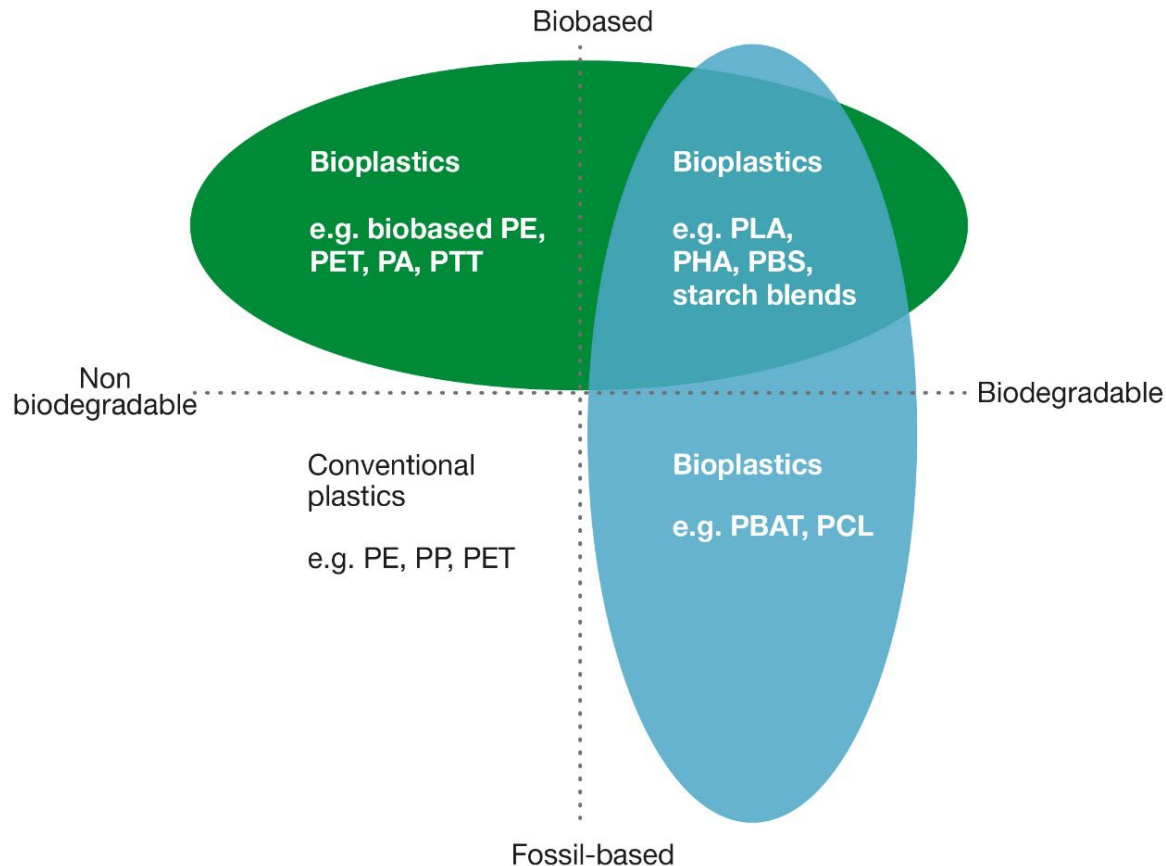


Kilde: <https://www.openaccessgovernment.org/the-plastic-timeline-how-did-we-get-here/102481/>



