D4.1. Appendix No 7
Cluster of bio-based solutions classified as "other products potentially applicable in the context of humanitarian interventions" (WP4, T4.2.1)

Disclaimer:

Scope: The appendix presents all the scoped solutions that were classified as "other products potentially applicable in the context of humanitarian interventions". The information on individual solutions are presented in the form of the filled – up templates. Before presenting an individual solution, information is given on the Bio4HUMAN partner responsible for scoping the given solution, as well as on the Investigation Line of T.4.2.1., the solution results from. There is also information on the presence / lack of presence of the solution on the final List of 27 bio-based products and technologies.

Note: The templates were filled up by the Leaders of Investigation Line based on the gathered information. Empty spaces in the templates mean *"no information available on the given criterion"* or *"difficulty in assessing the utility functions of the given solution"*. The second reason was quite common in relation to the potential application of the given solution to the different supply chain stages of humanitarian interventions. The filled up templates were provided to PRO CIVIS for further initial analysis. At the stage of internal consultation – all the Bio4HUMAN partners were granted access to the presentation of the solutions and were asked to provide comments and opinions on the subject of the potential applicability and functionality of the solution in the context of solid waste management in the humanitarian interventions.

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The appendix No 7 includes presentation of the following 19 bio-based solutions:

1. Biodegradable shelter

Responsible partner: ITENE
INVESTIGATION LINE: I

Solution 1 **on the final List**	**Biodegradable shelter**
Product / service	Yes (shelter) / Yes (decision-making tool)
Technology	

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I. Basic information

Description of functions

What is the effect or final product?

Designing circular tent tarpaulins/cloths and developing a decision-making tool for NGOs - so that these organisations can determine which shelter (temporary or longer term) suits each situation.
Currently, tent fabric is often made of PE (polyethylene) with a PVC coating. This is very difficult to recycle, because it is no longer possible to separate these materials. In the KIEM GoCI project, they have developed tent fabrics that consist of fabric material that can be molecularly recycled. The remaining layer can be used as fertiliser.

Description of technology and TRL level (if applicable)

NA

Description of product/service and TRL level (if applicable)

Circular Emergency Shelter
Product: TRL 5-6 (validation in relevant environment)

Basic conditions of use

Please include also minimum requirements of a given solution regarding the availability of public infrastructure.

Low

Please include the optimal scale/size of investment at which their solution or technology makes economic sense.

-

What kind of waste the solution is able to utilize or valorise?

Plant-based feedstock

To what extent does the use of a given solution or technology depend on climatic conditions?

Don´t know

Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

Yes

.....

Solution owner and his willingness to provide detailed technical and technological data

MNEXT.

Has the Life Cycle Analysis been already done for this solution?

