Biotransform transition pathways to circular bioeconomy: the MooV tool to address the logistic challenges

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Agenda

1. Biotransform
2. MooV
3. MooV in Biotransform
4. Other successful example

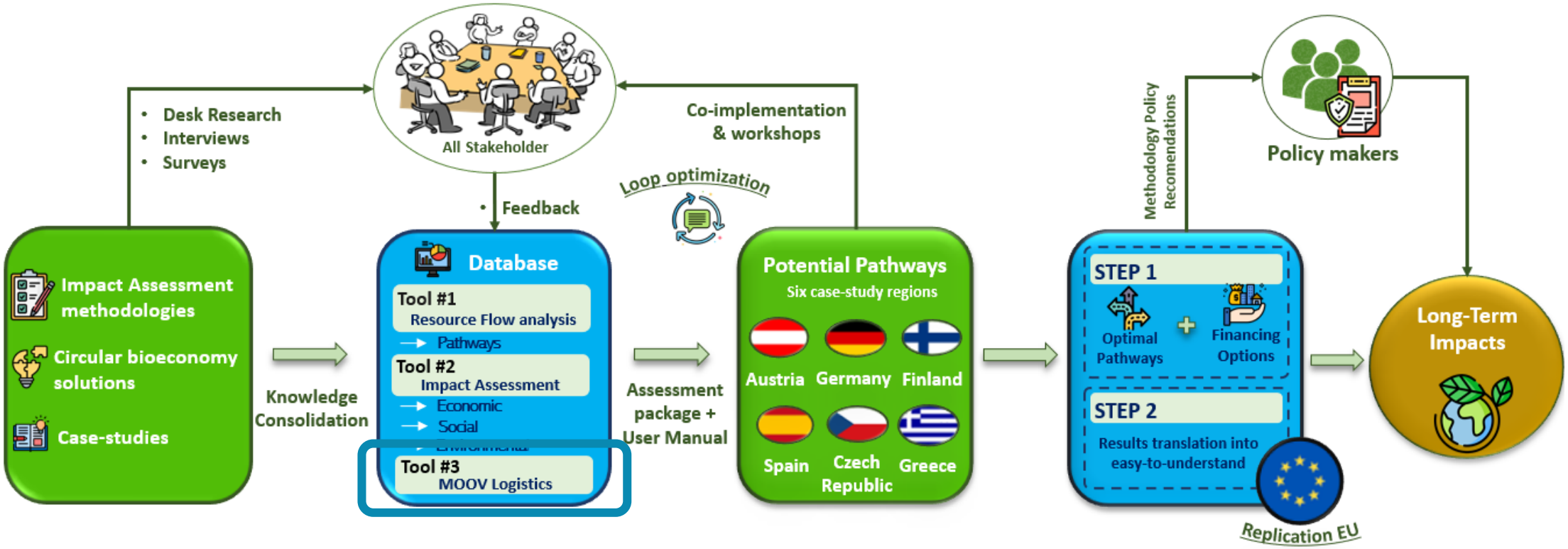
Biotransform

General information

- Website: https://www.biotransform-project.eu/
- Circular **BIO**economy **TRANSFOR**mation for whole regions through connected biorefineries
- Goals
  - Provides an ecosystem, for the transition from linear to circular bio-based systems.
  - Equips local policymakers with tools (assessment package – guidelines and recommendations) to set priorities serving environmental, economic, & social goals
  - Develops a framework to establish circular bio-based systems on 6 regions representing several important areas (forestry, agri-food, lake ecosystem, lignite and minerals and tourism), considering resources & infrastructures, conversion pathways, logistics, policies, strategies, & access to finance.
  - Builds on the concept of regenerative bioeconomy value cycles by tapping into what is there already and connecting the dots

Biotransform

Methodology & tools



MooV

General information

- See animation (3 min): https://moov.vito.be

- Supply chain optimization service
  - MooV model (LP, GIS, OL)
  - MooV team (programmers, engineers, consultants)

- Find the optimal supply chain configuration
  - Economic, environmental and/or social
  - Customize for specific needs, goals and constraints of the client (transport movements, material flows, seasonality…)
  - Existing, changing or new supply chain

- Support decision making
  - Analyze alternative strategies/supply chain variations
  - Simulate the impact of potential changes and critical decisions in the supply chain
  - Comparison of different pathways (as-is situation, to-be/what-if situation(s)…)
  - Result: graphs and tables with results (≠ license)