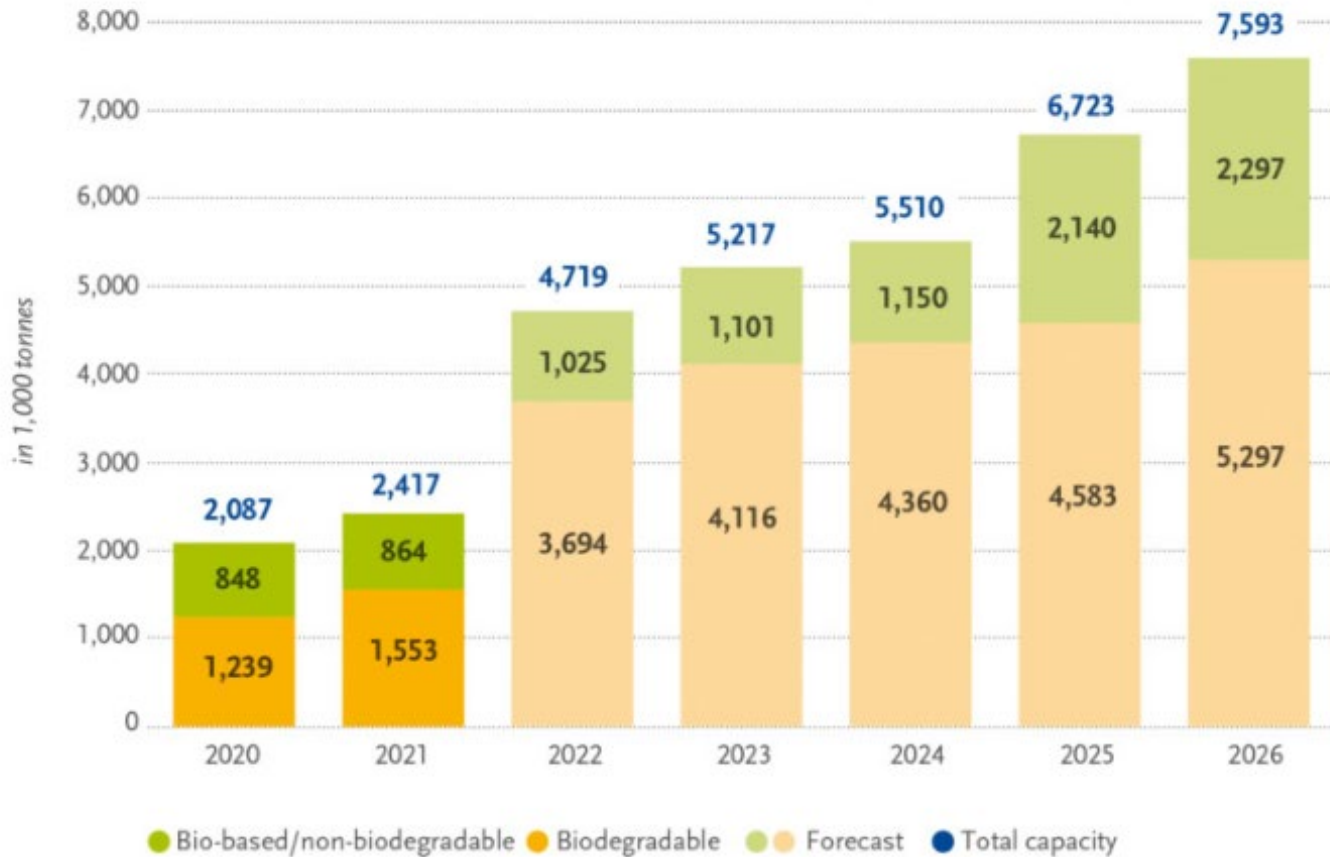
WHAT IS BIOPLASTIC?

The term bioplastic covers several different types of plastic materials, which can cause confusion:



- **Bio-based plastic made from biomass, e.g. sugar cane, sugar beet, corn etc.**
Bio-based plastic has the same properties as traditional plastic and cannot compost. Creates microplastics in nature.
- **Biodegradable plastic is made from biomass and can compost.**
Used primarily for rigid materials and can compost. Do not create permanent microplastics.
- **Compostable plastic made from biomass and oil/gas.**
Compostable plastics are broken down by microorganisms and do not create permanent microplastics.

Global production capacities of bioplastics



THE FUTURE OF BIOPLASTICS

- Today, bioplastics make up less than 1% of the more than 400 million tonnes of plastic produced annually.
- It is expected that global bioplastic production will increase to around 7.6 million tonnes in 2026 and for the first time reach 2% of plastic production.