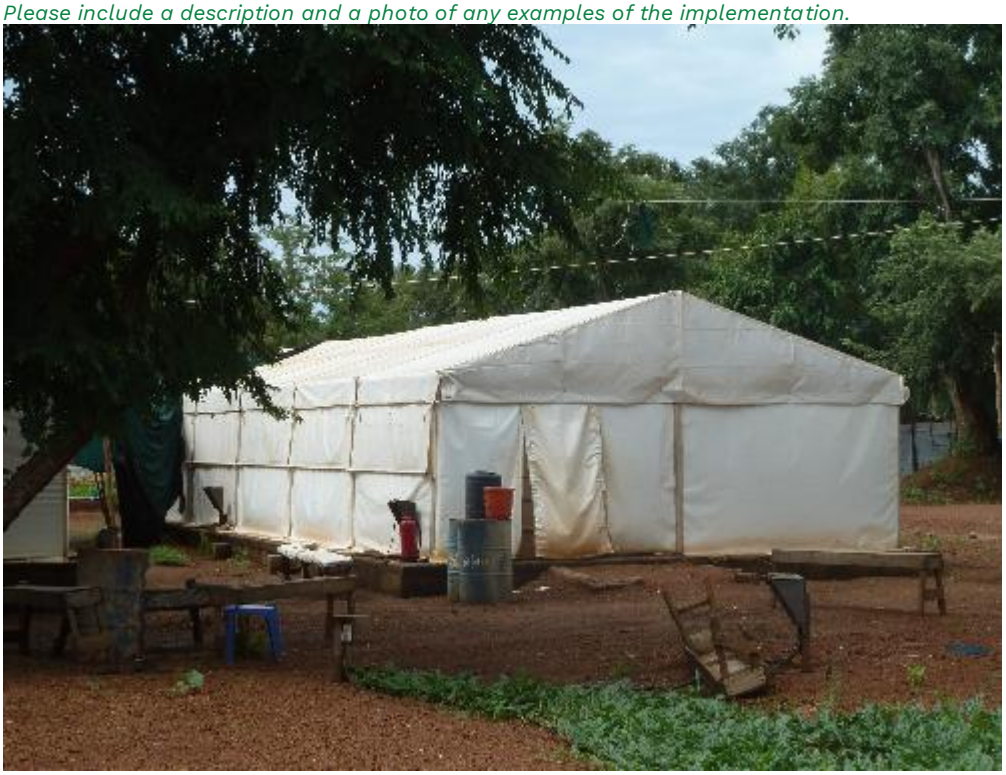
Yes. Open Access

Source of data

Response to online survey.

References

Please include a description and a photo of any examples of the implementation.



Source: *web page of SIA-KIEM CE project*

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MNEXT is joining forces in this SIA-KIEM CE project with the Avans research group "New Materials and Their Applications," humanitarian partner Médecins Sans Frontières (MSF), and emergency relief product developer Wijnroemer Relief Goods (WRG) to find a solution

https://onlinelibrary.wiley.com/doi/full/10.1111/disa.12670

https://www.croix-rouge.lu/wp-content/uploads/2023/11/Creating-an-assessment-tool-for-environmental-impact-reduction-of-humanitarian-shelters-Compeer-Hendriks-de-Zwart.pdf

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Reuse materials (for a service or technology solution). Avoid residues derived from temporary shelters/tents materials.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.
Circularity of relief goods.

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*
TYPICAL NON-FOOD ITEMS	
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.	
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.	
Medical supplies, wheelchairs, cold boxes.	

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Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.
Clothing materials to be produced in Europe and shipped to the humanitarian site. Shelter assembling to be made *in situ*.

Identification of needs
Temporary housing.
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
.....

2. Bio4Pack Waste Bag

Responsible partner: IBF
INVESTIGATION LINE: III

Solution 2 **on the final List**	**Bio4Pack Waste Bag (TIPA)**
Product / service	*X*
Technology	

I. Basic information

Description of functions
What is the effect or final product?
100% compostable
Size 8L - 10L - 30L - 60L - 120L - 240L

Description of technology and TRL level (if applicable)

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N/A

Description of product/service and TRL level (if applicable)

Bio4Pack's bags are a responsible alternative to a disposable bag. The bags are made from renewable resources and they can easily be composted after use in an industrial composting plant (EN 13432 certified).

Basic conditions of use

Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
To what extent does the use of a given solution or technology depend on climatic conditions?
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

Bio4Pack's biobags are made from renewable resources. After use, they can be disposed of in the organic waste container together with the organic waste itself. The product is already being sold as part of company's product offering. TIPA's compostable packaging solutions are designed to break down within months under compost conditions just like any organic matter. TIPA compostable packaging provides solutions for the food and fashion industries and is built to fit existing machinery and supply chains.

Solution owner and his willingness to provide detailed technical and technological data

N/A, **info@bio4pack.com, no response when contacted**

Has the Life Cycle Analysis been already done for this solution?

.....

Source of data

https://www.bio4pack.com/products/non-food/

References

Please include a description and a photo of any examples of the implementation.

