This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023664.

WASTE2FUNC

Project Acronym:	WASTE2FUNC
Project Title:	Lactic acid and biosurfactants sourced from sustainable agricultural and industrial (food) WASTE feedstocks as novel FUNCtional ingredients for consumer products
Project Number:	101023664
Topic:	BBI.2020.SO1.D1
Type of Action:	BBI-IA

Deliverable 7.3

Report of primary stakeholder focus group workshop

(Version 1.0, 29/11/2022)

Deliverable:	D7.3
Work Package:	WP7
Due Date:	30/11/2022
Submission Date:	29/11/2022
Start Date of Project:	01/06/2021
Duration of Project:	42 months
Organisation Responsible of Deliverable:	Innovatiesteunpunt
Version:	V1.0
Status:	Final
Author name(s):	Nele Loenders
Reviewer(s):	Sofie Lodens
Type:	☒ R – Report ☐ E - Ethics ☐ O – Other
Dissemination level:	☒ PU – Public ☐ CO – Confidential, only for members of the consortium (including the Commission)

Revision History			
Version	Date	Modified by	Comments
1.0	04/11/2022	Nele Loenders	First Draft
1.0	29/11/2022	Sofie Lodens	Revisions
2.0	30/11/2022	Nele Loenders	Updates version
2.0	1/12/2022	Sofie Lodens	Submitted new version instead of v1.0

Contents

1 PRIMARY STAKEHOLDER FOCUS GROUP WORKSHOP 5
1.1 GENERAL INFORMATION 5
1.2 WORKSHOP 5
1.3 ANSWERS AND FEEDBACK 5
1.4 CONCLUSIONS FOR FURTHER APP DEVELOPMENT 6
2 OTHER FEEDBACK AND INFORMATION FROM THE AGRICULTURAL SECTOR 7
3 SUMMARY OF VARIOUS BY-PRODUCTS FROM AGRICULTURAL SECTOR 8
4 ANNEX A - INVITATION WORKSHOP AND DEMO DAY 10
5 ANNEX B - LIST OF WORKSHOP ATTENDEES 11
6 ANNEX C – REVIEW WORKSHOP AND DEMO DAY 12
7 ANNEX D – PRESENTATION WORKSHOP 14
8 ANNEX E – ANSWERS WORKSHOP VIA MENTI 19

1 Primary stakeholder focus group workshop

1.1 General information

The workshop took place on Tuesday 18 October 2022 between 10 am and 1 pm and was combined with a demo of the app and tour at Bio Base Europe Pilot Plant. The schedule was as follows:

- 10h00: reception
- 10h15: introduction and general info BBEPP
- 10h30: general info Waste2Func project
- 10h45: workshop registration app
- 11h30: guided tour BBEPP
- 12h30: lunch

In Appendix A (page 8), you can find the invitation to the workshop. Appendix B (page 9) shows the list of people present. A total of 10 people were present: a tomato grower, a retired farmer, business developer from the agricultural research institute Inagro, supervisor of auction BelOrta, representative Rendac and partners of the Waste2Func project (Code-On, Bio Base Europe Pilot Plant, Group Op de Beeck, Innovatiesteunpunt). A review of the workshop and demo day can be found in Appendix C (page 10).

1.2 Workshop

Sofie Lodens (BBEPP) gave a presentation on Bio Base Europe Pilot Plant. Afterwards, information about the Waste2Func project was given by Nele Loenders (Innovatiesteunpunt); the consortium was introduced, the project's problem definition, purpose and work packages were explained. The presentation is attached in appendix D (page 12). Nele Loenders (ISP) continued by showing the demo version of the registration app and the accompanying workshop. Menti, an online tool to collect answers from attendees, was used. Following questions were asked in this way: What by-product streams are present on your farm and when? What is the current valorisation method? In what way would you prefer to register your by-product streams? Finally, feedback was also requested on the demo version of the registration app, this feedback and accompanying discussion took place orally.

1.3 Answers and feedback

Below, we summarise the answers given (verbally and via Menti) and feedback for each question. The answers given via Menti, can be found in Appendix E (page 17).

Question 1: What by-product streams are present on your farm and when?