MooV

MooV methodology

DEFINE

DESIGN

DELIVER

RESOURCES

INSTALLATIONS

MULTIMODALITY

SPECS

SPECS

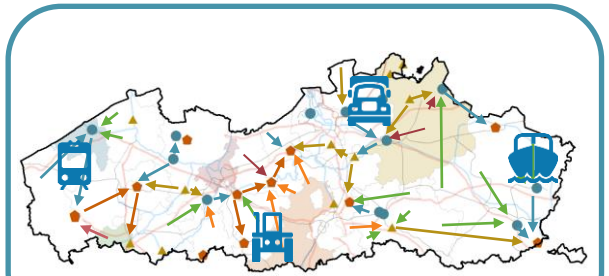
SPECS

SPECS

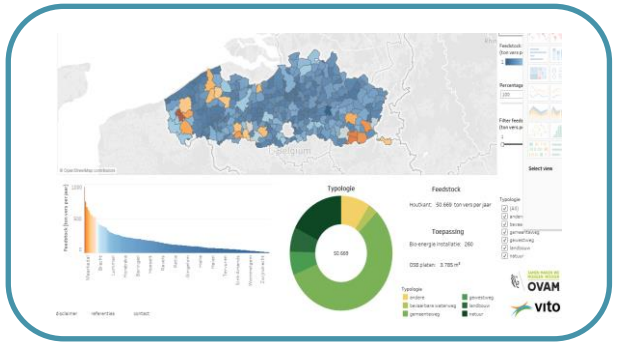
GOALS

OPTIMISATION

OPTIMISED VALUE CHAIN DESIGN



INTERACTIVE DASHBOARDS



MooV in Biotransform

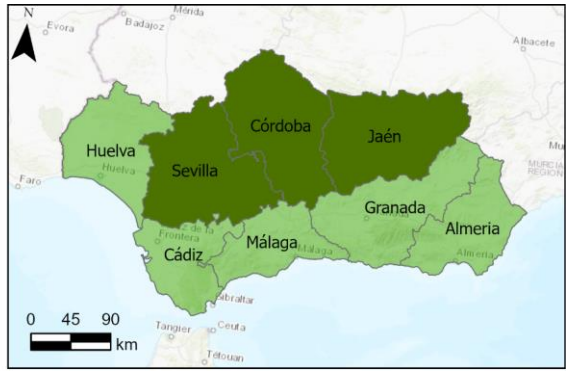
2 case-studies

Czech – Karlovy Vary case

Food waste

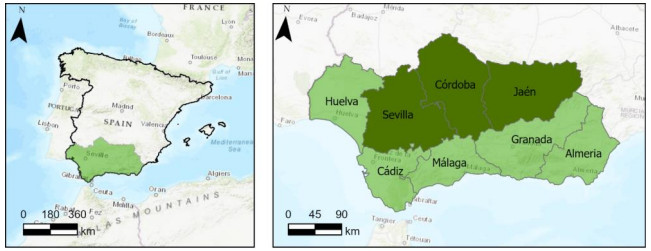
Spanning - Andalusian case

Olive tree prunings

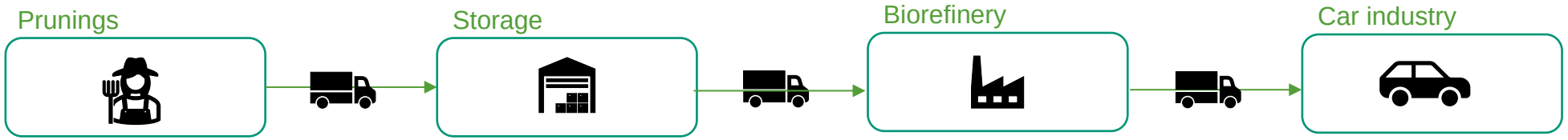


MooV in Biotransform

Spannish case

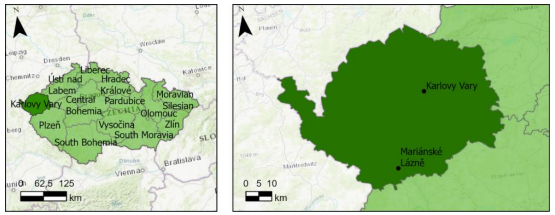


- In collaboration with CTA and Andaltec
- Andalusia – Jaen, Corboda and Sevilla
- Olive tree prunings
  - Current situation: shredded and used as organic fertilizers or burned
  - New situation: valorisation in biorefinery to produce polymers to use in the car manufacturing sector
- Logistic challenges – environmentally and financially
  - Where to install the biorefinery/ies? Capacity?
  - What is the benefit of a storage unit? Amount? Location(s)?
  - How to arrange the transport phases?
  - …

