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Innovative fully biodegradable mulching films & fruit protection bags for sustainable agricultural practices LIFE14 ENV/ES/000486

LIFE PLATFORM MEETING - PLASTICS IN A CIRCULAR ECONOMY

21-22TH SEPTEMBER 2017, ATHENS, GREECE

LIFE – working towards a Circular Economy for plastics

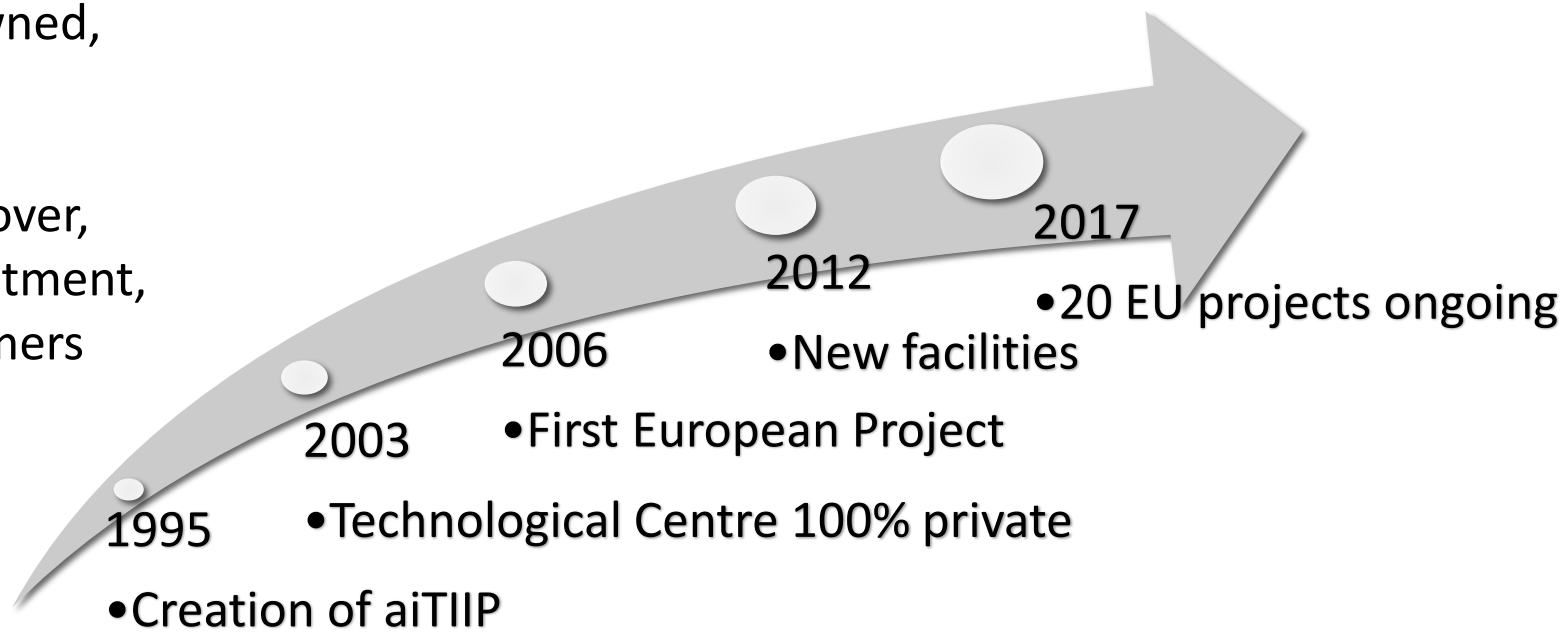
Our organization

Key Activities

AITIIP is a private technological centre whose goal is to increase the competitiveness of companies in the industry of moulds and plastic parts manufacturing.
AITIIP offers advanced technology services to other companies (62% of the income), performs research, development and innovative actions (37% of the income) and training and e-training aitemy by aitiip (1%).