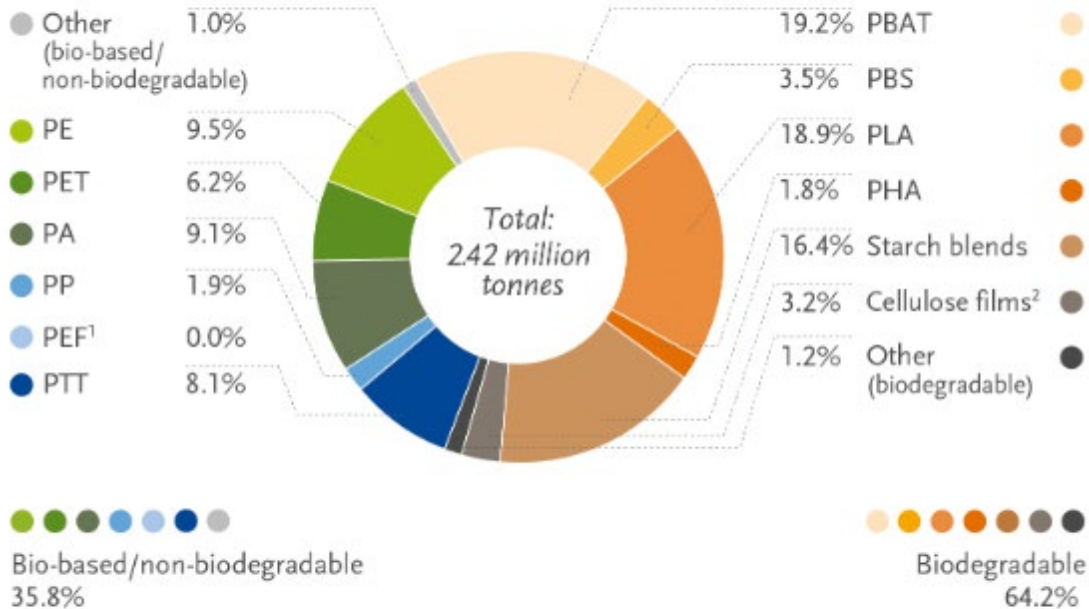
Source: European Bioplastics, nova-Institute (2021)

More information: www.european-bioplastics.org/market and www.bio-based.eu/markets



WHICH TYPES OF BIOPLASTICS ARE PRODUCED?

Global production capacities of bioplastics 2021
(by material type)

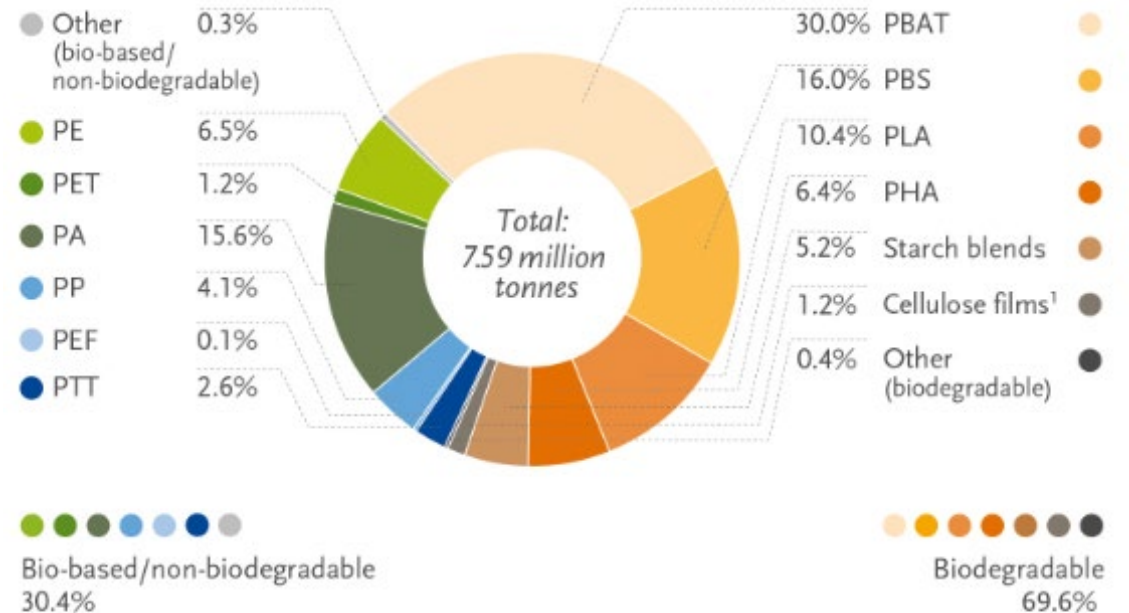


¹PEF is currently in development and predicted to be available at commercial scale in 2023. ² Regenerated cellulose films