- Unsold vegetables and fruit (e.g. from farm shops): year-round
- Unsold vegetables: year-round
- Surplus hard fruit (mainly apples and pears): April to September
- Milk whey (during cheese production): year-round
- Forced chicory roots: year-round (This answer was given 2 times).
- Leek leaves (green part of leeks): year-round
- Organic residues from agri-food industry and catering: year-round (minimal differences throughout the seasons)
- Damaged tomatoes: 700 kg per week, year-round
- Shredded tomato leaves: 550 tonnes in December (A comment was made here from the project that the lignin content of this stream is probably too high for valorisation within Waste2Func.)

Question 2: What is the current valorisation method?

- Food banks
- Animal feed (e.g. the case for forced chicory roots)
- Fermentation/ biogas plant
- No valorisation

We asked specifically what happens at the auctions with surplus fruit and vegetables. In the first instance, this goes to the food banks. What cannot be collected by the food banks is made available as animal feed for local farmers, who collect it on site. If there are any surpluses afterwards, it is valorised via fermentation. This option is only necessary if there is overproduction and therefore surpluses on a larger scale.

Question 3: In what way would you prefer to register your by-product streams?

- Website: this option was chosen 4 times
- App: this option was chosen 4 times
- Phone: this option was chosen 1 time
- Other: this option was not chosen

As an addition, it was mentioned that the telephone option is useful as a back-up. If there are technological problems, it is then possible to register via phone.

Question 4: Feedback on the demo version of the registration app

Feedback was also collected on the demo version of the registration app. Following issues were mentioned: adding question on recipient in which biomass is to be transported, e.g. truck, tanker, etc. This could possibly replace the question about a dry or wet stream. A question was also raised as to why a distinction was made between fruit and vegetables, but not further specifically asked about the type of biomass, e.g. tomatoes, forced chicory roots, etc.

1.4 Conclusions for further app development

After the workshop, a meeting was held with the various project partners involved in the development of the app (BBEPP, GODB, Code-On and ISP) to compile the feedback from both the stakeholder focus group workshop and the primary stakeholder focus group workshop and draw conclusions. The following things should definitely be able to be registered through the app:

- Weight or volume
- Type of product: distinction between vegetables, fruit, meat and fish is not enough. Specific info is needed to classify the product in a risk class. For example, chicory roots or potatoes from a farmer belong to risk class 1, but potatoes already processed in a food processing company belong to a higher risk class. Risk class 1 products do not need further analyses, products from industrial processes belong to a higher risk class and do need these further analyses. So here the specific biomass type has to be determined. This is important for the waste collector to determine the risk class and the EURAL code (European waste list code). The specific type of fruit or vegetable is also important to determine the fermentation potential and the associated cost or price of the side stream is related to this.
- Treatment process: if the product does not belong to risk class 1, it is important to determine which industrial treatment process preceded it.
- Analytical data and environmental values: this is again important for products that do not belong to risk class 1.
- Reason for rejection: if applicable, this is very important info to determine risk class.

- **Packaging**: choice between bulk product or packaged product. It should also be possible to indicate the type of packaging, e.g. plastic, glass, cardboard, etc.
- **Other contamination**: this question should indicate whether other contamination is present outside the packaging, e.g. sand, other crops, stones, etc.
- **State of the product** (preservability): important to determine the pick-up time.
- **Condition of the product** (liquid/solid/...), **method of collection** (truck/tanker/...) and **return packaging** (yes/no): these things are important to know for planning towards a specific type of transport.
- **Pick-up time**: choices between as soon as possible, in a few days and in a week.
- **Pick-up address**: options between different addresses (for larger industrial companies, several pick-up addresses are often possible and should be specified). There should also be the possibility to indicate whether a registration at the company is required or not, if applicable, more info on this should be added.
- Possibly a **photo** of the biomass

From the list above, we also conclude that a lot of extra info is required for biomass streams from the food processing industry, which is not needed for biomass streams collected from farms. However, we want to keep it easy and low-threshold for farmers to register biomass, this is not the case if unnecessary questions are asked at registration. Therefore, it is proposed to differentiate between farmers and industrial companies when signing up. This way we can ensure that only relevant questions for the type of farm are asked.

