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22 JUNE 2021

Thematic sessions

From Farm to Fork

An overview 2014-2020

Rebecca Grossberg

Project Officer, Interreg NWE Joint Secretariat

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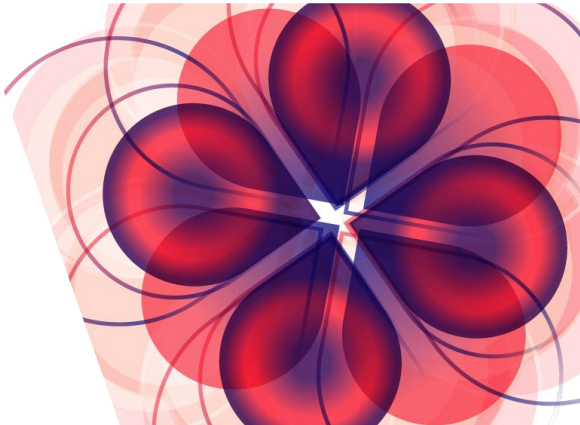
From Farm to Fork

Session agenda

- **How *Farm* and *Fork* are addressed in the current programme**
- **Presentation of two Interreg NWE projects**
  - **IDEA - I**mplementation & **D**evelopment of **E**conomic viable **A**lgae-based value chains in NWE, *Leen Bastiaens*
  - **FABulous Farmers** - Functional Agro-Biodiversity as a nature-based solution to reduce use of natural and material resources, delivering benefits for farmers, society and the environment in NWE, *Bart Schoukens*
- **How *Agrofood* will be addressed in the new Interreg programme 2021-2027**
- **Break sessions of 2 x 25 minutes**



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An overview 2014-2020

Inge Keymeulen

Project Officer, Interreg NWE Joint Secretariat

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Overview of NWE projects in the field

- **12 projects**
  shift from a linear agro-system to a circular agro-ecosystem, optimizes reuse of natural resources (soil, water and biodiversity), become less dependent on exhaustible external inputs, reduce food waste, decrease of GHG emissions in agriculture

- Around **130** partners involved

- **€ 31,5M** ERDF budget dedicated to topic

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Frameworks for action

Contributions to other Frameworks

- EU Green Deal
- EU 2020 Strategy for Sustainable Growth
- EU Action Plan for a Circular Economy
- SDG 12: Ensure sustainable consumption and production patterns

NWE Priority 1: Innovation

- S.O. 1: Enhance innovation performance of enterprises throughout NWE regions

NWE Priority 2: Low Carbon

- SO3: Facilitate the uptake of low carbon technologies, products, processes and services

NWE Priority 3: Resource and Materials Efficiency

- SO5: Optimise (re)use of material and natural resources in Northwest Europe

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REAMIT – Reduction of food waste in supply chains for fruits, vegetables, meat and/or fish, using existing Big Data technologies

ALG-AD - Creating value from waste nutrients by integrating algal and anaerobic digestion technology

QCAP - Development of laser-based interactive storage system for potatoes, apples, pears, blueberries

ValuSect – Transfer of knowledge on efficient use of insects and insect components as building blocks for new food products

ICare4Farms - increase the use of Solar Thermal Energy in farming in the NWE regions, to increase the share of renewable energies and the decrease of GHG emissions in agriculture

IDEA - Implementation of economic viable algae-based value chains in the cross-boundary rural area of NWEurope

UV-ROBOT - Develop innovative autonomous UVc-vehicles and crop specific strategies for mildew control in horticulture

Food Heroes - Reduce food waste in the first parts of the food chain thus enhancing a more efficient use of resources and a circular economy in NWE

MiteControl - develop, test and implement innovative integrated pest management programmes to control poultry red mite infestations in NWE and beyond

GROOF - combine skills of construction and agricultural sector to jointly reduce CO2 emissions and energy waste by creating a European market for integrated rooftop greenhouses

HappyMoo - enable farmers and veterinarians in the dairy sector to increase animal health, and product quality

FABulous Farmers - accelerate the uptake and implementation of Functional AgroBiodiversity (FAB) by farmers and land managers in NWE

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HappyMoo

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From Farm to Fork

Delivering tools to monitor cows' welfare

BE | CH | DE | FR | IE | LU | UK

OBJECTIVES

HappyMoo aims to provide dairy farmers, vets and extension workers with tools to monitor cows' welfare and to protect them from diseases, hunger and stress, using the milk mid-infrared composition, thus going beyond criteria only related to the cowshed environment.

ACHIEVEMENTS

- Development of a transnational database to store milk data and cows' phenotypes.
- Organisation of workshops with experts in the field of animal welfare and stress.
- Implementation of an animal experiment in Belgium to identify biomarkers of chronic stress.
- Adaptation of a German model to detect mastitis.

PUSHING RESULTS ONE STEP FURTHER

HappyMoo is envisaging collaborations with third parties to share datasets and improve the strength of the existing or future equations.

2018-2022

Total Budget

€4.1 M

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ICaRE4Farms

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Increase the capacity of Renewable Energies (RE) in Farms in the North West Europe Region by using Solar Thermal Energy (ICaRE4Farms)

BE | FR | IE | NL | UK

2019-2022

Total Budget

€3.4 M

9

PARTNERS

OBJECTIVES

Increase the use of Solar Thermal Energy in farming in the NWE regions, increase the share of renewable energy and decrease of GHG emissions in agriculture

ACHIEVEMENTS

- Analysis of the solar thermal electricity Market and agricultural applications in NWE.
- 21 next generation STE systems will be implemented and will save 481 tonnes of CO_2 per year (23 tonnes of CO_2/system/year) equivalent to 0,01% of CO_2 emissions in agriculture in NWE (Eurostat, 2016).