Source: *web page of Bio4Pack*

Bio4Pack's biobags are made from renewable resources. After use, they can be disposed of in the organic waste container together with the organic waste itself. The product is already being sold as part of company's product offering. TIPA's compostable packaging solutions are designed to break down within months under compost conditions just like any organic matter. TIPA compostable packaging provides solutions for the food and fashion industries and is built to fit existing machinery and supply chains.

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

It will disintegrate within—at most—180 days under compost conditions.

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III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

Minimises the amount of waste generated as the bag will decompose itself.

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
Conceptualization and planning
.....

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Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
Will be more than likely multi-stage from manufacturer to humanitarian setting involving air and road travel. Can be transported easily
Transport to the final destinations – last mile
Road transport
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
To be organised by distributors

3. Single use compostable HaPPE apron

Responsible partner: IBF
INVESTIGATION LINE: III

Solution 3 **on the final List**	**Single use compostable HaPPE apron**
Product / service	*X*
Technology	

I. Basic information

Description of functions
What is the effect or final product?
Single use compostable HaPPE apron is made from HaPPE's Proprietary Resin with neck loop and waist ties. Compostable PPE for healthcare setting.

Description of technology and TRL level (if applicable)
.....

Description of product/service and TRL level (if applicable)
The HaPPE Apron is a CE marked fully compostable PPE product. The company helps the healthcare industry make the shift from single use plastic consumables to medically approved compostable alternatives to reach their sustainability goals.

The HaPPE aprons are in use in public and private healthcare providers in Ireland.
Key benefits:
sustainable healthcare product
100% compostable
usability tested by healthcare staff

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
To what extent does the use of a given solution or technology depend on climatic conditions?

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Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

.....

Solution owner and his willingness to provide detailed technical and technological data

HaPPE, contacted and happy to talk further.

Has the Life Cycle Analysis been already done for this solution?

Yes, in parts, happy to talk further if required

Source of data

https://happeearth.ie/product/happe-apron/, **Dr Mary O'Riordan**

References

Please include a description and a photo of any examples of the implementation.

Source: *web page of HaPPE*

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

It is compostable. Could be used in bio digester.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

Reduces waste and is essential PPE equipment in humanitarian setting.

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the*

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flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
To be used in medical settings.
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
Air/road
Transport to the final destinations – last mile
Any mode of transport as material is light.
Storage at the final destination
No specific requirements.
Operational logistic at final destination - distribution of goods and services
Yes

4. Biodegradable containers

Responsible partner: ITENE

INVESTIGATION LINE: V

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Solution 4 **on the final List**	**Biodegradable containers**
Product / service	**X**
Technology	

I. Basic information

Description of functions

What is the effect or final product?

Biodegradable bags for disposing of an unwanted substance formed from a bio-based material in the form of a maize flour, and a biodegradable plasticizer.

Description of technology and TRL level (if applicable)

Not applicable.

Description of product/service and TRL level (if applicable)

Biodegradable bags are formed from a bio-based material in the form of a maize flour, and a biodegradable plasticizer selected from the group consisting of vegetable oil, polyesters made from glycerine, glycerine, derivatives of glycerine, and combinations thereof. The maize flour comprises a minor volume percent of the total volume of the bioplastic material. A biodegradable additive is used to provide a degree of stiffness to the material, a preferred additive being polylactic acid. A UV stabilizer may optionally be included. Biodegradable bags have an open end and a closed end with a sidewall extending there between. The bag includes a feature for enclosing a substance once placed into the bag. Alternatively, the feature may include an opening through a sidewall and an adhesive section.
It is considered a TR6 prototype system verified.

Basic conditions of use

Please include also minimum requirements of a given solution regarding the availability of public infrastructure.

No information provided.

Please include the optimal scale/size of investment at which their solution or technology makes economic sense

No information provided. It has to be considered that biodegradable materials such as polyesters are normally expensive in comparison with conventional fossil-based materials such as polyolefins.

What kind of waste the solution is able to utilize or valorise?

Agricultural waste (maize crops).

To what extent does the use of a given solution or technology depend on climatic conditions?

Climatic conditions will affect to the maize crops required to produce the bio-based materials.

Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

Considered not relevant.