Source: European Bioplastics, nova-Institute (2021)

More information: www.european-bioplastics.org/market and www.bio-based.eu/markets

Global production capacities of bioplastics 2026
(by material type)



¹ Regenerated cellulose films

Source: European Bioplastics, nova-Institute (2021)

More information: www.european-bioplastics.org/market and www.bio-based.eu/markets

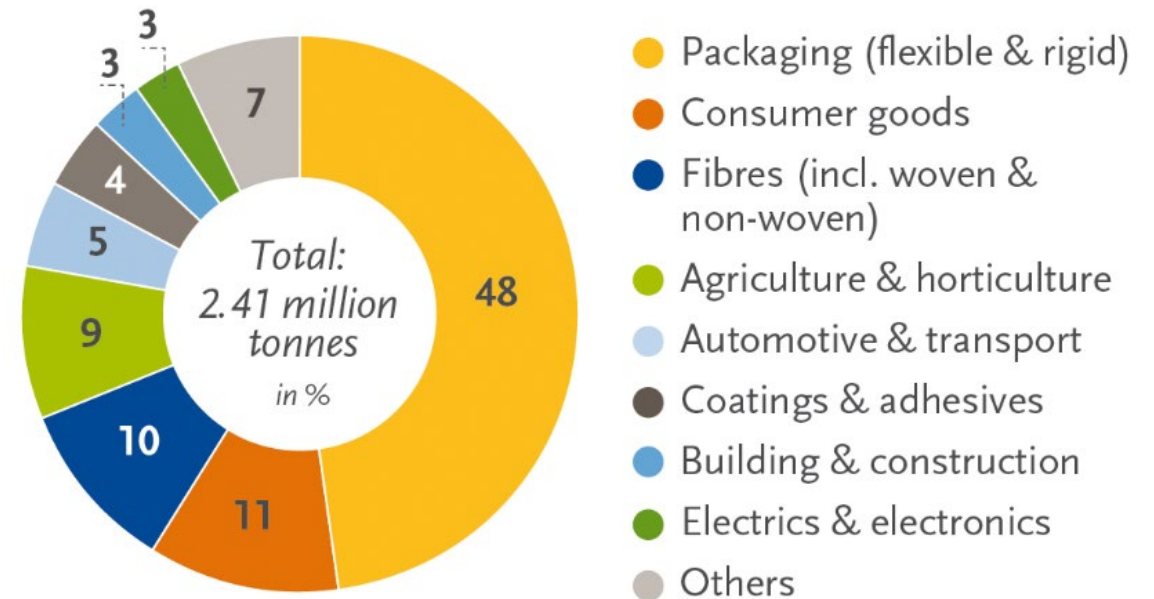


IN WHICH SEGMENTS?

Bioplastics are used in an increasing number of applications, from packaging and consumer products to electronics, automotive and textiles.

Packaging remains the largest market segment for bioplastics with 48 percent (1.15 million tons) of the total bioplastics market in 2021.

Global production capacities of bioplastics in 2021 (by market segment)