PUSHING RESULTS ONE STEP FURTHER

Potential collaboration with STE system installers and develop a network of distributors around NWE. Clustering with other innovative energy generating solutions to offer the most impactful and appropriate solution to the farmers.

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Two examples of Farm to Fork projects

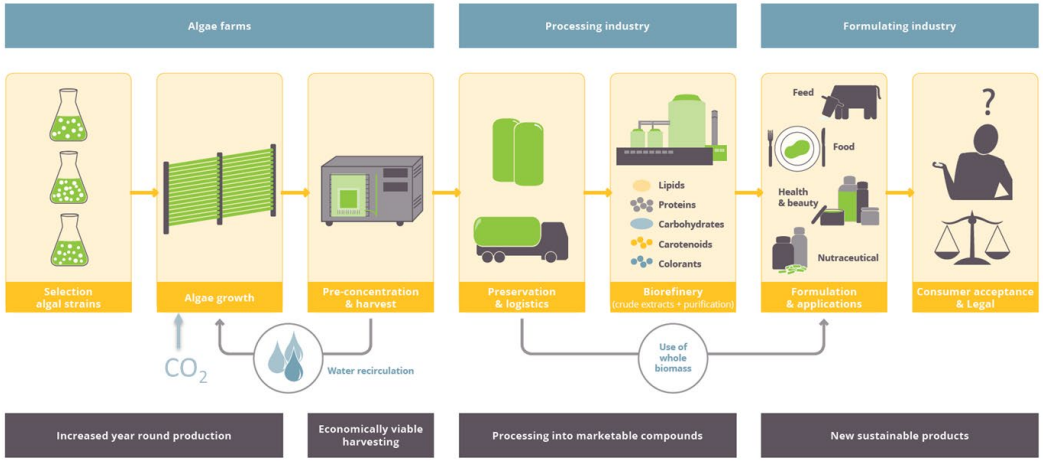
- **IDEA - Implementation and development of economic viable algae-based value chains**
  - Leen Bastiaens
    - Vlaamse Instelling voor Technologisch Onderzoek (VITO: Flemish Institute for Technological Research)

- **FABulous Farmers – Functional AgroBiodiversity (FAB) to reduce the use of natural resources**
  - Bart Schoukens
    - AgroNature Flanders (Boerennatuur Vlaanderen)

Thematic sessions

Implementation & Development of Economic viable Algae-based value chains in NWE

Leen Bastiaens - VITO - Belgium



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Challenges

Renewables & sustainable resources

- Consumer interested in more healthy food/feed:
- replacing antibiotics & imported proteins

Algae have potential as such source:

- CO_2 + lights + nutrients → algae biomass
- Algae biomass is a source of multiple valuable & healthy compounds
- Algae value chain not fully developed in NWE

Innovation in primary sector – empty greenhouses

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Why NWEurope?

Climate:

- Much research focused on Southern Europe (more sun)
- NWE may require other approach, other algae species & growth systems (greenhouses)

Larger territory than country:

- Cultivating biomass (algae farms) will happen at several location
- Biomass processing: can be centralized over a larger region

Empty greenhouses in NWE

- Due to cheaper production elsewhere
- Focus on closed systems → higher valuables → economic viability increases

Relevant knowledge & infrastructure available in different countries from NWE

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Main objective

IDEA = Implementation & Development of Economic viable Algae-based value chains in NWE

Sub-objectives
1. Year-round algae production in NWE in a economic & sustainable way
2. Processing of algae biomass into marketable compounds
3. Concept of an algae value chain implementation plan
4. Long-term impact

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IDEA-project & Consortium

Title: Implementation & Development of Economic viable Algae-based value chains in NWEurope (IDEA)

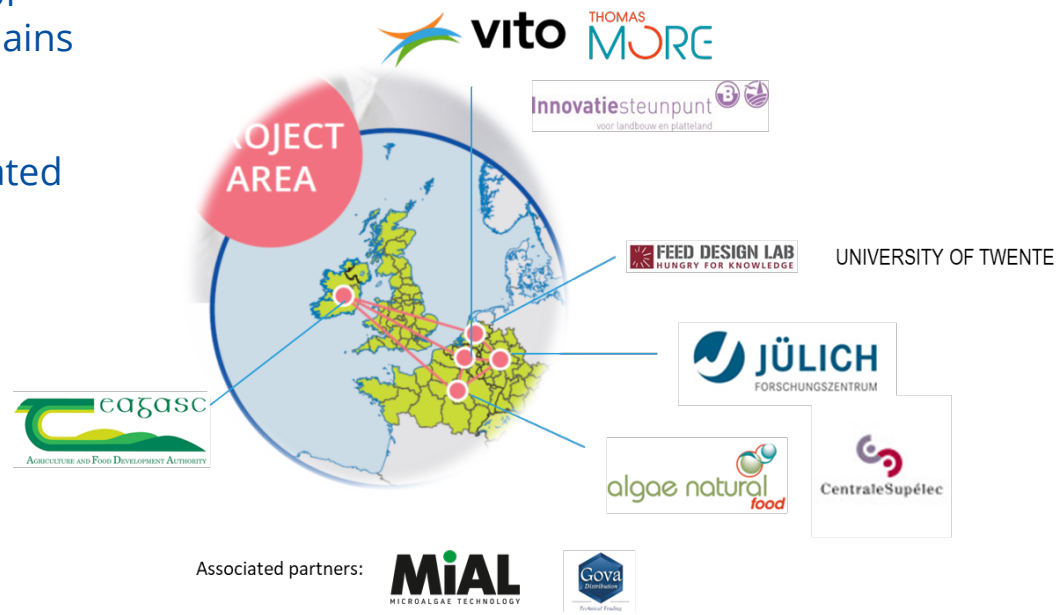
Consortium: 9 Full partners & 2 associated partners:
Belgium, Germany, France, The Netherlands, Ireland