Solution owner and his willingness to provide detailed technical and technological data

Vijay C. Patel. No contact information was found.

Has the Life Cycle Analysis been already done for this solution?

No information available.

Source of data

Derwent Innovation patent search.

References

Please include a description and a photo of any examples of the implementation.

Side view of various example bioplastic containers:

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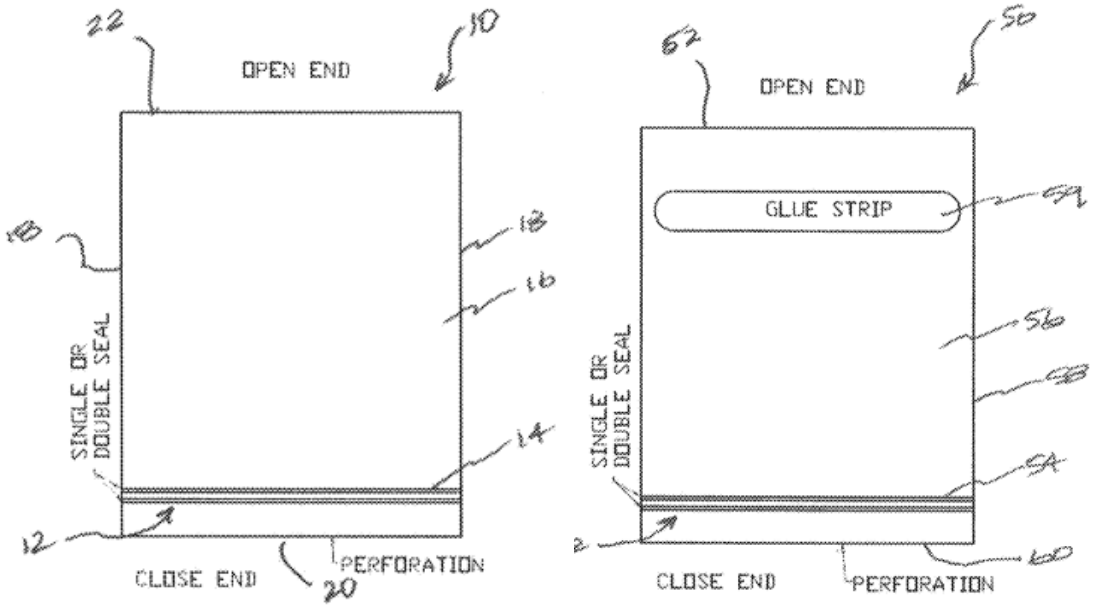
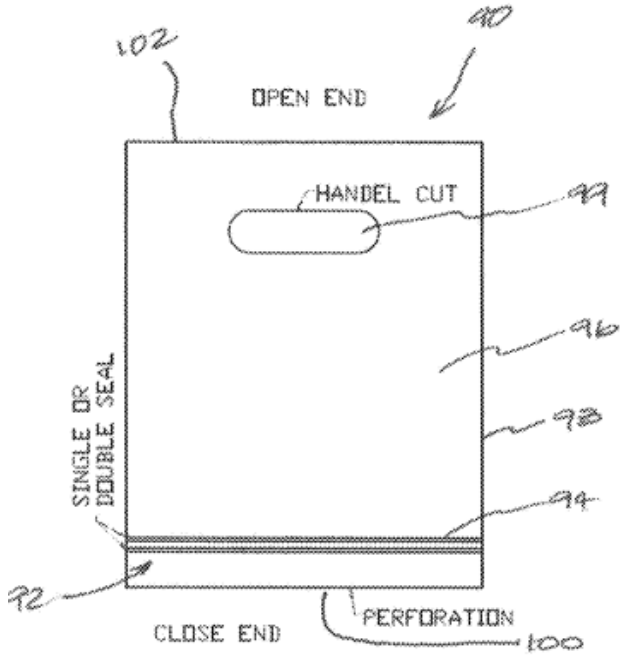


Source: *Derwent Innovation patent search.*



Source: *Derwent Innovation patent search.*

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, compostability or other means of end-of-life stage.