Key Figures (2016)

100% privately owned,
49 employees,
12,000 m2
7 M€ annual turnover,
1 M€ annual investment,
175 annual customers



For more information please visit: www.aitiip.com

Our organization

Membership

Member of the Technical Committee for Standardization / Normalization ISO working group of additive manufacturing / 3D printing
Associated Member of Biobased Industry Consortium
Member of European Factories of the Future Research Association

Results (2016)

25 own projects in R&D
75 projects of research, technological development and innovation and collaborative agreements with companies
250 technological services for enterprises

European projects (2016)

HORIZON 2020, BIO-BASED INDUSTRIES, Clean Sky, Life, Erasmus+, circpack, MEGA ROB*, KRAKEN*, Fungus chain, HyperBioCoat, ECOxy, BARBARA*, WIN TOOL*, FALCON*, Freshbox, Multibiosol*, CITRUS PACK*, cardemy*, DELTA DRONES, bioplastictrain*

Circular Economy

- Agricultural waste valorisation
- Biopolymers
- Green composites

Industry 4.0

- Multi-material additive manufacturing and 3D printing
- Robotization of processes

Main Sectors

Automotive
Aeronautic
Agroindustry & Food Packaging

For more information please visit: www.aitiip.com

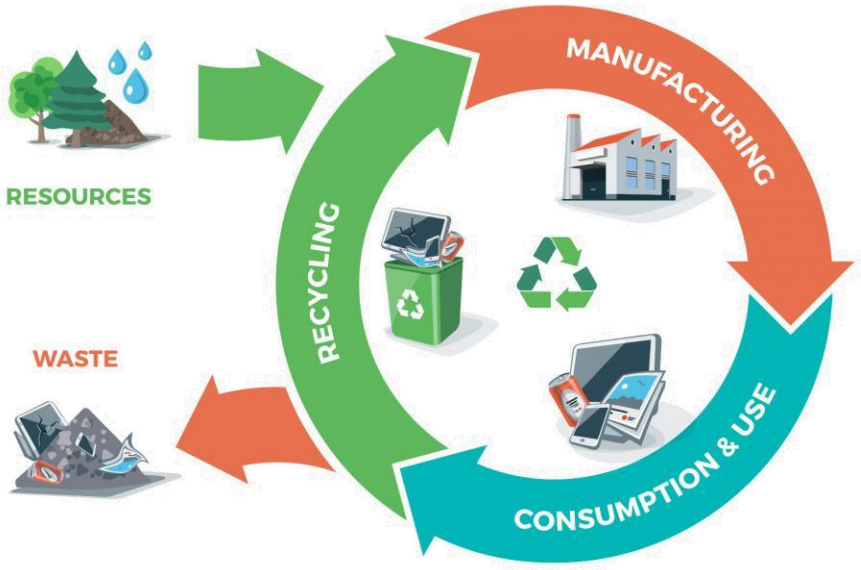
Circular economy projects

Freshbox · Multibiosol · CITRUS PACK

BIO-BASED INDUSTRIES · fungus chain · ECOxy · HyperBioCoat · BARBARA

HORIZON 2020 · circpack

Erasmus+ · bioplastictrain



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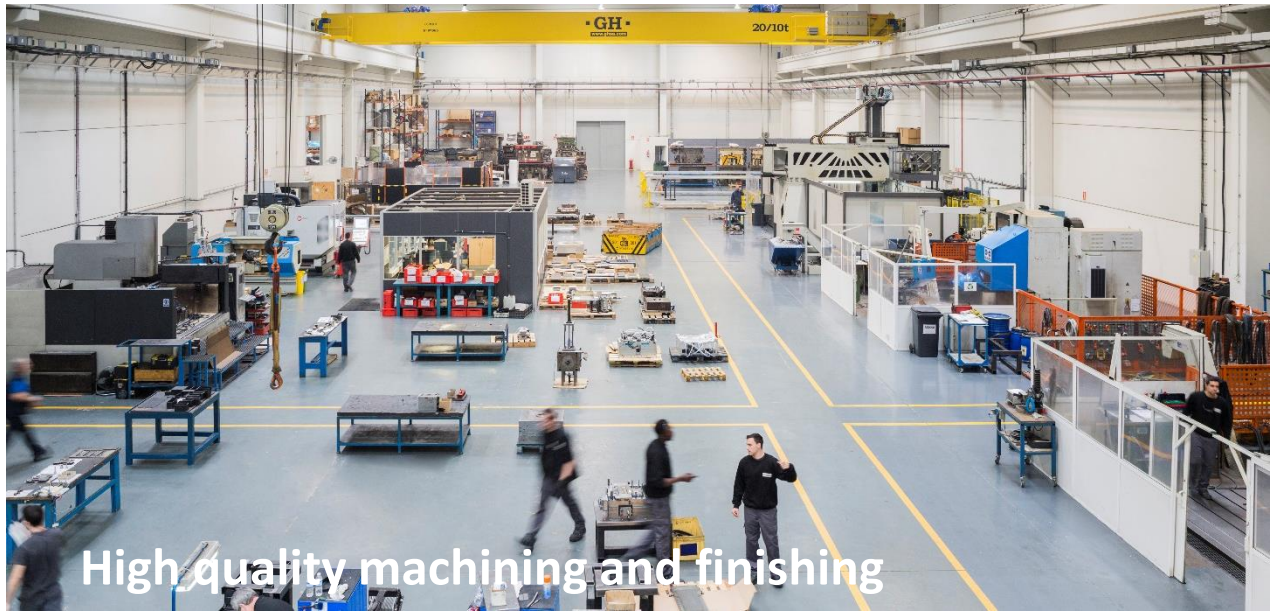
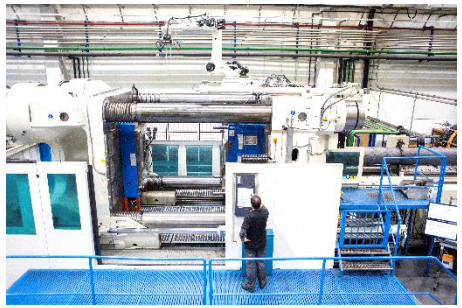
Plastic Injection