Duration: 9/2017 – 12/2020 →10/2021

Project budget:
Total budget: 4.931.632 euro
Co-funding ERDF: 2.958.979 euro

Lead Partner: VITO

Website: www.nweurope.eu/idea



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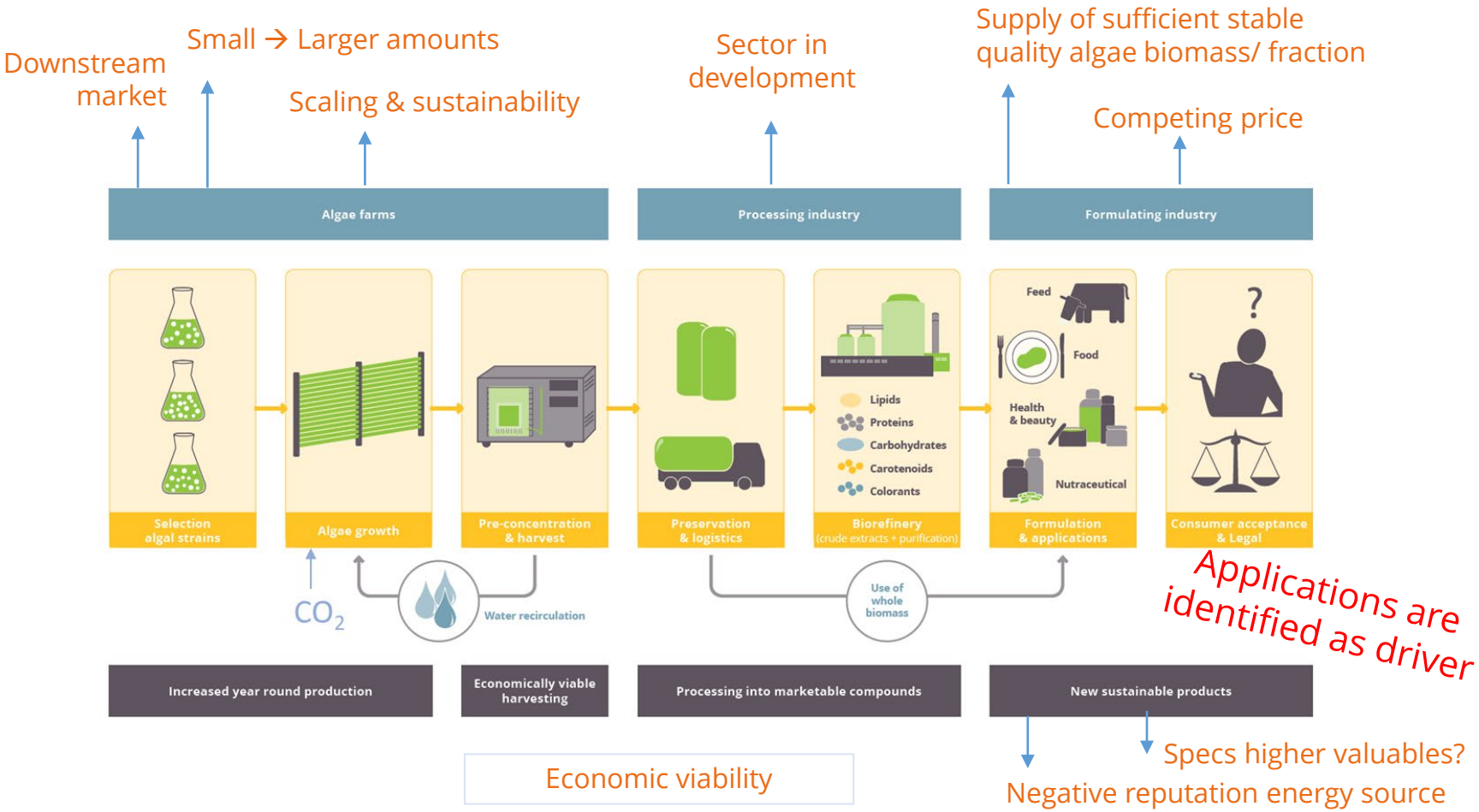
Challenges of algae value chains



Implementation & Development of Economic viable Algae-based value chains in NWE

1. Year-round algae production in NWEurope

1-Algae adapted NWE climate

2-Year-round production of algae biomass in NWE at pilot scale

3-increasing the sustainability of algae growth & harvesting

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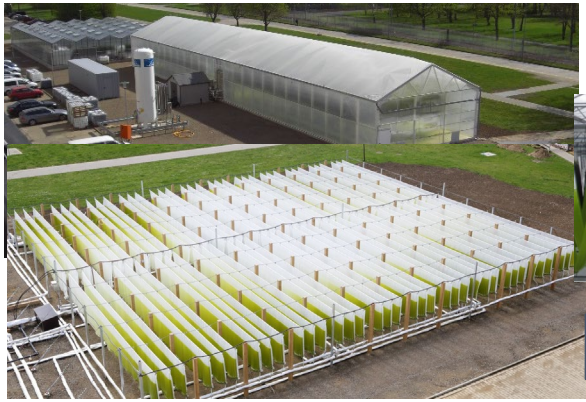
Algae cultivation

Existing pilot infrastructure:

Year-round cultivation:

Germany:

JÜLICH FORSCHUNGSZENTRUM



Greenwall

V-bags

3000 - 18000 L

Mixed culture comprising: *Chlorella*, *Scenedesmus* & *Synechocystis* (composition changes with season)

Belgium:

THOMAS MORE

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Tubular photobioreactors

2*300 L – 2*1500 L

Set of altering algae
Summer: *Nannochloropsis gaditana*
spring/authumn: *Porphyridium*
Winter: *Chloromonas*

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Sustainability aspect

Water & medium re-use:

VITO MAF- technology

- = Membrane Algae Filtration
- Pre-concentration of algae
- Medium recycling
- Continuous harvest

CO_2 capture from air :

- Sorption-based technology

Compact unit ready & Mobile

UNIVERSITY OF TWENTE

2. From algae biomass to marketable products

1. Preservation of algae biomass after harvest
2. Fractionation via biorefinery
3. Application tests & product formulation

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Wet preservation of algae biomass

Bridging gap between algae biomass production and its use in marketable compounds

Wet preservation:
- ‘ at algae farm’
- In storage vessels → till collection like in milk sector
- Impact: T, algae density, …

Algae species:
Nannochloropsis, Porphyridium, Chlorella

Conclusions:
Up to 1 week at 8°C

Storage vessels

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Biorefinery of algae biomass – some examples

Nannochloropsis

Cascading biorefinery
- Lipid extract
- Defatted biomass

Lab to pilot

Porphyridium

Cascading biorefinery
- EPS recovery
- Phycoerythrine
- Sugar enriched fraction
- Protein enriched fraction

Lab to pilot

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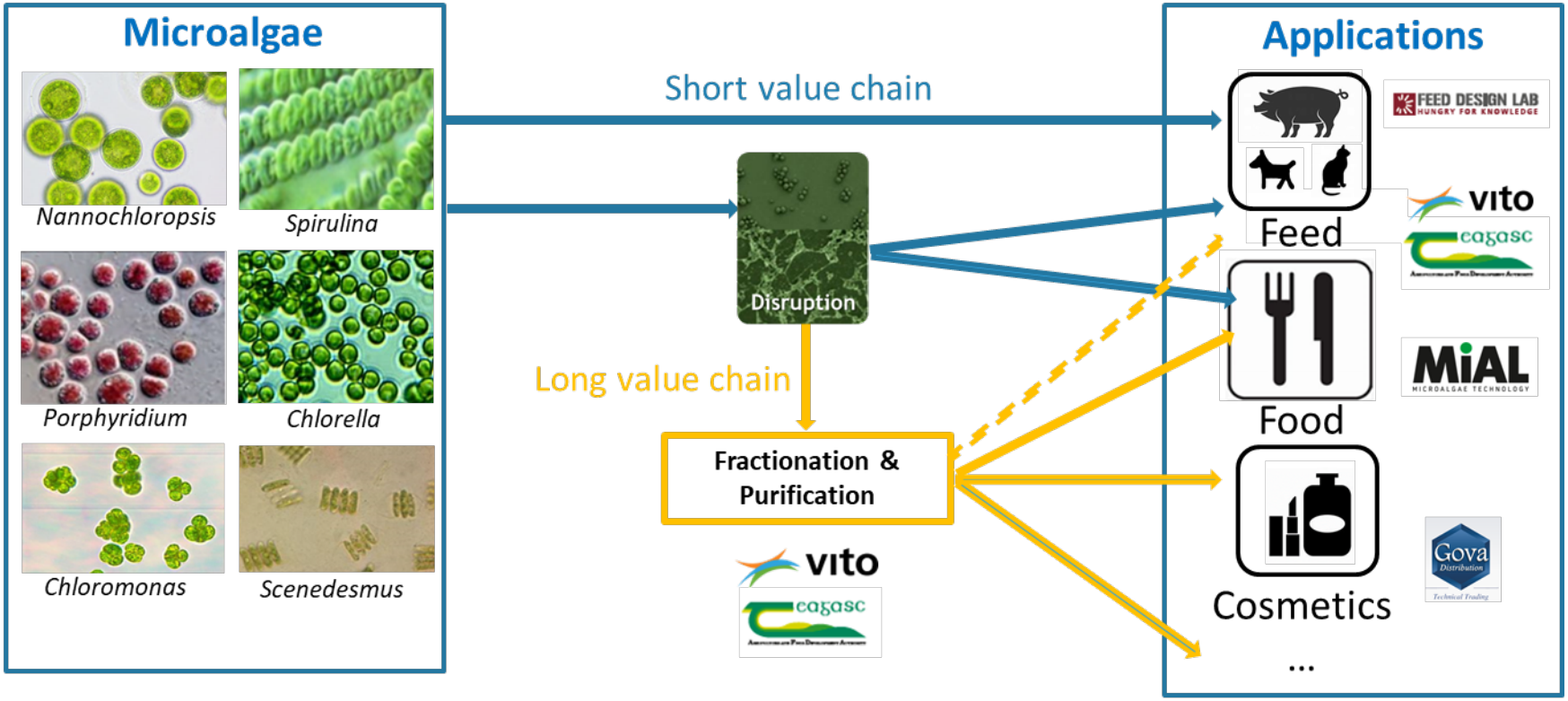
Applications



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Applications

Phase 1: whole biomass
(disrupted & non-disrupted)

Phase 2: algae fractions

Selections

Small scale analyses/tests to identify potential application domains for algae (phase I) and algae fractions (phase II)

- Composition analyses
- Technical functionalities; digestibility, ..
- Bioactivity tests

Formulation (feeds, foods, cosmetic products, ...)