The solution refers to biodegradability.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

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We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

This solution will allow the reduction of the usage of fossil-based materials for flexible packaging applications, that are currently ending up incinerated or in landfills.

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs

.....

Conceptualization and planning

.....

Procurement – sourcing/ purchasing of products and services

.....

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Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
.....

5. Monofilament fishing nets

Responsible partner: ITENE

INVESTIGATION LINE: I

Solution 5 **on the final List**	**Monofilament fishing nets**
Product / service	Yes
Technology	

I. Basic information

Description of functions
What is the effect or final product?
SEABIRD develops innovative biobased and biodegradable bioplastic formulations for many fields of applications, in particular for the production of monofilaments for fishing nets or geotextiles, but also formulations used for different packaging solutions. Monofilament fishing nets are the product chosen for this template.

Description of technology and TRL level (if applicable)

Description of product/service and TRL level (if applicable)
TRL = 7? The developed finished or semi-finished products have been tested and approved by end users in regional, national or international projects under real conditions of use. Source: SeaBird webpage).

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
NA
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
To what extent does the use of a given solution or technology depend on climatic conditions?
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
NA
.....

Solution owner and his willingness to provide detailed technical and technological data
SeaBird.

Has the Life Cycle Analysis been already done for this solution?
Yes. Confidential information.

Source of data
Response to online survey and email correspondence.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

References
Please include a description and a photo of any examples of the implementation.

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Biodegradable bio-based product solution.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

- Substitution of conventional thermoplastic materials to reduce the environmental footprint
- Integration of by-products for local valorization.
- End-of-life modulation suited to the product's use (e.g. marine biodegradation).

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*
TYPICAL NON-FOOD ITEMS	
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.	
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.	
Medical supplies, wheelchairs, cold boxes.	
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).	
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.	
Paper, printed products, office equipment, electronic waste, etc.	

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Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.
Please indicate the link of the supply chain for which the solution can be applied? Describe how.
Identification of needs
.....
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
.....

6. Biodegradable and compostable mulching spray

Responsible partner: ITENE

INVESTIGATION LINE: I

Solution 6 **on the final List**	**Biodegradable and compostable mulching spray**
Product / service	X
Technology	

I. Basic information

Description of functions
What is the effect or final product?
Fully biodegradable and compostable mulching spray that prevents the growth of weeds in the soil near plants and fruits.

Description of technology and TRL level (if applicable)
TRL 7-8 (prototype demonstration).

Description of product/service and TRL level (if applicable)
The biospray, once sprayed on the soil, forms a film that isolates the underlying soil, preventing weed growth. This film lasts for approx. 4-8 months depending on the application and type of mixture. Once the cultivation period is over, the treated soil is shredded with a power tiller and the film becomes a 100% ecological amendment or fertiliser.
Product: TRL 7-8 (prototype demonstration).

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.

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Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
Agricultural waste.
To what extent does the use of a given solution or technology depend on climatic conditions?
It is affected by climate conditions.
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
Yes.

Solution owner and his willingness to provide detailed technical and technological data
Agribiom, willing to provide further information.

Has the Life Cycle Analysis been already done for this solution?
Yes. Confidential information.

Source of data
Response to online survey on November 27th,

References
Please include a description and a photo of any examples of the implementation.

Source: *web page of Agribiom*

An ecologically valid alternative to drastically reduce this environmental degradation is represented by this bio-spray, applied following an eco-sustainable and innovative methodology. The bio-spray, consisting of an aqueous solution based on polysaccharides, obtained from renewable and easily available sources, is sprayed onto the ground generating a protective geo-membrane covering the ground, which guarantees a valid alternative by performing barrier functions against the growth of weeds and maintenance of soil moisture.
The bio-spray, once sprayed on the ground, forms a film that isolates the underlying soil preventing the birth of weeds. This film has a duration of approx. 4-8 months depending on the application and the type of mixture. After the cultivation period has elapsed, the treated soil is milled by motor hoe and the film becomes a 100% perfectly eco-compatible fertilizer or fertilizer.
The bio-spray protects the soil around the stem even with the adult plant, while the application of a mulching sheet or manual weeding would be very expensive. The spray is available both with dark or light color depending on the need for insulation (eg pomegranate). It can be applied simultaneously to the plowing of the land not cultivated between a row and the other with slightly modified means already owned by the farmers.