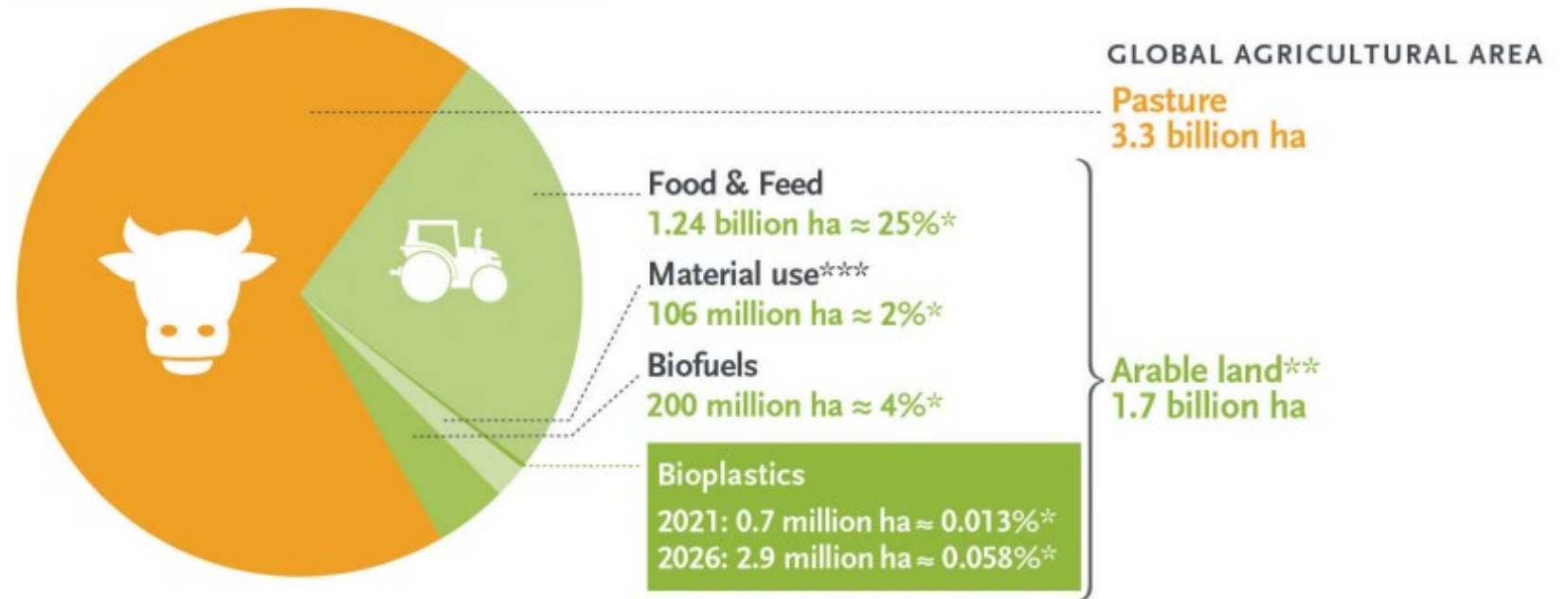


Source: European Bioplastics, nova-Institute (2021). More information: www.european-bioplastics.org/market and www.bio-based.eu/markets

LAND USE ESTIMATION




- The share of land use for bioplastics is estimated to be 0.01% of the global agricultural area.
- Although bioplastic production is expected to increase, the area use will still be below 0.06%.

Land use estimation for bioplastics 2021 and 2026



Source: Source: European Bioplastics (2021), FAO Stats (2020), nova-Institute (2021), and Institute for Bioplastics and Biocomposites (2019), University of Virginia (2016). Info: www.european-bioplastics.org

*In relation to global agricultural area, **Including approx. 1% fallow land, ***Land-use for bioplastics is part of the 2% material use

Environment	European Reference Standard	Certification and logos	Notes
Industrial composting	EN13432		EN 13432 refers to packaging. In addition, EN 14995 is a similar European standard for compostability of non-packaging products in industrial composting plants.
Well-managed home composting conditions	No European standard		The OK compost home label builds on a certification scheme developed by TÜV Austria Belgium NV. The DIN-Geprüft Home Compostable label is based on French standard NF T51-800 and/or the Australian standard AS 5810. National standards also exist in Belgium and Italy. A draft European standard exists for plastic carrier bags suitable for treatment in well-managed home composting installations (prEN 17427:2020).
Soil	EN17033		EN17033 applies to mulch films only. Based on a certification scheme developed by the label provider, but can be compliant with EN 17033 on request by adding two additional ecotoxicity tests.

Kilde: <https://www.eea.europa.eu/publications/biodegradable-and-compostable-plastics>



WHERE DOES BIOPLASTICS MAKE SENSE?