We would also like to bring some comments in terms of wording in the current version of the registration app. In the app the term waste is mentioned several times, this could perhaps be replaced by the terms residual streams, by-product streams or biomass. This way it is additionally emphasized that these are not waste streams since they will be valorised higher. Also, the dashboard mentions 'x number of euros earned', this will not be the case for all by-product streams so it is suggested to replace this with 'x number of euros earned or saved'.

Group Op de Beeck also stresses that it would be an added value if it were possible to request a waste register under the 'history' tab. This is an overview of all collections with the necessary info (e.g. information sheet, tender reference, processing certificate) to meet the legal requirements of OVAM (public waste agency of Flanders). This is an important service to users of the app, as manually creating a waste register is not efficient for potential users.

2 Other feedback and information from the agricultural sector

Apart from the workshop, info was also gathered on by-products from the agricultural sector at other times.

For instance, a company that grows, stores and packages potatoes, carrots and onions was questioned. Sorted potatoes are collected once a week. Depending on available quantities and prices, these potatoes are processed in potato processing plants (e.g. for production of chips) or used as animal feed. By-products of onions (mainly undersized onions) are valorised in a biogas plant. By-products of carrots (carrots that are too small or too large) are collected once a week and used as feed for horses or other animal feed. The farm also operates its own farm shop with its own produce and produce from nearby farmers. The surpluses from the farm shop are collected by Foodsavers, a local food distribution platform that prevents food losses.

Another farm that produces vegetables has by-products released from harvesting and processing. They compost these by-products on their own farm.

A livestock farmer indicated that he collects forced chicory roots from a neighbouring grower and uses them as feed for the cows. They also buy brewers' grains from a nearby brewery to use as feed.

Last months, additional food losses were also recorded from the Flemish apple sector. There are several reasons for this: an oversupply on the world market (because of the Russian trade boycott, Polish apples are entering the Western European market), low selling prices and sharply increased costs (including high energy costs that make storage expensive). This makes apples remain on the tree[1]. Mainly for class 2 apples, this poses a problem. These apples destined for industry were bought in October for about 10 cents per kilo. However, picking already costs 8 to 10 cents per kilo, to which must be added the cost of storage and sorting. Some apple growers therefore choose not to pick the class 2 apples. Others do pick, as they sell the apples directly to traders without storage. Another reason is that fruit left hanging too long affects flower bud formation next spring. It is suspected that this is why apples remain mostly on plots that are being uprooted. According to an estimate by VBT (union of Belgian horticultural cooperatives), 15% of apples have not been harvested this season[2]. With 238,000 tonnes of apples hanging on Flemish apple trees this year, pre-harvest losses are estimated at 35,700 tonnes.

Interesting info and tips were also provided during a meeting with waste processor Renewi. It was urged to definitely pay sufficient attention to fruit and vegetable cutting residues (and not just sorted material). These cutting residues are released by farmers who process on their own farms and also by buyers of fruit and vegetables (e.g. frozen food industry, auctions and processing industry). Lessons to be learned from Symbiosis were also highlighted. Through Symbiosis, OVAM wants to offer companies support for exchanging by-product streams. The Symbiosis platform is a tool that connects demanders and providers of materials[3]. There is therefore a clear link with the registration app being developed within the Waste2Func project, so we can learn from the development of the Symbiosis platform. The following issues are important to include in the development of the registration app: qualitative info is needed for the registration app to work efficiently, it is necessary to actively manage the registration app and the app only has a chance of success if someone effectively collects and valorises the by-product streams.

3 Summary of various by-products from agricultural sector

The following summarises the info from this and previous deliverables on various by-products from the agricultural sector.

- By-product streams from **open-grown vegetables** sector: mainly surplus, sorting and cutting residues of carrots, leeks, cauliflower, Brussels sprouts, onions and also forced chicory roots. These by-product streams can be collected at both auction and farm level.
- By-product streams from **greenhouse horticulture**: mainly surplus and sorted tomatoes, to a smaller extent also cucumber, sweet pepper and aubergine. These by-product streams are best collected at auction level, although there are also large farms where this is possible at farm level (e.g. tomato grower at workshop who has 700 kg of damaged tomatoes every week).