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Compostable bio-based product solution.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

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The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.
The periodic and frequent replacement of plastic films at the end of their use generates a huge amount of agricultural plastic waste after use. This biospray, after performing its function, is milled and buried to be easily metabolized by the bacterial flora present in the soil that transforms it into biomass, water, methane or carbon dioxide.

IV. Logistic supply chains application potential - in which stage?

The 'humanitarian supply chain' *is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*
TYPICAL NON-FOOD ITEMS	
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.	
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.	
Medical supplies, wheelchairs, cold boxes.	
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).	
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.	
Paper, printed products, office equipment, electronic waste, etc.	
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.	

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs

Reducing plastic waste derived from food/crop systems due to protecting coverings in humanitarian sites (?)

Conceptualization and planning

.....

Procurement – sourcing/ purchasing of products and services

.....

Goods collection in warehouses and repacking for transport to final destination

.....

Custom clearance

Funded by the European Union

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……
Transport to the destination country (often multi-stage and using different modes of transport)
……
Transport to the final destinations – last mile
……
Storage at the final destination
……
Operational logistic at final destination - distribution of goods and services
……

7. Agricultural film

Responsible partner: ITENE

INVESTIGATION LINE: I

Solution 7 **not on the final List**	**Agricultural film.**
Product / service	x
Technology	-

I. Basic information

Description of functions
Soil biodegradable material (mulching film) with improved performance (addition of natural additives with UV resistance and biodegradation retardant effect).

Description of technology and TRL level (if applicable)
-

Description of product/service and TRL level (if applicable)
TRL = 7 (250 kg of compound processed into films at semi-industrial facilities).

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
NA
Please include the optimal scale/size of investment at which their solution or technology makes economic sense.
NA
What kind of waste the solution can utilize or valorise?
Formulation based of PBAT. TPS, PHBV and lignin. All of them are biobased polymers that can be produced from renewable sources.
To what extent does the use of a given solution or technology depend on climatic cconditions?
NA
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
NA

Solution owner and his willingness to provide detailed technical and technological data
ITENE (SEALIVE project coordinator) and IPC.

Has the Life Cycle Analysis been already done for this solution?
Yes

Source of data
ITENE internal communication.

References
Please include a description and a photo of any examples of the implementation.

Funded by the European Union

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Source: *web page of SEALIVE project*

Thickness 35 µm and 450 film width, processed in conventional blown film extrusion equipment.

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Biobased & soil biodegradable material.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

- *Please describe below how the solutions addresses the needs.*

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

Funded by the European Union

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COMMODITY TYPE	PACKAGING
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
Conceptualization and planning
Procurement – sourcing/ purchasing of products and services
Goods collection in warehouses and repacking for transport to final destination
Custom clearance
Transport to the destination country (often multi-stage and using different modes of transport)
Transport to the final destinations – last mile
Storage at the final destination
Operational logistic at final destination - distribution of goods and services

8. Single use plastic cutlery

Responsible partner: ITENE

INVESTIGATION LINE: I

Solution 8 **not on the final List**	**Single use plastic cutlery**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Product / service	x
Technology	-

I. Basic information

Description of functions
Food contact bio-based material with improved End-of-Life: both reusable and recyclable.

Description of technology and TRL level (if applicable)
-

Description of product/service and TRL level (if applicable)
150 kg of compound processed at SP Berner in an industrial injection moulding machine.