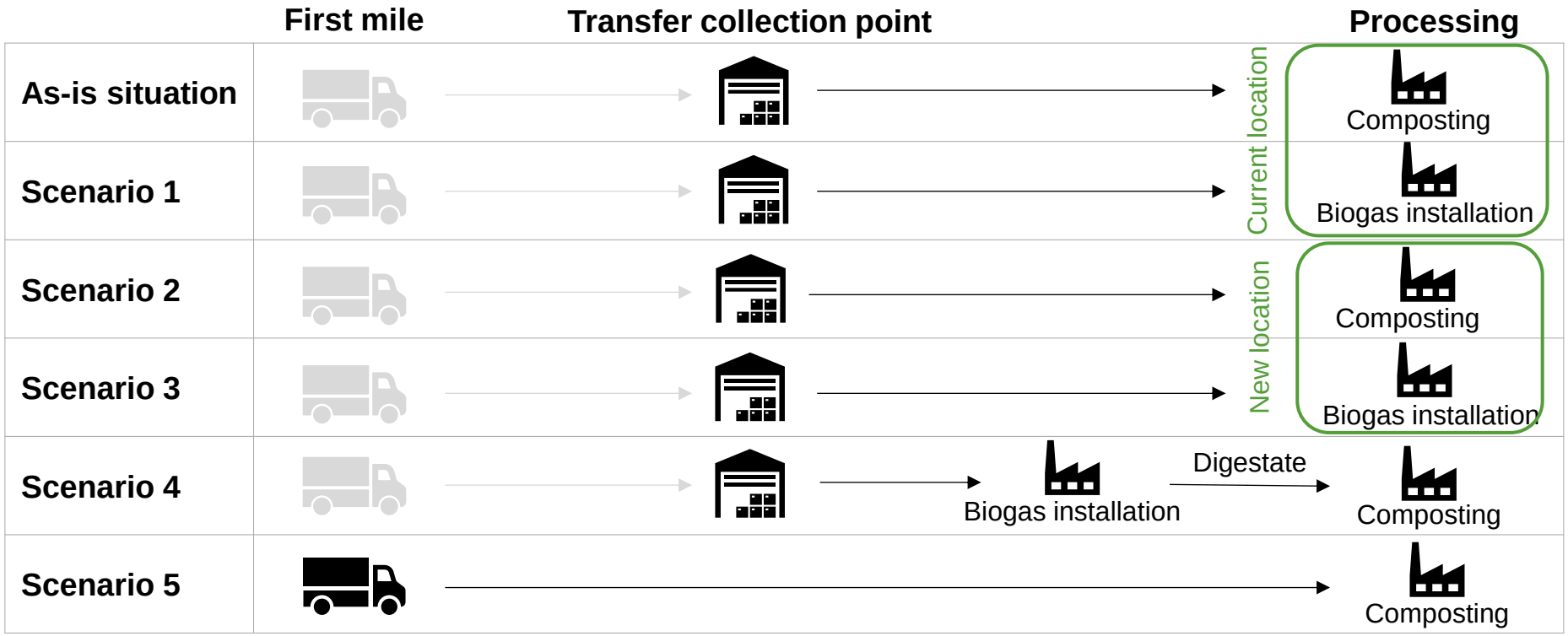


MooV in Biotransform

Czech case

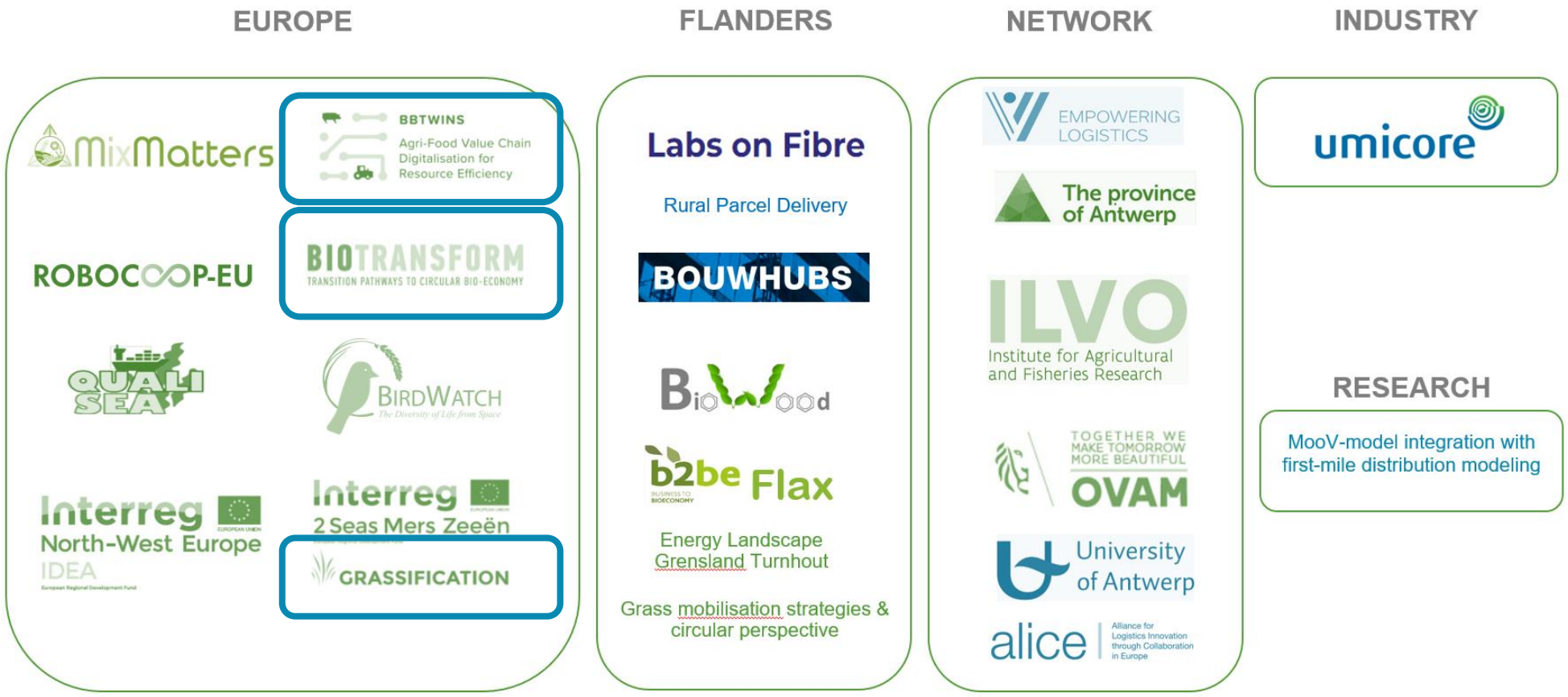


- In collaboration with EastHUB
- Karlovy Vary & Mariánské Lázně
- Food waste – domestic and touristic sector