Evaluation of formulations:

- Feed: Animal tests
- Food: taste, ...
- Cosmetics:

Flagship markets
- Aquaculture
- Cosmetics
- Petfood

Safety aspects

Selection of 2 formulations tested in real life

General approach – application part

Phase 1: whole biomass
(disrupted & non-disrupted)

Phase 2: algae fractions

Selections

Small scale analyses/tests to identify potential application domains for algae (phase I) and algae fractions (phase II)

- Composition analyses
- Technical functionalities; digestibility, ..
- Bioactivity tests

Formulation (feeds, foods, cosmetic products, …)

Evaluation of formulations:

- Feed: Animal tests
- Food: taste, …
- Cosmetics:

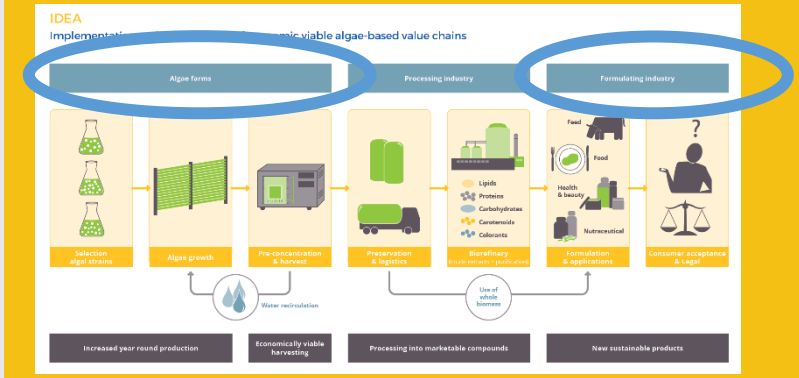
Selection of 2 formulations
tested in real life

Safety aspects

Implementation & Development of Economic viable Algae-based value chains in NWE

3. Algae value chain implementation plan

1. Assessment of logistic and techno-economic aspects
2. Platform for linking demand and offer of algae (fractions)
3. Roadmap towards implementation algae value



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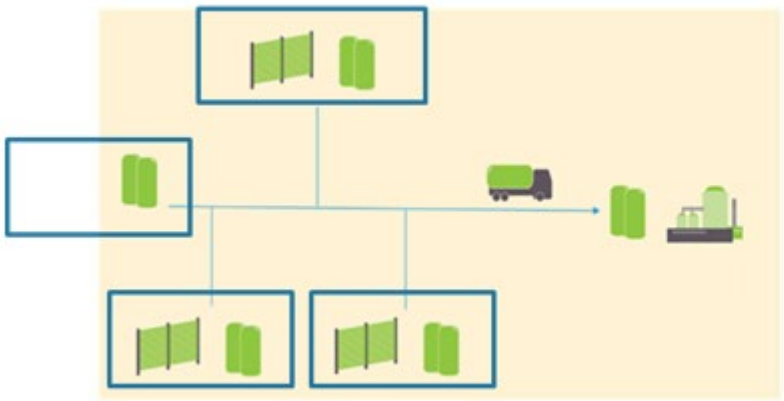
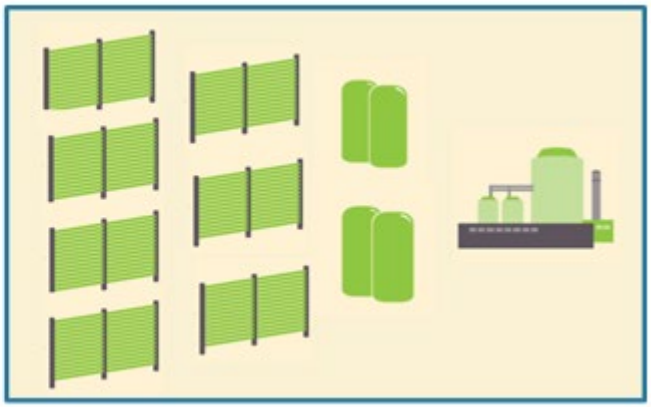
Value chain assessment



Cluster (milk model)



Integrated approach

4. Long-term effects

1. Needs of stakeholders
2. Translating roadmaps into specific plans for roll out of algae-based value chains in NWEurope

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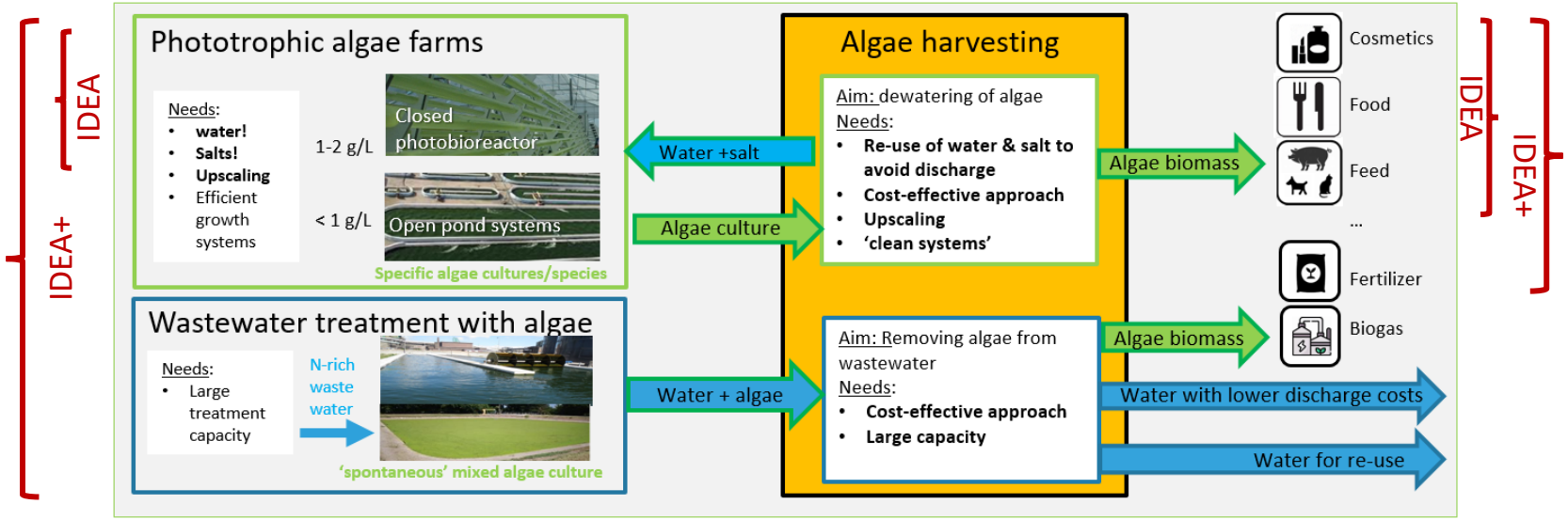
Pushing results one step further