High quality machining and finishing



3D Printing

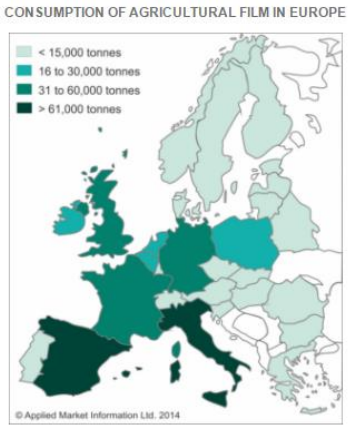
Semi-industrial machinery for processing of materials and Mechanical tests Laboratory

Purpose of this project

Current semi-intensive and intensive farming practices require the use of large quantities of plastic film and paraffin wax paper.

These practices have a significant environmental impact:

- Single use only
- Elimination involves high costs in terms of time and money

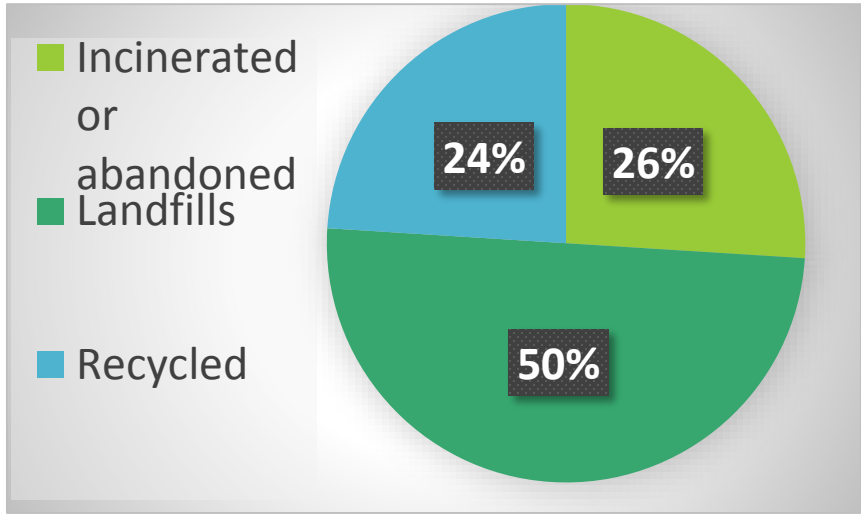


Environmental consequences if not removed correctly

1.High economic and environmental impact in the use of conventional plastics and fossil energy (50% is disposed of in landfill).

2. HDPE – LDPE material abandoned in landfills or open fields may take about 100 to 500 year to degrade or/and break completely.

3. Loss of harvested products due to improper use, soil loses fertility (less nitrogen fixation and nutrients) and lead to erosion as a result of concentrated runoff. Some plastics contains traces of heavy metals,…



Purpose of this project

Protected Designation Origin

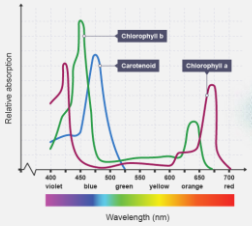
Agroplastics are needed:

Innovations **Sustainable**

- Conserve water and nutrients
- Prevent weed growth
- Permit adequate temperature in the rhizosphere

Trace elements

- Protection against pests and infestations
- Isolate fruit from plant protection products
- Fruit with uniform skin colour



Macro-perforations
Coloring bags

Biodegradable films deliver the same positive agronomical effects as conventional ones, additionally, they offer additional advantages at the end of the crop cycle because they can simply be left on the field and ploughed under.