Successful examples of the MooV-tool

MooV Portfolio



BBTWINS

Agri-Food Value Chain Digitalisation for Resource Efficiency

BBTWINS

Agri-food Value Chain Digitalisation for Resource Efficiency

Supply chain optimization of stone fruit farmers in Greece

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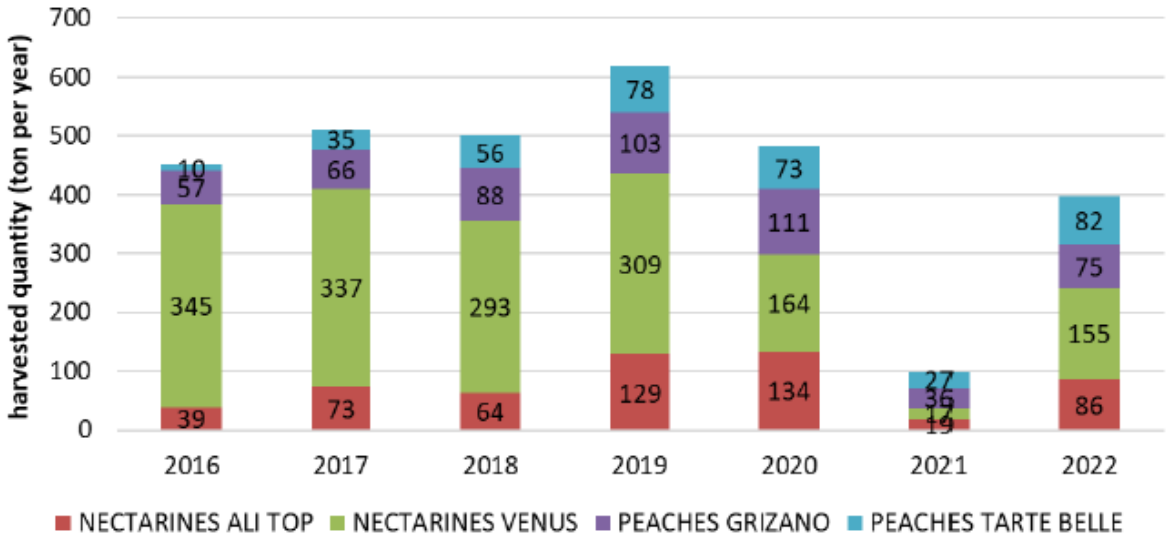
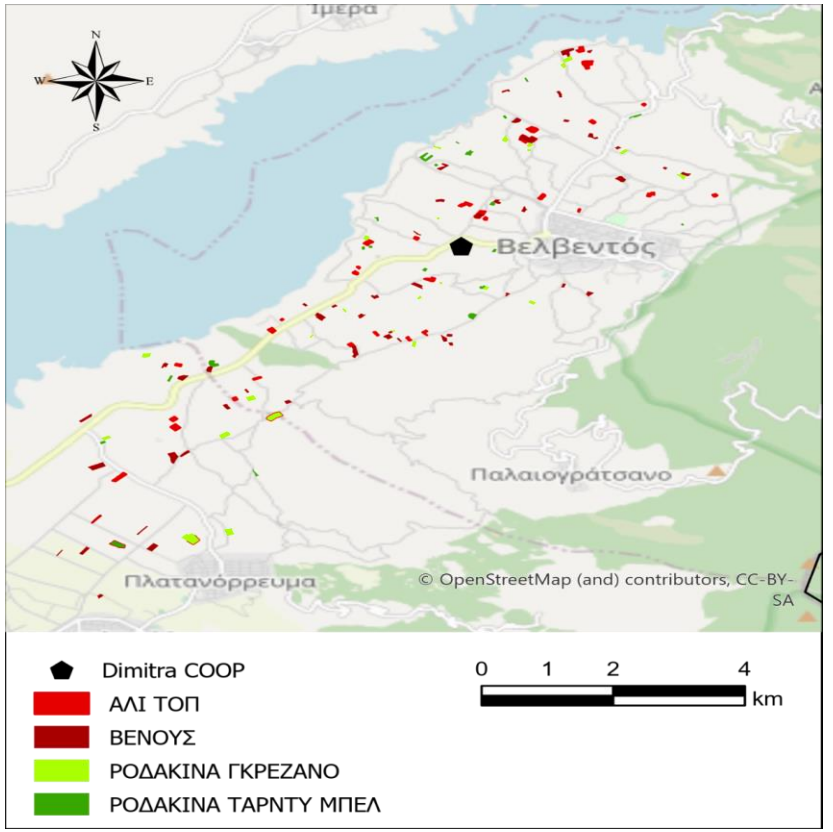
BBTWINS: Supply chain optimization of stone fruit farmers in Greece

General information

- Goal: Optimal logistics from field-to-cooperation
- Production data: 2016-2022
- Production volume: ca. 440 ton/y
- Fields: 100-150
- Varieties: 4 (2 nectarines & 2 peaches)