- Organic waste sorting
- Mulch film for farmers
- Fruit and vegetable bags in supermarkets
- Carrier bags
- Industrial film for packaging

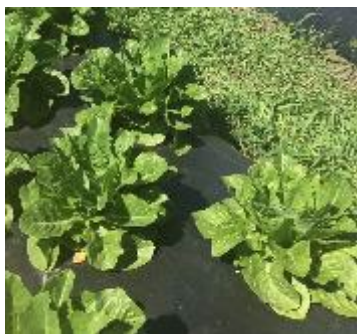


ADVANTAGES OF SORTING FOOD WASTE IN BIOBAGS



- Achieve savings due to weight reduction because of the breathability of the bio bag
- Give an important signal to citizens and thereby achieve a cleaner waste fraction
- Facilitate high capture rates of separately collected food waste, and thereby contribute to production of renewable energy.
- Ensure nutrient-rich compost for agricultural soil without microplastics.
- Emit less CO₂ when incinerated.
- Are certified fully compostable and biodegradable.

MULCH FILM FOR FARMING



- By using compostable mulch film instead of conventional plastic film, we can potentially avoid long-term plastic accumulation in the soil.
- Conventional plastic is difficult to remove completely from agricultural soil.
- Certified OK biodegradable in SOIL.
- Due to its biodegradability, residues from the mulch film can be ploughed into the soil at the end of the cycle, avoiding plastic residues accumulating in the soil.



COMPOSTABLE PLASTICS IN RETAIL

- By replacing fruit and vegetable bags with compostable bags, the amount of single use conventional plastic bags is reduced.
- Due to the biobags breathability, fruit and vegetables are kept fresh longer.
- Compostable carrier bags can be reused for food waste collection.
- Minimize the amount of 100% fossil carrier bags with compostable solutions.



COMPOSTABLE PLASTIC IN INDUSTRIAL FILMS



Food Pads



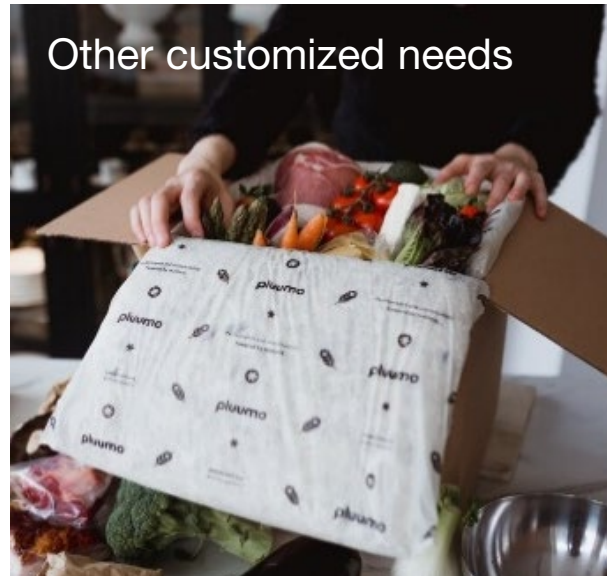
Diapers



Flowpack Foil



Laminated Pouch



Other customized needs

- Diapers
- Feminine hygiene
- Packaging
- Bed linen in hospitals
- Flowpack foil
- Laminated products
- Food packaging
- Other customized needs

COMPOSTABLE INNOVATIVE PACKAGING SOLUTIONS

MISURA

FILENI

LA LINEA VERDE

CROCCO

COOP

MELINDA

COMPOSTABLE HIGH BARRIER PACK



The first compostable packaging for long-life food products with a high barrier to oxygen and water. An alternative for multi-layer and multi-material packaging that is currently impossible to recover.

COMPOSTABLE TRAY



The packaging of Fileni 'antibiotic free' products becomes compostable in every part: Tray, film, label and absorbent pad

COMPOSTABLE SALAD BAG



Dimmidisi salad becomes "a green bag". The wrapping film is made up of layers of different types of Mater-Bi, selected to engineer a packaging solution that guarantees mechanical characteristics of rigidity, machinability and printability.

COMPOSTABLE CLING FILM



LEAF is the new compostable cling film developed by CROCCO for application to automatic and manual packaging of fresh food. LEAF can be used for direct food contact, even with high fat content.

COMPOSTABLE COFFEE CAPSULES



Compostable capsules made of Mater-Bi with over 50% of raw material of renewable origin. The Coop Italia's coffee Capsules Tintoretto are already on the market. The compostable capsules can be disposed of together with organic waste allowing the reduction of packaging waste.