[1] Vlaamse appelen blijven aan de boom hangen, VILT, 12/10/2022, https://vilt.be/nl/nieuws/vlaamse-appelen-blijven-aan-de-boom-hangen

[2] Hoge appelproductie dit jaar, maar 15 procent niet geoogst, VILT, 23/11/2022, https://vilt.be/nl/nieuws/hoge-appelproductie-maar-15-procent-niet-geoogst

[3] https://www.smartsymbiose.com/#/

- By-product streams from **hard fruit** sector: surplus and sorted apples and pears, also press cake at farms producing their own juices. These by-product streams can be collected at both auction and farm level.
- By-product streams from the **soft fruit** sector: mainly surplus and sorting of strawberries, raspberries and blackberries. These by-product streams are best collected at auction level, although there are also large farms where this is possible at farm level (e.g. grower of soft fruit with 15-20% class 2 fruit per season).
- By-product streams of the **potato** sector: surplus and sorted potatoes. These by-product streams are best collected at farm level.
- **Crop failures**: These by-product streams are best collected at farm level.

These by-product streams already have various valorisation opportunities at both auction and company level. The Waste2Func project aims to higher valorise by-product streams that are currently valorised towards energy and materials.

- **Auctions**: valorisation via food banks (or other projects that combat food losses), animal feed and fermentation.
- **Farms**: valorisation through processing into food for human consumption (e.g. processing apples into juice and potatoes into chips), to a lesser extent also projects that combat food losses, animal feed (e.g. chicory roots), finally also composting on the farm or returning by-products to the land.

4 Annex A - invitation workshop and demo day

5 Annex B - list of workshop attendees

Name	Company
Johan Vlaemynck	Tomato masters
Adrien De Smet	retired farmer
Evelien Lambrecht	Inagro
Wim Hubrechts	BelOrta
Mark Van Dael	Rendac
Hilde Keymeulen	Code-On
Sofie Lodens	Bio Base Europe Pilot Plant
Sophie Roelants	Bio Base Europe Pilot Plant
Thomas Anné	Group Op de Beeck
Nele Loenders	Innovatiesteunpunt

6 Annex C – review workshop and demo day

Available via: https://www.boerenbond.be/actualiteit/bioplastic-uit-jouw-afvalstromen

Actualiteit > Bioplastic uit jouw afvalstromen?

Bioplastic uit jouw afvalstromen?

21 oktober 2022

Op dinsdag 18 oktober 2022 organiseerden we samen met Bio Base Europe Pilot Plant (BBEPP) een demodag voedselverliezen. Verschillende stakeholders vanuit de landbouwsector werden samengebracht en maakten kennis met de pilootinfrastructuur aanwezig op het BBEPP in de haven van Gent. Daarna staken ze de koppen bij elkaar om zoveel mogelijk input te verzamelen rond hoe we voedselverliezen kunnen inperken.

Bio Base Europe Pilot Plant

Sofie Lodens (projectcoördinator Waste2Func) opende de demodag met meer info over Bio Base Europe Pilot Plant. Om uit te leggen wat er zoal gebeurt binnen de pilootinfrastructuur, gaf ze een cursus 'industriële biotechnologie voor dummies'. Hierin leerden we over enzymen en micro-organismen die worden ingezet om biogebaseerde producten aan te maken. BBEPP is dé partner voor het opschalen van deze biogebaseerde processen. Er wordt dus gewerkt op een schaal die tussen de kleine laboschaal en de grote industriële schaal in ligt. De pilootinfrastructuur is broodnodig om de typische 'valley of death' van innovatie te overbruggen.

Naast gebruikte enzymen en micro-organismen werden ook enkele veelvoorkomende processen toegelicht zoals biokatalyse, vloeibare fermentatie en gasfermentatie. Er kwamen ook verschillende technologieën binnen de voorbehandeling en productzuivering aan bod. Sofie gaf aan dat het grote voordeel van samenwerken met BBEPP zit in hun expertise en de aanwezige infrastructuur. Bedrijven moeten hierdoor niet investeren in eigen pilootinfrastructuur en kunnen beroep doen op de expertise van BBEPP, wat voor belangrijke economische voordelen zorgt.