➔ Volume/field/day

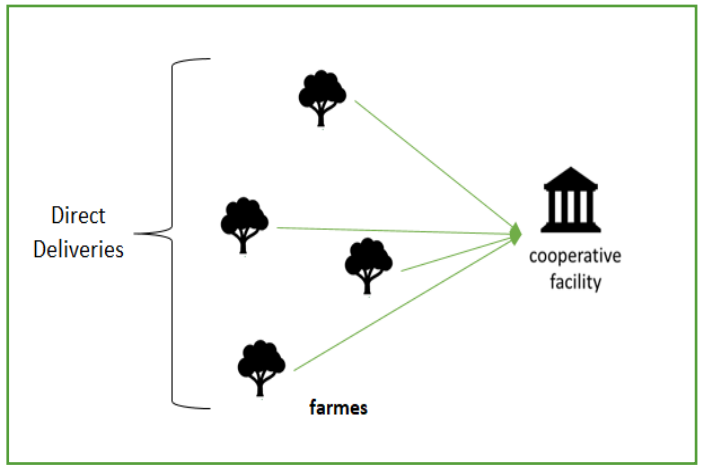




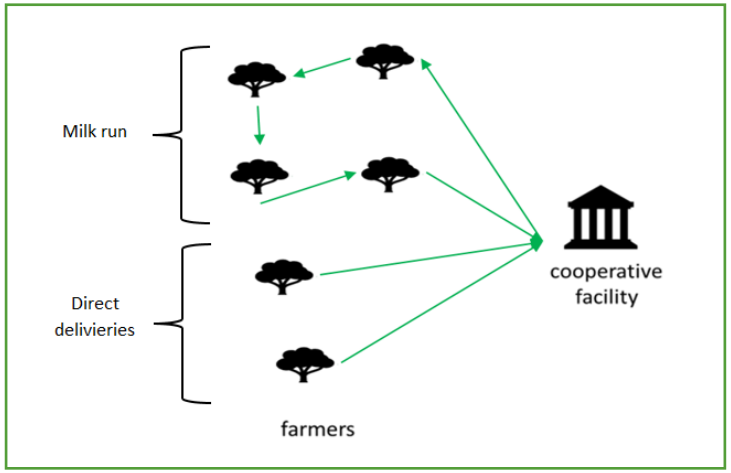
BBTWINS: Supply chain optimization of stone fruit farmers in Greece

