



**Releasing the potential of feathers**  
to foster circularity in agriculture



@UNLOCK\_BBI



UNLOCK\_project

[www.unlock-project.eu](http://www.unlock-project.eu)

# Environmental impacts



## Managing natural resources sustainably

UNLOCK deploys innovative solutions for a circular use of biomass, using feather waste as a raw material.



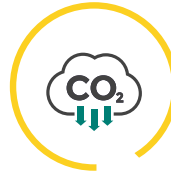
## Reducing dependence on non-renewable resources

UNLOCK proposes solutions to substitute fossil raw materials in agricultural applications.



## Protecting life on land

Microorganisms contained in unprocessed feather waste can affect biodiversity if landfilled. But after revalorisation, feathers are a source of nitrogen to microbial soil communities, thus enhancing biodiversity.



## Reaching climate neutrality in the EU by 2050

UNLOCK aims at reducing the overall CO<sub>2</sub> emissions in the value chain by 20%.

## UNLOCK IN NUMBERS

**€ 5M**

Budget

**48**

Months

**15**

Partners

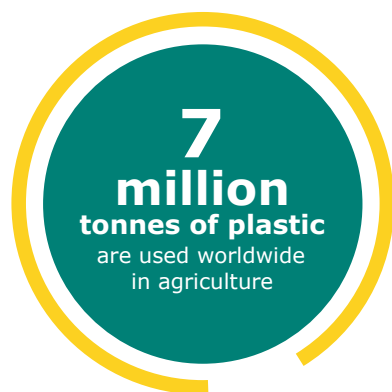
**7**

Countries

**8**

Work Packages

# TRANSFORMING ENVIRONMENTAL CHALLENGES....



## The need to replace fossil-based products in agriculture

Plastics are widely used in agriculture as they **present significant advantages in terms of logistics and even water use efficiency**. Mulch films for instance, representing 80% of plastics in agriculture, prevent moisture loss.

Unfortunately, plastics used in agriculture are **not sufficiently recycled** due to contamination at use phase and a significant part stays in the fields, generating **microplastics**.

## A valuable but underutilised waste, with potentially harmful effects.

Feathers contain nearly 90% keratin, a valuable protein that can be a source for biodegradable materials. But currently, only around **25% of feather waste is valorised** for animal feed or fertilizers.

Besides, unprocessed feather waste contains high quantities of microorganisms. When landfilled those represent a considerable risk of environmental pollution!

---

The European poultry  
sector generates

**3.6 million**

tonnes of waste feathers  
each year

---

## ... INTO OPPORTUNITIES:

High value end-products for agricultural applications

- ▶ In line with the **EU Bioeconomy Strategy**, UNLOCK proposes to valorise feather waste and generate the following **innovative bio-based products** for agricultural applications:



**Mulch films**



**Hydroponic foams**



**Nonwoven geotextiles**



**Forest and seed trays**

## Did you know?

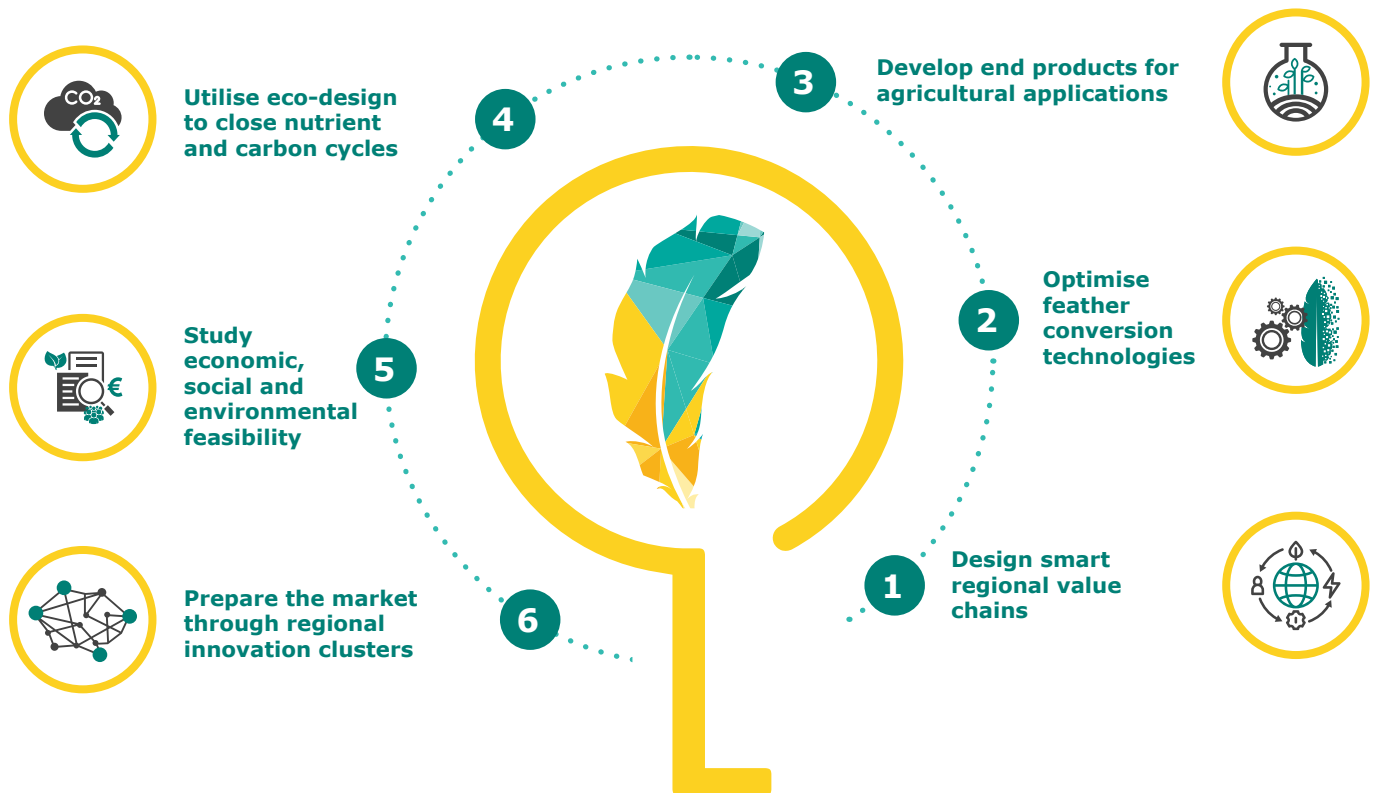
Keratin-based materials are targeted **to be zero waste and allow for controlled biodegradability, while also enriching soils.**

- ▶ The biodegradability of UNLOCK's products will be adjusted to the crop duration
- ▶ The products will release nitrogen with a fertilizing effect.



# A COMPREHENSIVE APPROACH TO RELEASE THE POTENTIAL OF FEATHERS

From storage to treatment efficiency, product performance to market readiness, UNLOCK finds **solutions to every hurdle along the value chain to create a feather-based bioeconomy.**



# Project partners

UNLOCK is driven by a well-balanced consortium that covers the whole value-chain, from feedstock and supply chain analysis to processes, end-product fabrication and sustainability assessments.



## COORDINATION

**Sarah Montes**

[smontes@cidetec.es](mailto:smontes@cidetec.es)

## COMMUNICATION

**Greenovate! Europe**

[info@greenovate-europe.eu](mailto:info@greenovate-europe.eu)



This project has received funding from the Bio-based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement N° 101023306.