Van voedselverliezen tot biogebaseerde reinigingsmiddelen

Deze demodag kadert in het Europees gesteunde bio-economie project Waste2Func. Dit projectconsortium bestaat uit 12 verschillende partners, waaronder Boerenbond en Bio Base Europe Pilot Plant. Het doel van dit demonstratieproject is reststromen uit de agro-voedingsindustrie via een fermentatieproces omzetten tot melkzuur en biosurfactanten. Beide producten kunnen gebruikt worden voor bestanddelen van schoonmaakmiddelen, bioplastics, cosmetica … Het achterliggende doel is om voedselverliezen en restromen hoger te valoriseren en zo de waarde te verhogen. Ook wordt er op deze manier CO_2-uitstoot verminderd. Het project is opgedeeld in verschillende takenpakketten:

- In kaart brengen van nevenstromen en opzetten van registratie- en inzamelingssysteem
- Proces optimalisatie, purificatie en formulatie voor zowel melkzuur als biosurfactanten
  - De pilootinfrastructuur voor melkzuur bevindt zich in Kallo bij Group Op de Beeck
  - De pilootinfrastructuur voor biosurfactanten is aanwezig in BBEP
- Duurzaamheidsanalyse (LCA) en regelgeving
- Business modellen

Workshop voedselverliezen

In het Waste2Func project is de eerste stap van de keten dus het verzamelen van reststromen. Het project heeft ervoor gekozen om te focussen op biomassa van landbouwbedrijven, voedingsverwerkende bedrijven en retail, aangezien een aanzienlijk deel van deze biomassa wordt gebruikt voor biogasproductie. Via dit project willen we een nieuwe bio-raffinage keten demonstreren die voor een hogere valorisatie van de biomassa zorgt dan de klassieke biogasinstallatie. Tijdens de workshop werd een bevraging gedaan bij de aanwezigen naar de beschikbare nevenstromen op hun bedrijf, wanneer deze stromen beschikbaar zijn en wat de huidige afzet of valorisatie is.

Om de restromen van verschillende oorsprong efficiënt te kunnen verzamelen, wordt er in het project een registratie- en inzamelingssysteem ontwikkeld. Hiervoor is input nodig uit alle betrokken sectoren: landbouwers, voedingsindustrie, afvalophalers en bio-raffinage. Tijdens deze workshop werd de feedback van landbouwers verzameld op de eerste versie van de registratie-app. De registratie-app werd getoond aan alle aanwezigen, nadien volgde er een discussie over mogelijke verbeterpunten. Met deze feedback gaat het project uiteraard aan de slag om de app te verbeteren.

Rondleiding

Na de workshop voedselverliezen volgde er nog een rondleiding in Bio Base Europe Pilot Plant. Sofie toonde ons eerst het labo. Nadien volgde de verschillende hallen met fermentatietanks, verschillende toestellen voor voorbehandeling en scheiding. We ontdekten ook dat de pilootinfrastructuur gevestigd is in een oude brandweerkazerne. Een ander leuk weetje is dat alle hallen een andere kleur vloer hebben, hier wordt ook naar verwezen in de naam van de hallen. De laatste stap op onze rondleiding was de grijze hal, speciaal geïnstalleerd voor de proeven binnen het Waste2Func project.

7 Annex D – presentation workshop

Waste2Func - doel

- Biotechnologie: reststromen uit agro-voedingsindustrie => PLA en biosurfactanten
- Bestanddelen voor schoonmaakmiddelen, bioplastics, cosmetica …
- Doel
  - Waarde van nevenstromen verhogen
  - CO_2-uitstoot verminderen

BOEREN BOND

Waste2Func - algemeen

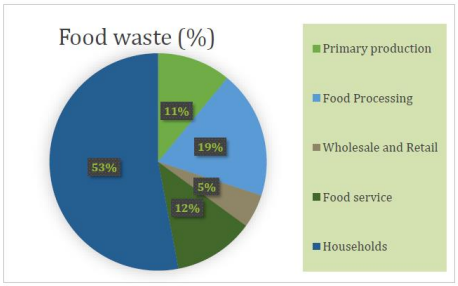
Coordinator: BIO BASE EUROPE PILOT PLANT
Duration: 01.06.2021 – 30.11.2024
BBI JU contribution: €6 703 878.85