Logistic scenarios – Dimitra case

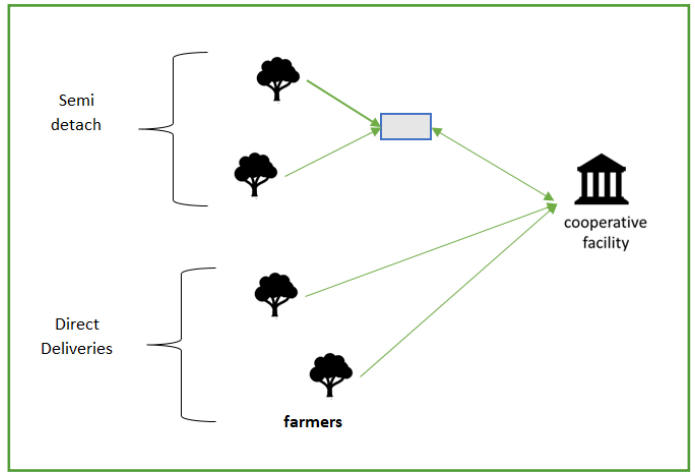
As- Is situation

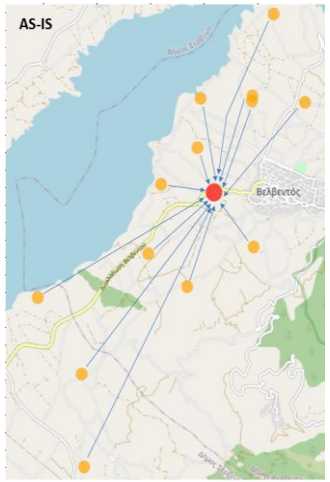


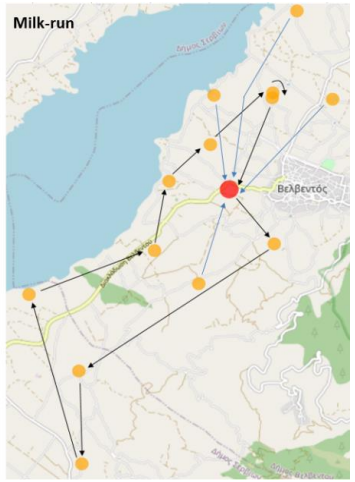
Organized pick-up round

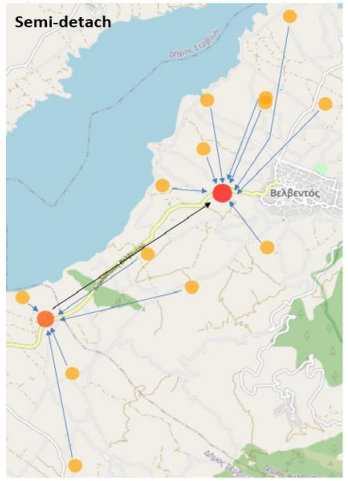


Semi-detached container



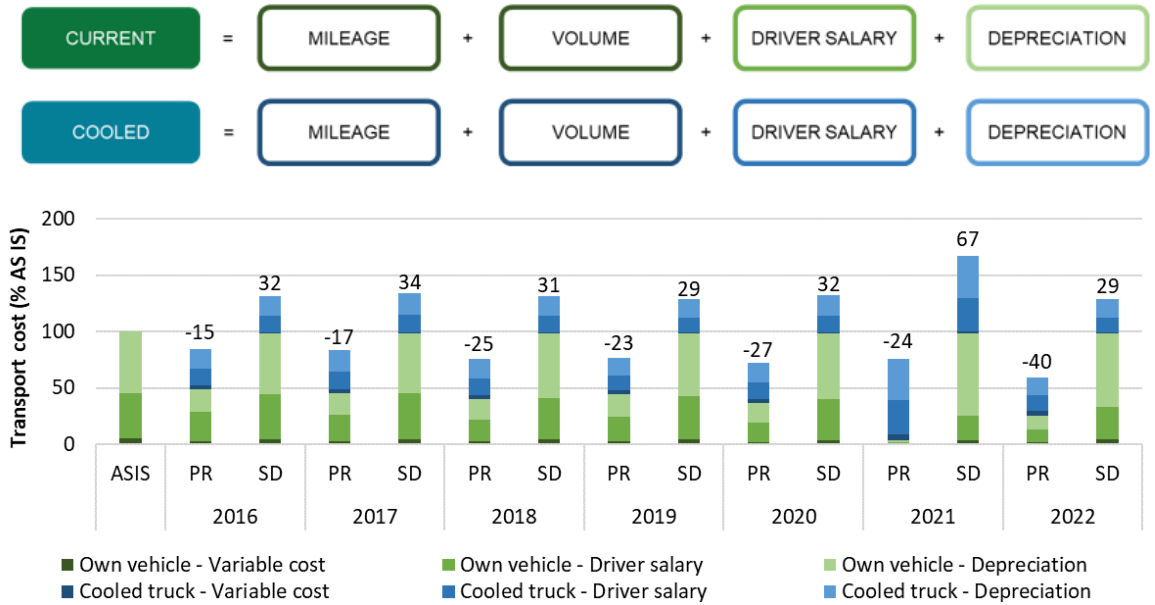


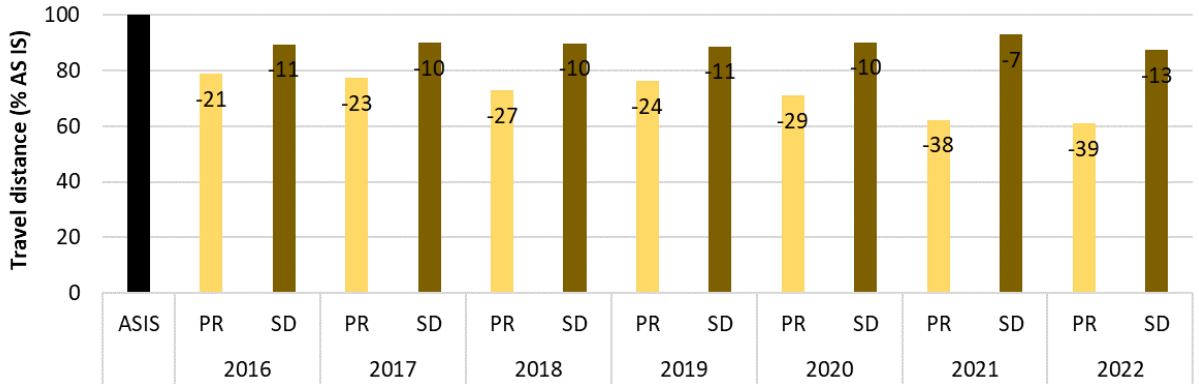


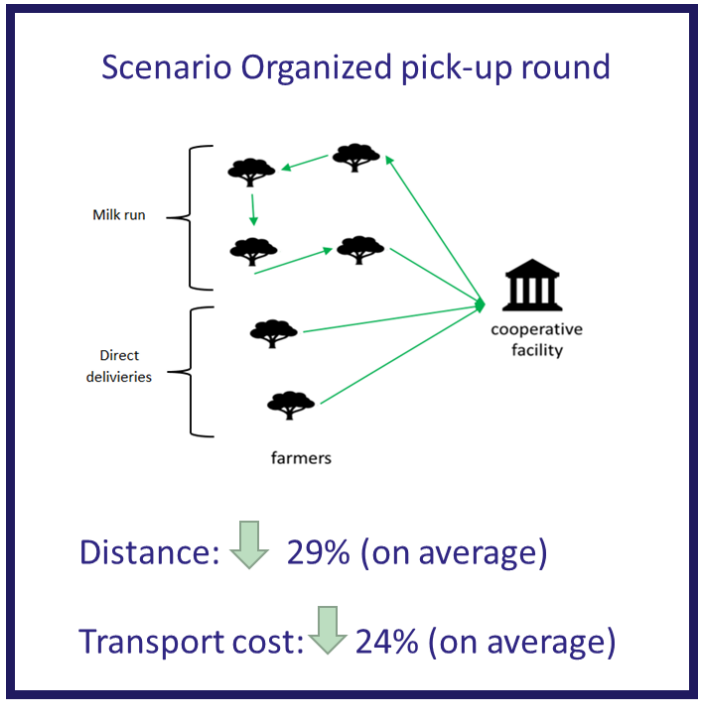


BBTWINS: Supply chain optimization of stone fruit farmers in Greece

Results evaluated logistic scenarios – Dimitra case



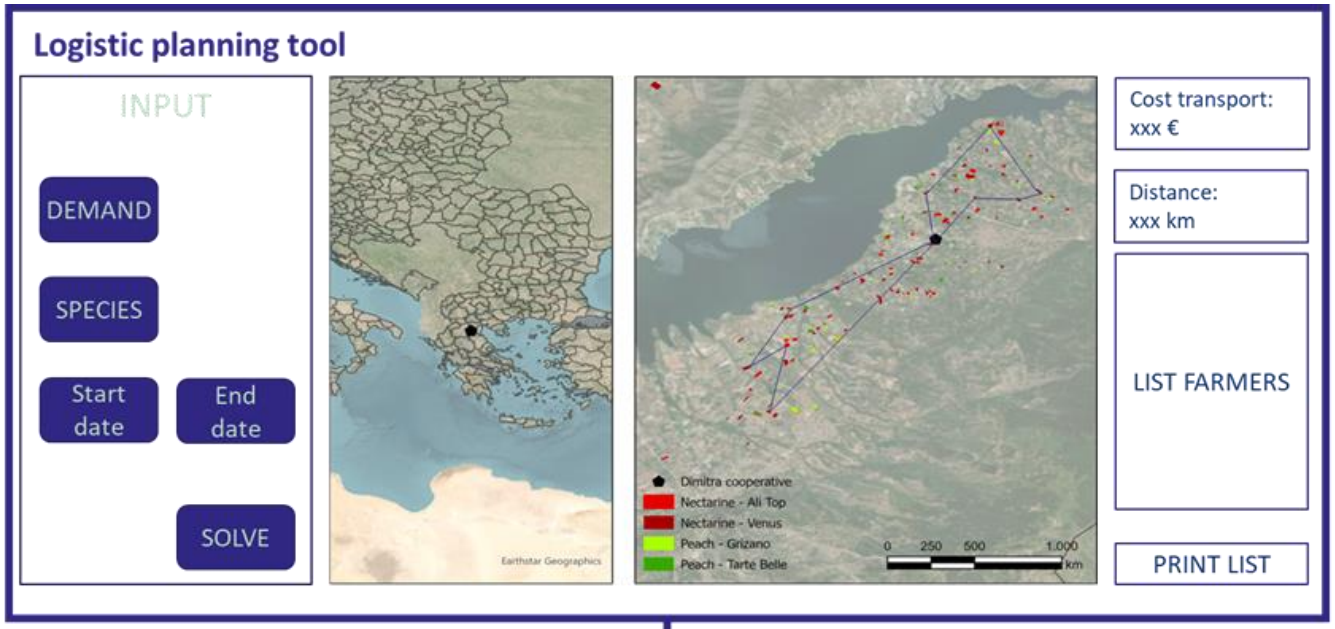




PR : Organized pick-up round
SD : Semi-detached container

BBTWINS: Supply chain optimization of stone fruit farmers in Greece

Logistic planning dashboard



Given a defined client demand to fulfill an order (e.g. x ton by dd/mm/yy

- Which members of the cooperation should harvest
- Which route to organize with the cooled vehicle