The overall objective of the project is to demonstrate that the **sustainability and efficiency of agricultural practices** can be achieved by introducing an **innovative**, economically viable and soil biodegradable plastic that **eliminates waste** completely.

Demonstration Character

Raw materials
-100% biodegradable
-Polymers based on natural sources

Production processes
-Materials extrusion
-Film blowing

Validation of plastics products in fields
-Tomato (Spain and France), pepper and cucumber in Spain and sweet potato in Belgium
-Bags for apple and peach (Spain)

Validation of plastics in laboratory
-Mechanical tests of materials
-Tests for certification OK BIODEGRADABLE SOIL

Validation of quality:
- Soil
-Crop (Pre-harvest)
- Product (Post-harvest)

Expected results
- Reduction of plastic waste
- Less CO_2 emitted during the production of plastics/Non-emissions from disposal
- Improvement of soil quality
- Improvement in crop quality
- Certification OK BIODEGRADABLE SOIL

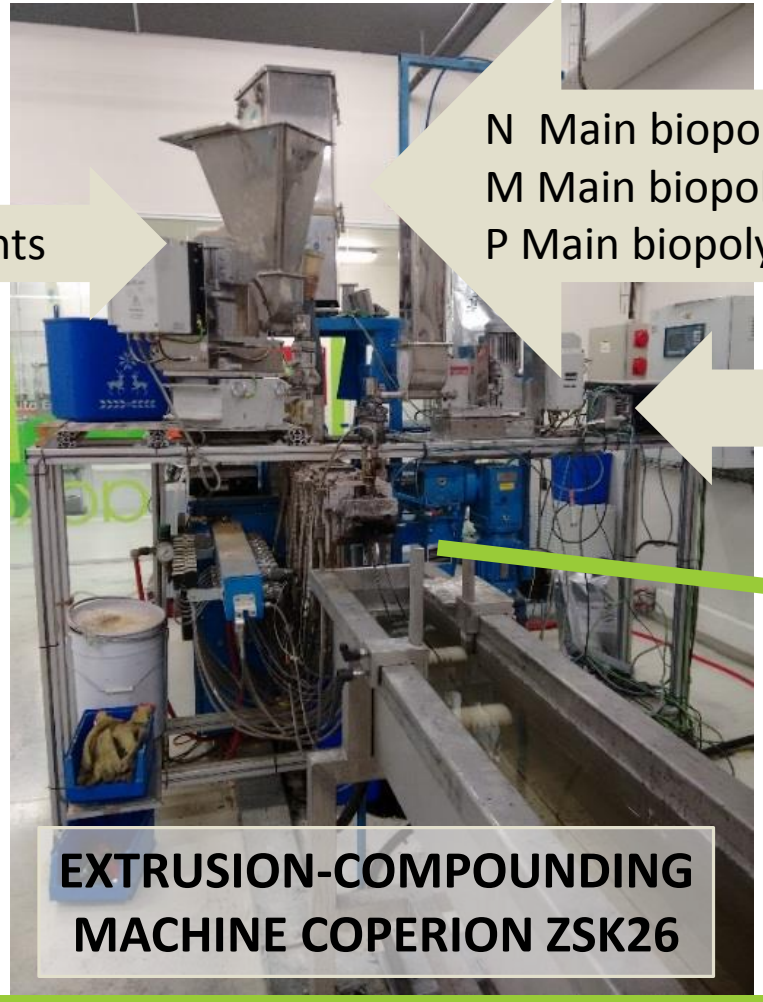
Transformation processes

1 Extrusion compounding

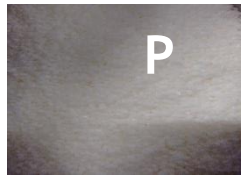
Twin-screw extruder equipped with one gravimetric dosing for pellets, two for powder and one for liquids (1 to 100 Kg/h)

- Pelletizer and dryer on the same line.
- Adapted screws for several materials and additives
- Ultrasonic system of dispersion available