COMPOSTABLE CLING FILM



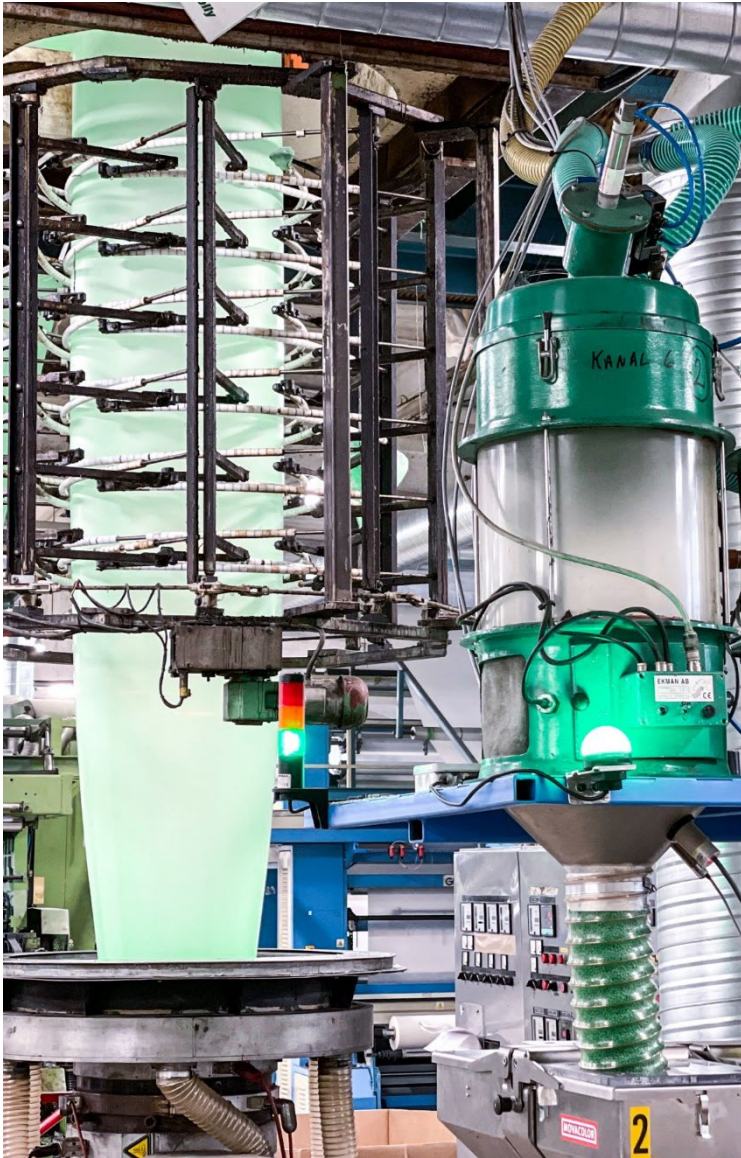
New pack for the whole Melinda BIO line: tray, film, labels. The new Melinda packaging, made with consumer friendly graphics, can be recycled with the collection of organic waste to be transformed into compost.



OTHER EXAMPLES

Examples of combination of paper and the compostable material Mater-Bi





RECIRCULATION OF BIOPLASTIC

Is it possible to include bioplastic in the recycling process of conventional plastic?

- A study from 2015 tested 0,5-10% mix of PBAT/PLA and pure PBAT in the recycling stream of LDPE.
 - It showed the same viscosity, elasticity and tensile strength as pure LDPE.
 - No visible changes to the plastic were observed.
 - There was a small change in the melting point at 10% mixing of bioplastic.
- There seems to be a belief that it is catastrophic if bioplastic enters the recycling stream, but the study from 2015 disproves this.

Kilde: https://docs.european-bioplastics.org/publications/bp/EUBP_BP_Bioplastic_films_in_mechanical_recycling_streams.pdf



WHAT ARE OTHER COUNTRIES DOING?



- In Italy, only compostable carrier bags are given to customers in the supermarkets.
- France has banned plastic bags in the fruit and vegetable department and replaced it with compostable bags.
- Spain is introducing a ban on fruit and vegetables packed in plastic from 2023.
- Are we ready to recommend that our food waste should be sorted in bags that do not harm the environment?
- Are we ready to introduce a similar ban in Denmark?

THANK YOU

CONTACT ME FOR MORE INFORMATION:

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