- The transport cost and distance for the cooled vehicle

GRASSIFICATION

Grassification

Supply chain optimization of road-side & nature grass cuttings

Grassification: Supply chain optimization of road-side & nature grass cuttings

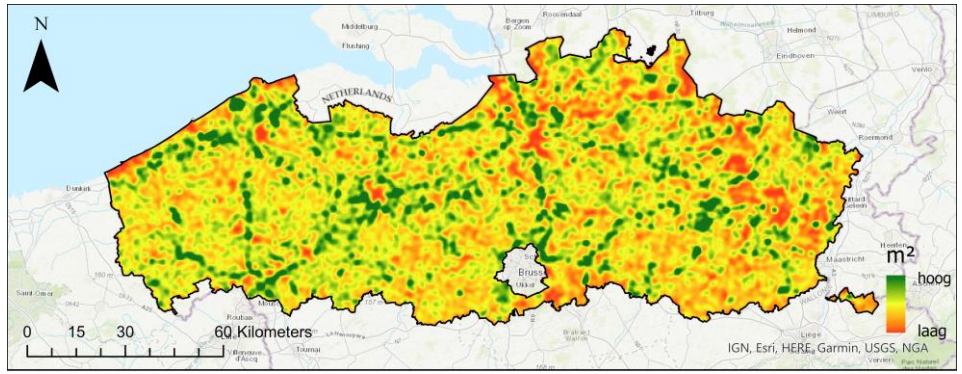
Logistic challenges

- High volumes – low mass/high volume:
  - Transport of ‘air’ (350 kg/m³) – transport of ‘water’ (60-75%) – limited ‘fiber’ (25%)
  - Low value
- Geographically scattered plots
  - High logistics for collection
- Multiple owners and landscape managers
  - Many logistics chains
- Quick quality degradation
- Seasonal effects
  - Production peaks & storage needs before processing

Grassification: Supply chain optimization of road-side & nature grass cuttings

Goal and scope

Surface	38.000	ha
Grass biomass (technical)	986.000	ton
Grass potential (harvested)	690.000	ton
Highway/general road/rural road	20/70/10	%