Oligo elements



N Main biopolymers AAPE
M Main biopolymer PHA-PLA
P Main biopolymer PBS



Carbon Black

- ✓ Tª control
- ✓ Material flow control
- ✓ % components

EXTRUSION-COMPOUNDING MACHINE COPERION ZSK26

Moretto X DRY AIR T Minidryers

Transformation processes

2 Film blowing

Film blowing unit LABTECH LF 400 for film production

- Different layer configurations 3-layer (bi material: ABA), 2-layer (AB or BA) and monolayer
- Max film width output: 800 mm
- Blow ratio up to 3,5
- Thickness from 10 µm depending on material

- ✓ Air speed control
- ✓ BUR control
- ✓ Height of the equipment
- ✓ Roll speed

3 Technical measurements

Thickness

Width

Dispersion

Mulching

Film for fruit bags

Samples (materials)			Thickness
MULCHING 3% oligoel.	M	M1-M3	2 thickness
	N	N1-N3	3 thickness
	P	P1-P3	1 thickness
FRUIT BAGS 2% and 2 different colour	M	M4-M7	40 µm
	N	N4-N6	35 µm
	O	O1-O3	50 µm

Plastics validation

Heavy metals content in plastic samples

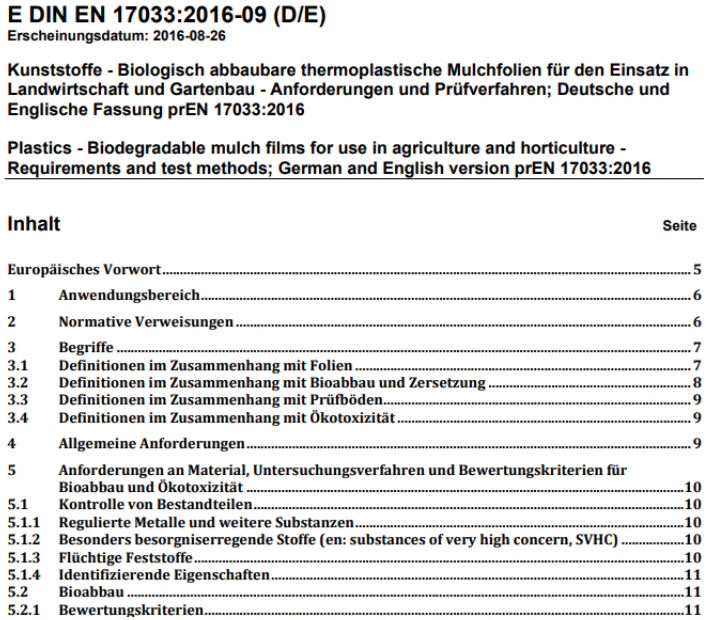
Heavy Metals concentration → > Limits (EN 13432) = Not accepted

- **EN 13432:2000: Packaging - Requirements for packaging recoverable through composting and biodegradation - Test scheme and evaluation criteria for the final acceptance of packaging.**
- ***UNE-EN 14995:2007*** *Plastics. Evaluation of Compostability. Test scheme and specifications.*
- ***prEN 17033:2016 Plastics - Biodegradable mulch films for use in agriculture and horticulture - Requirements and test methods.***

Plastic Legislation

Fertilizers values

DRAFT STANDARD DIN EN 17033
Plastics - Biodegradable mulch films for use in agriculture and horticulture - Requirements and test methods; German and English version prEN 17033:2016
Responsible national committee
NA 054-01-07 AA - Biodegradable plastics
Responsible european committee
CEN/TC 249/WG 7 - Thermoplastic films for use in agriculture



E DIN EN 17033:2016-09 (D/E)
Erscheinungsdatum: 2016-08-26

Kunststoffe - Biologisch abbaubare thermoplastische Mulchfolien für den Einsatz in Landwirtschaft und Gartenbau - Anforderungen und Prüfverfahren; Deutsche und Englische Fassung prEN 17033:2016

Plastics - Biodegradable mulch films for use in agriculture and horticulture - Requirements and test methods; German and English version prEN 17033:2016