Capitalisation project IDEA+ is about to start:

- Increasing economic feasibly of algae value chain by re-use of side-stream
  - MAF-harvest of algae from open ponds
  - Exploring application of the algae biomass
- New application domain: crop protection



Implementation & Development of Economic viable Algae-based value chains in NWE

WP-C Communication

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Online IDEA dissemination event

- When? 6th of July 2021
- Aim: Dissemination of IDEA results & interact sith other projects/parties
- Programme – see website (www.nweurope.eu/idea)
  - Plenary sessions
  - E-poster session
  - Breakout discussion session
- No registration fee – registration required

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Acknowledgements

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Website: www.nweurope.eu/idea

AGENTSCHAP INNOVEREN & ONDERNEMEN
Vlaanderen is ondernemen

Full partners:

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CentraleSupélec
FEED DESIGN LAB HUNGRY FOR KNOWLEDGE
THOMAS MORE
cagasc
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Breakout sessions

FABulous Farmers

Bart Schoukens

https://www.fabulousfarmers.eu

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Challenge

- Expectations to agriculture :
  - Tackle climate change
  - Delivering more and better ecosystem services

➔ Improve recourse efficiency by better water management and improved soil quality by using Functional AgroBiodiversity

(targeted stimulation of biodiversity to deliver ecosystem services such as pest and disease control, pollination soil and water quality)

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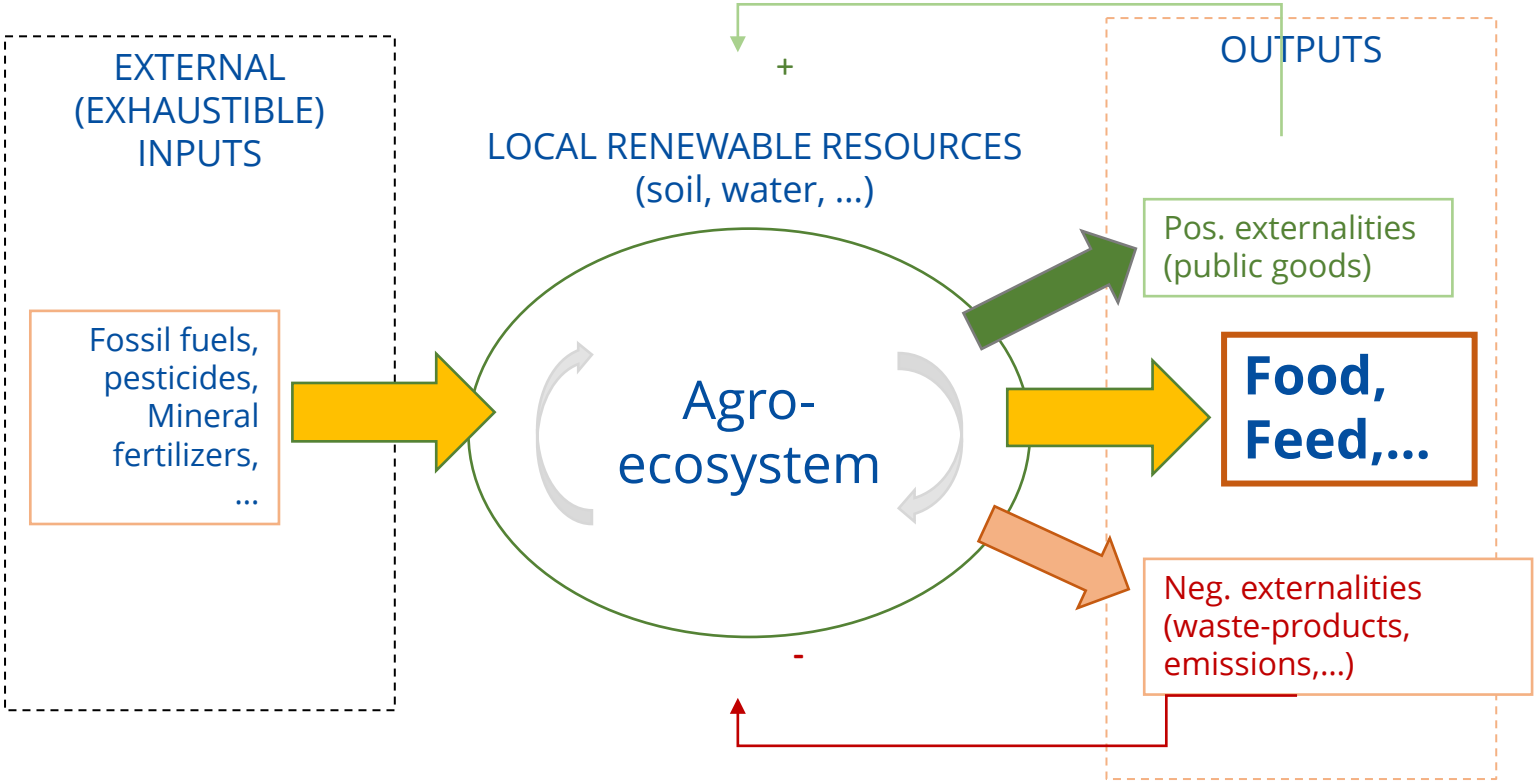
Current situation in NWE