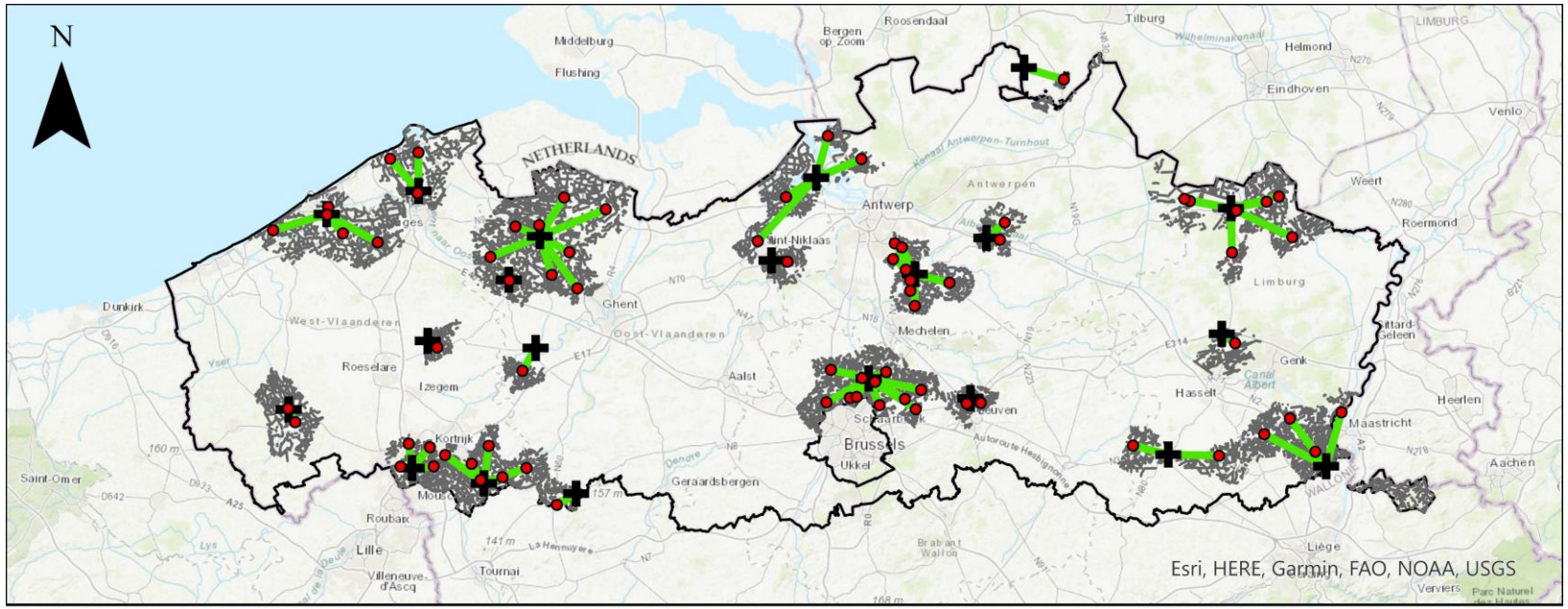


Goal: Assessment of logistic scenarios to reduce logistic cost and increase higher added value products from road-side grass

Grassification: Supply chain optimization of road-side & nature grass cuttings

AS-IS scenario: limited composting

- Current compost capacity set to 100% as a benchmark
- Evaluate TO-BE scenarios



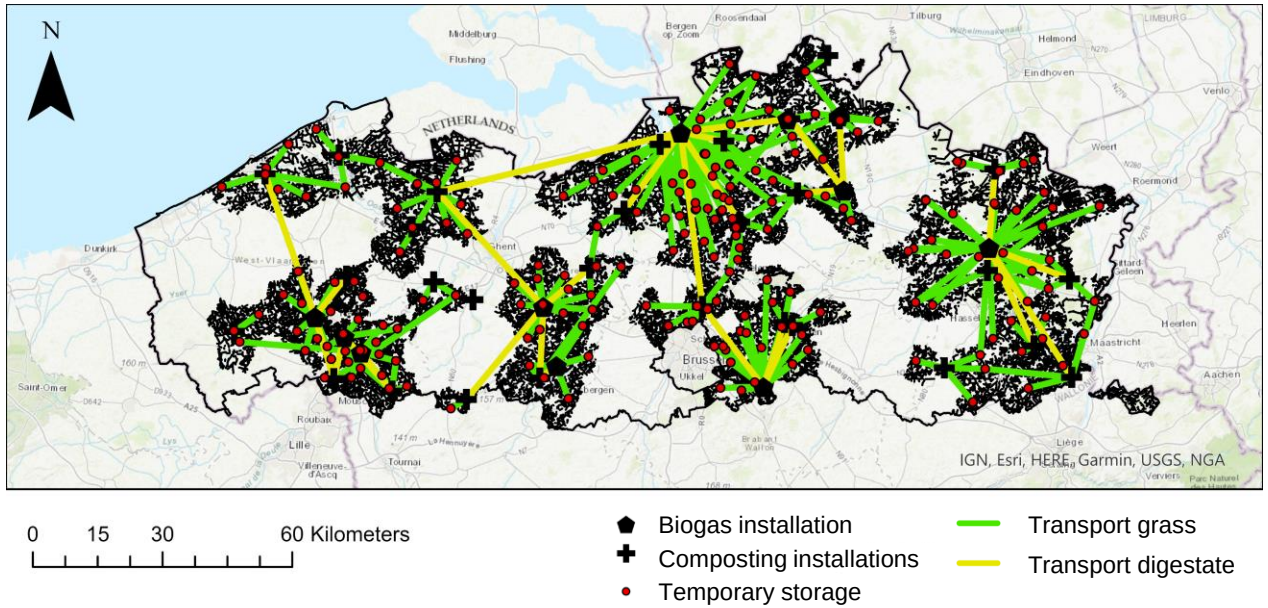
Grassification: Supply chain optimization of road-side & nature grass cuttings

TO BE: increase composting combined with biogas production

- While optimizing logistics & storage

- +300% ton grass processed
- +17% mileage increase
- -25% decrease in vehicle movements
- -24% reduction of costs

- *Important effect of double-use of grass as a resource.*



MOOV

Excellence in network design

Ruben Guisson

Manager

Annelies De Meyer

Sr Product developer

Ine Rosier

Product developer

Astrid Stalmans

Project management

Raphael Arevalo

PhD co-worker

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Thank you for your attention