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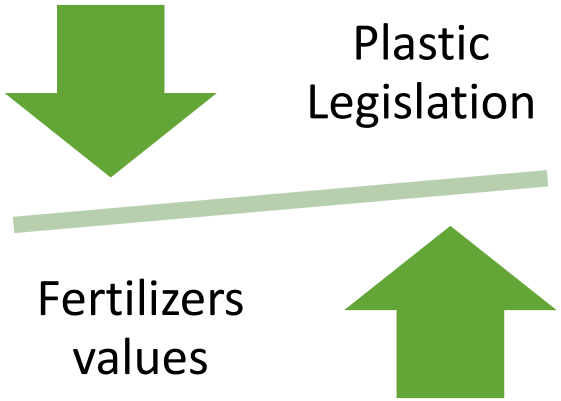
Plastics validation



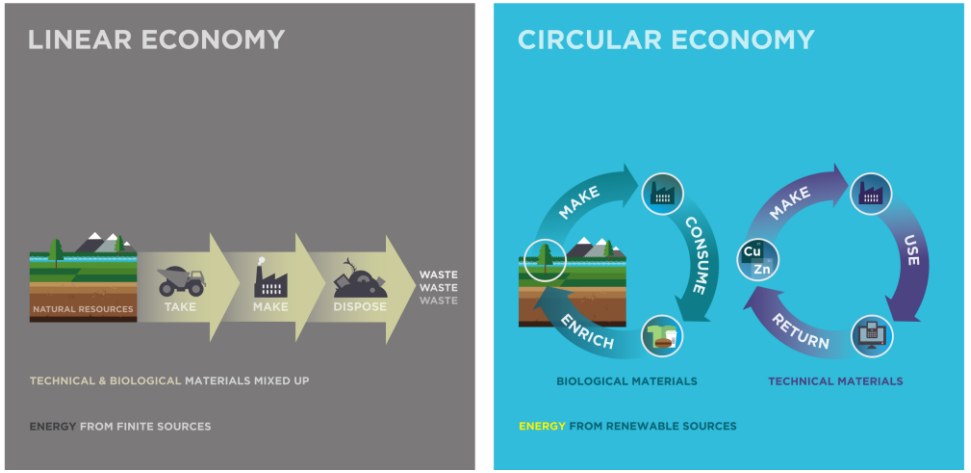
Regulation (EC) No 1069/2009 and (EC) No1107/2009 relating to fertilisers

COM(2016) 157

Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL laying down rules on the making available on the market of CE marked fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009

- By including this innovative product in the **Fertilisers Regulation as soil improver** the EU could help tackle several challenges at once including the need to produce more food from less land and to farm more sustainably using less resources.
- According to the Commission, this proposal represents **a step forward towards a circular economy**. However, the proposal fails to recognise the potential role of biodegradable mulch films in modern agriculture *(Position of European Bioplastics & EuropaBio).*

Towards a Circular Economy



Contribution to the specific objectives of the priority areas of the LIFE Subprogramme for Environment.

Towards a circular economy: A zero waste programme for Europe (COM 2014, 398). As a first priority affecting all the phases in a **circular economy**, it should be ensured that **less waste is generated**. Waste Framework Directive EU directive 2008/98/CE required that Waste prevention programmes had to be adopted. Following their assessment, the Commission will develop initiatives promoting good practices in waste prevention in the EU such as:

Directives on the landfill of waste *(COM 397, 2014) aims to "reflect the needs of the circular economy by increasing preparation for re-use and recycling of municipal and packaging waste and eliminating landfilling".*

Our project eliminates the need for **waste management** through **complete biodegradability** directly **leaves out** the necessity of **landfilling** while protecting the soil's integrity.

Towards a Circular Economy

Contribution to the specific objectives of the priority areas of the LIFE Subprogramme for Environment.

Using plastic more sustainably (COM 123, 2013) and **better design of plastics and plastic products**.

This strategy paper is a reflection and consultation paper **"on possible responses to the public policy challenges"** brought by plastic waste. It collects the facts and takes into account the different views of all interested **stakeholders in the challenges of plastic waste**.

Thematic Strategy on the Prevention and Recycling of Waste (COM 211, 2013): "Life-Cycle thinking" introduced in this waste policy focuses on the environmental impact of a product throughout its life cycle. *For both the Commission and our project, Waste prevention remains a key priority which can be achieved through product design and manufacturing.*

-- EU Directive 2008/98/EC, on waste and repealing certain Directives: This Directive is "the legislative framework for the handling of waste". **Key concepts of waste, recovery and disposal are defined as well as requirements/obligations for waste management.**

Contribution to Commission's target of banning recyclable material in landfills by 2025.