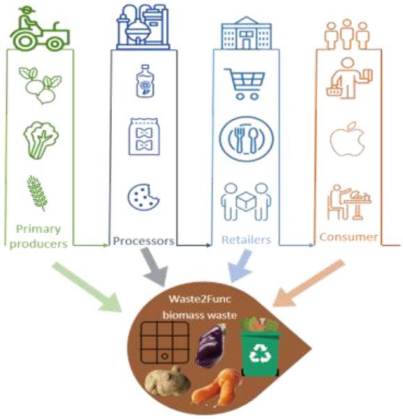
BOEREN BOND

Waste2Func - doel

- Biotechnologie: reststromen uit agro-voedingsindustrie => PLA en biosurfactanten
- Bestanddelen voor schoonmaakmiddelen, bioplastics, cosmetica ...
- Doel
  - Waarde van nevenstromen verhogen
  - CO_2-uitstoot verminderen

BOEREN BOND

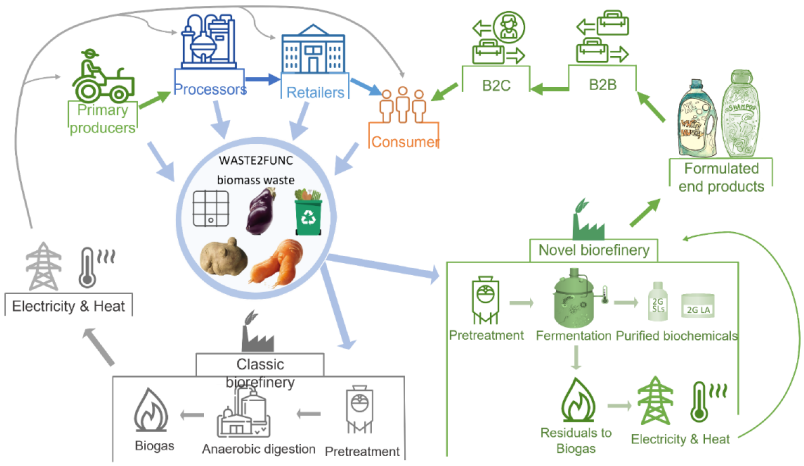




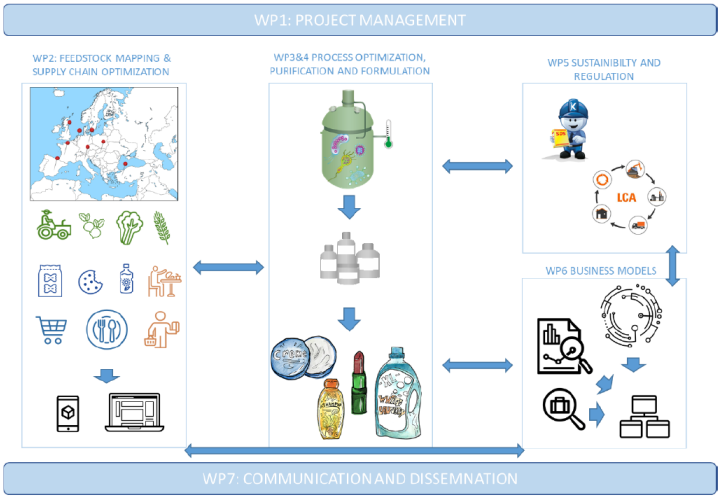
BOEREN BOND

Go to **www.menti.com** and use the code **4252 5986**

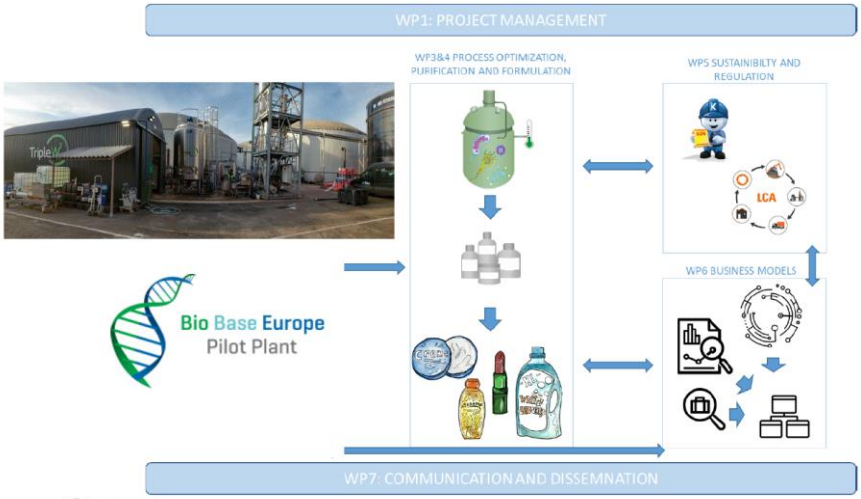