High production, but also a strong **dependency on external inputs** + **negative effects** on the quality of natural resources (soil, water, biodiversity)

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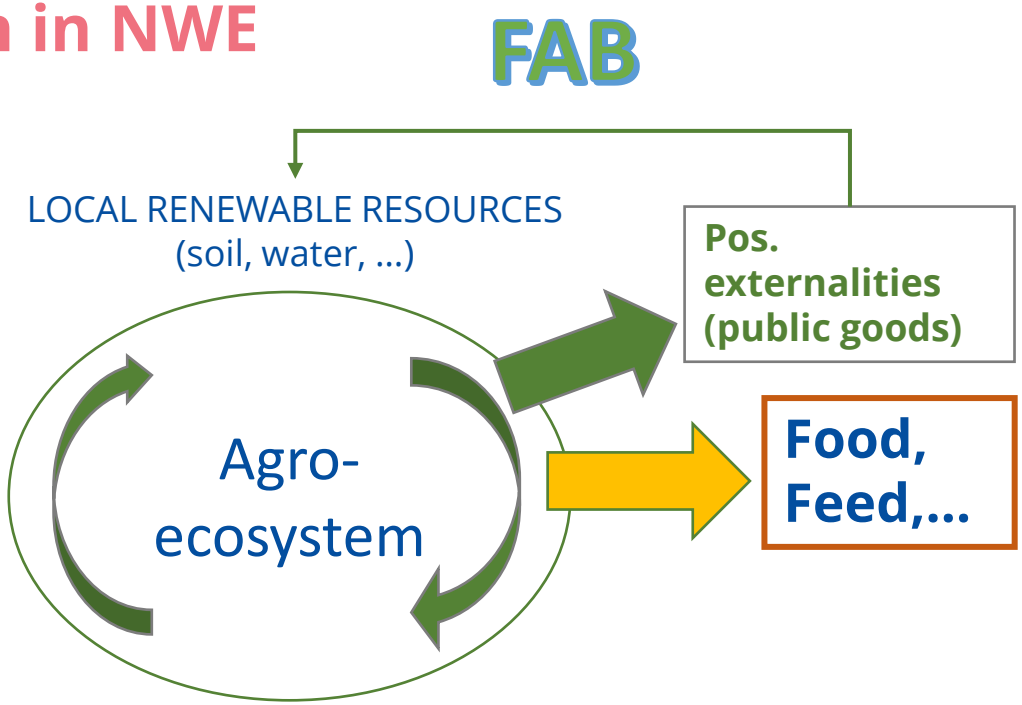
Desired situation in NWE



Circular agro-ecosystem

More **robust** to disturbances, optimizes **reuse of natural resources** and is less dependent on exhaustible **external inputs** whilst delivering benefits to **farmers**, **society** and the **environment**.

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Project objective :

'FABulous Farmers' aims to accelerate the uptake and implementation of **Functional AgroBiodiversity (FAB)** by farmers and land managers in NWE (BE, NL, LUX, UK, FR) as a nature-based solution to **shift from a linear agro-system to a circular agro-ecosystem** that is more robust to disturbances, **optimizes reuse of natural resources** (soil, water and biodiversity) and is **less dependent on exhaustible external inputs** whilst delivering benefits to farmers, society and the environment.

- **FAB – solution toolkit**
- **Self-sustainable NWE-wide FAB-learning network**
- **Reduce external inputs by an average of 30%**

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Results

- **Achievements up to now?**
  - Review current metrics & indicators for monitoring environmental performance of FAB-measures
  - 12 Local FAB-learning networks, FAB-actionplans & FAB-landscape integration plans
  - EU-policy paper en EU-policy event
  - Over 100 farmers have been supported in implementing FAB-measures

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Achievements at the end of the project :

- 10 FAB solutions tested in 12 pilot regions over 5 countries FR, NL, UK, BE, LUX
- 315 farms – 25.000 ha
- 12 tailor-made collective FAB action plan on 25000 ha of agricultural land
- Improved functioning of agro-ecosystems (e.g. pollination, biological pest and disease control, water retention, soil fertility…) result in on average 30% decreased chemical inputs (pesticides & fertilizers).
- 1 EU- & 5 approved policy papers embed FAB in the regional policy

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Results

- Unforeseen benefits or challenges have emerged during the course of project implementation :
  - Farms not participating as a whole : more fragmentated results
    ➔ **working with field-diaries**
  - Monitoring : not possible to work with one European lab
    ➔ **results will be contextual for each region but gives overall result**
  - Creating extra economic incentives for farmers : looks promising, but these value chains are very long ➔ result only on the long term
    ➔**Capitalisation-WP**
  - Recent policy and societal changes encouraging citzens and componies to invest in green practices
    ➔ **Capitalisation-WP**

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Pushing results one step further

- **After 5 years :**
  - further and more intensive implementation of FAB actions on 3.500 farms (250.000ha)
  - further improved ecosystem functioning ensuring reuse of natural resources
  - average 35% decreased chemical inputs.