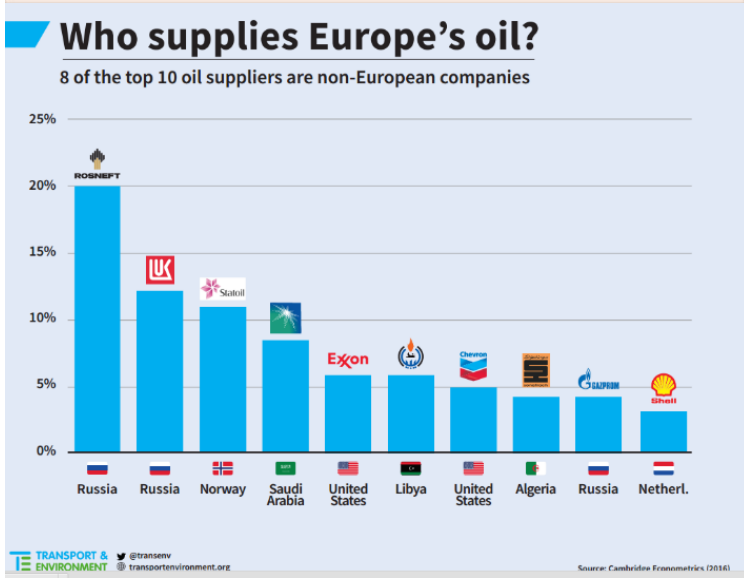
Towards a Circular Economy

MULTIBIOSOL creates synergies with the objectives of other EU policies and contributes to the integration of environmental aspects into other policies:

EU rural development policy in the 2014-2020 period (In line with Europe 2020 and the **Common Agriculture Policy (CAP)** objectives) identifies three long-term strategic objectives: 1) fostering the competitiveness of agriculture (added value), 2) ensuring the sustainable management of natural resources and climate action; and 3) achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment.

Multibiosol has identified as one key target "to improve the knowledge base of **biobased products development** within European Region facilitating the Innovation for **Sustainable Growth: a Bioeconomy for Europe (COM 60, 2012)"**. *Multibiosol will contribute to the market for bio-based products.*

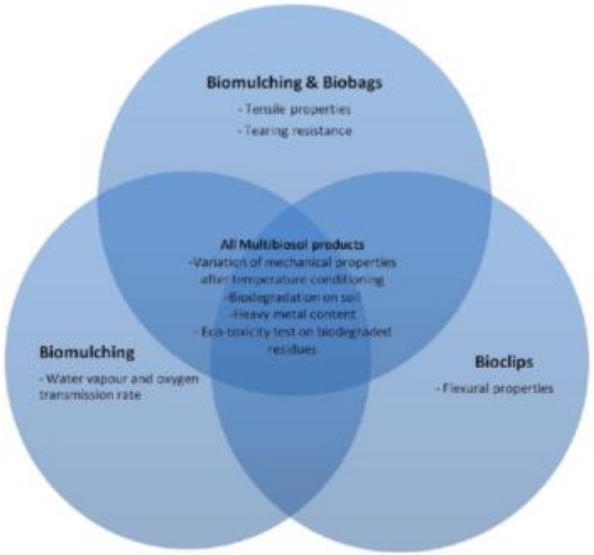
Europe 2020 – "Sustainable growth for a resource efficient, greener and more competitive economy": emphasis is being put on building a more competitive low-carbon economy and protecting the environment by **reducing CO_2 emissions**, thus reducing the **resource intensity** of what we **use and consume, since Europe is too dependent on fossil fuels.** *Our project fits right into this strategy by striving to use resources that do not depend on fossil fuels and leave a low carbon footprint.*



Towards a Circular Economy

MULTIBIOSOL is in line with European Legislation and strategies mainly related to the elimination of plastic waste, in particular:

- European Strategy on Plastic Waste in the Environment for elimination/reduction of plastic waste;
- Reduction of waste landfilling with complete biodegradable plastics and packaging and assurance of soil protection;
- Life Cycle Assessment and Costing (LCA and LCC) to quantify the environmental and economic impact of innovative products and to reduce CO2 emissions;
- Waste as a resource, in particular prevention/reduction of food waste ;
- “Zero waste” goal:
  - starting from the design of production processes and innovative products,
  - lowering dependency on fossil fuels,
  - aiming at eco-design
  - promoting future use of bio-based raw materials and products.



Thank you for your attention

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http://multibiosol.eu/