BOEREN BOND



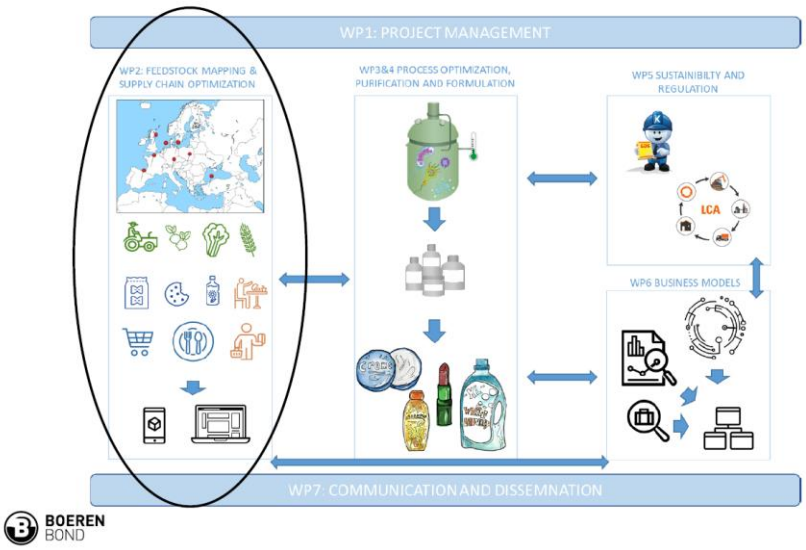
BOEREN BOND



BOEREN BOND



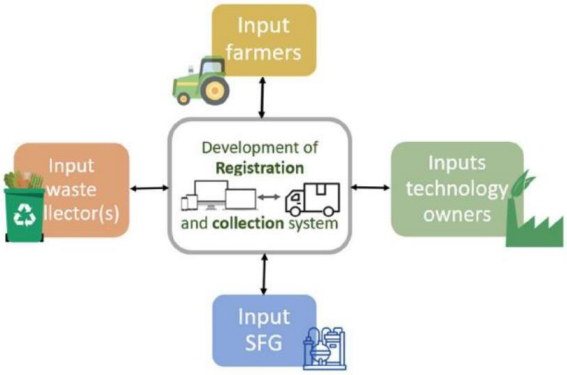
BOEREN BOND



BOEREN BOND

BOEREN BOND

Ontwikkeling van registratie- en inzamelingssysteem



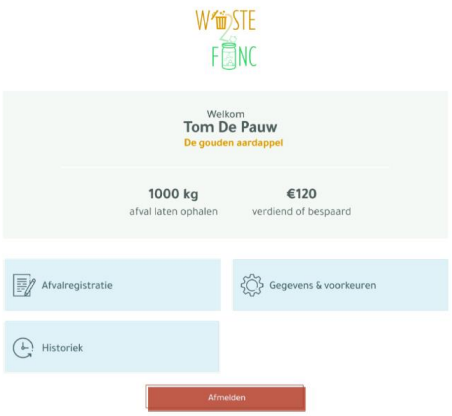
BOEREN BOND

Ontwikkeling van registratie- en inzamelingssysteem

Go to **www.menti.com** and use the code **4160 3240**

BOEREN BOND

Ontwikkeling van registratie- en inzamelingssysteem



8 Annex E – answers workshop via Menti