- **After 10 years :**
  - further and more intensive implementation of FAB actions on 9.500 farms (700.000ha)
  - further improved ecosystem functioning ensuring reuse of natural resources
  - average 40% decreased chemical inputs.

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Pushing results one step further

- Capitalisation WP approved :
  - Develop digital marketplace concept for FAB ecosystem services with LT – developmentplan
  - 5 platforms (UK, BE, FR, NL, GER)
  - Support for farmers in 2 supplementary regions (UK & GER)
  - 100 more farmers implementing FAB-measures

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Partnership

- **Main added-value of working together at NWE level**
  - some regions are ahead in certain areas ==> opportunity to learn quickly : e.g. ;
    - Hoeksche Waard - flower strips
    - ZALF – agora Natura
- **Reasons to keep on working with our partners in the future**
  - This is a strong partnership. Aim is to continue cooperating on FAB and valorisation of eco-system-services implemented by Farmers

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Thematic sessions

From Farm to Fork

Main features of the new Programme 2021-2027 regarding ***sustainable food systems***

Julia ERIPRET

Head of Project Unit, Joint Secretariat

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Priority 2

Smart and just energy transition

SO 2.1: Promoting energy efficiency and reducing greenhouse gas emissions.

SO 2.2: Promoting renewable energy.

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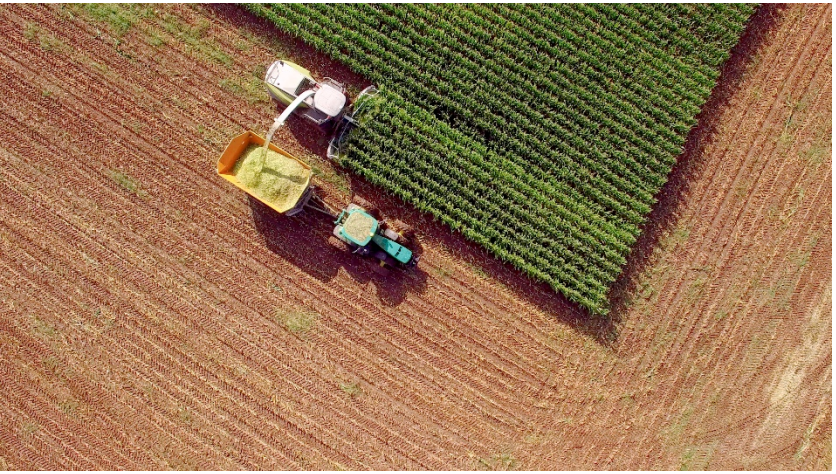
Priority 3

Transition towards a place-based circular economy



SO 2.6: Promoting the transition to a circular and resource efficient economy.

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Priority 4

Innovation for territorial resilience in NWE

SO 1.1: Developing and enhancing research and innovation capacities and the uptake of advanced technologies.

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Programme approach

- Involving different stakeholders through **multi-level governance models** (between businesses, regulators, local authorities, investors and local communities).
- Increasing **stakeholder capacity** to demonstrate, transfer and implement new/innovative integrated solutions.
- Contributing to behavioural change at societal level, **from citizens to industries**.

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What type of activities?

- Elaboration and implementation of **joint strategies or action plans**
- **Pilot actions** for testing tools/solutions upscaled
- **Capacity building** and **awareness raising activities**

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Browse through our latest publication to find out more about the impact of our projects.

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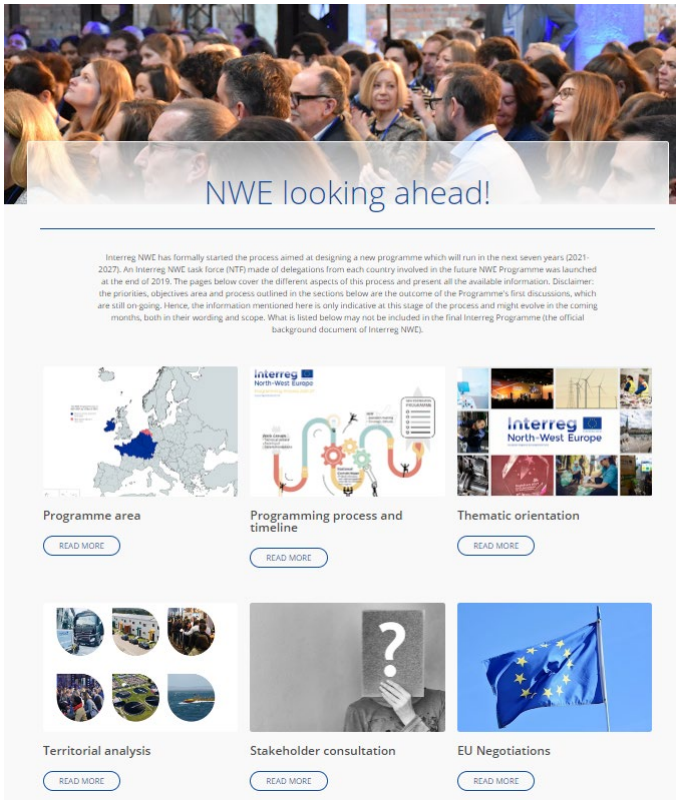
Thank you for taking part in our event!

Visit our Future Programme section for up-to-date content on Interreg NWE 2021-2027



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