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
NA
Please include the optimal scale/size of investment at which their solution or technology makes economic sense.
NA
What kind of waste the solution can utilize or valorise?
Material based on PLA, CPB and another compound.
To what extent does the use of a given solution or technology depend on climatic cconditions?
NA
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
NA

Solution owner and his willingness to provide detailed technical and technological data
ITENE (SEALIVE project coordinator) and SP BERNER.

Has the Life Cycle Analysis been already done for this solution?
Yes

Source of data
ITENE internal communication.

References
Please include a description and a photo of any examples of the implementation.

Source: *web page of SEALIVE project*

Food contact biobased material, processable in conventional injection equipment. Food safety of cutlery end items has been assesed in accordance with EU Regulation 10/2011: global and specific migration tests for repeated use contact with all types of foodstuffs under conditions of 0.5h at 70°C. The final articles are suitable for contact with all types of foodstuffs under repeated used conditions.

Up scalable using conventional equipment: cycle time similar to PS. Improved mechanical performance compared to fossil-based counterparts (actual PS cutlery).

II. End-of-life stage addressed by the solution

Funded by the European Union

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Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Reusable according to UNE53928.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

- *Please describe below how the solutions addresses the needs.*

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Conceptualization and planning
Procurement – sourcing/ purchasing of products and services
Goods collection in warehouses and repacking for transport to final destination
Custom clearance
Transport to the destination country (often multi-stage and using different modes of transport)
Transport to the final destinations – last mile
Storage at the final destination
Operational logistic at final destination - distribution of goods and services

9. Biodegradable Plastic Bag carrier (Mater-Bi)

Responsible partner: IBF

INVESTIGATION LINE: III

Solution 9 **not on the final List**	**Biodegradable Plastic Bag carrier (Mater-Bi)**
Product / service	*X*
Technology	*Please mark X if relevant*
I. Basic information	
Description of functions *What is the effect or final product?* Biodegradable plastic bags are produced of renewable resources such as plant starch and plant oil. The manufacturer of Mater-Bi® guarantees that no genetically modified plants are used for the production of raw materials. The Mater-Bi® plastic carrier bags are also biodegradable in the ocean. The biodegradable plastic bags are robust and have a high tear resistance.	
Description of technology and TRL level (if applicable)	
Description of product/service and TRL level (if applicable) Reduce contamination possibilities, thereby contributing to the production of quality compost, a precious soil improver. Mater-Bi organic waste bags can be a solution not only in managing household organic waste but also in commercial catering. Bags are made from the renewable raw material Mater-Bi®, which is obtained from corn starch. They are compostable and certified according to the European standard EN13432, which stands for industrial compostability. This means that the compostable bags may carry the OK compost and seedling logo.	
Basic conditions of use	

Funded by the European Union

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Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
To what extent does the use of a given solution or technology depend on climatic conditions?
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

Biodegradable plastic bags are produced of renewable resources such as plant starch and plant oil. The manufacturer of Mater-Bi® guarantees that no genetically modified plants are used for the production of raw materials. The Mater-Bi® plastic carrier bags are also biodegradable in the ocean. The biodegradable plastic bags are robust and have a high tear resistance.

Solution owner and his willingness to provide detailed technical and technological data

Novamont. Contacted, but no response.

Has the Life Cycle Analysis been already done for this solution?

Don't know.

Source of data

https://www.biologischverpacken.de/en/mater-bi-bags-22-13-x-50-cm-200-pieces-per-roll/dse02367, **novamont-fr@novamont.com**

References

Please include a description and a photo of any examples of the implementation.

Biodegradable plastic carrier bags
Non-binding recommendation: load capacity 3 Kg
Made of Mater-Bi® bioplastic, petroleum-free
Robust & tear-resistant
Imprint with illustrations about environmental benefits
Wrist straps 13 cm
100 % Mater-Bi® made of renewable resources
Foil strength (Micron): 11 µ

Source: *web page of Novamont*

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

Biodegradable and compostable

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

· *sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;*
· *utilization of local resources and knowledge.*

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

Eradicates waste

IV. Logistic supply chains application potential - in which stage?

The 'humanitarian supply chain' *is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs

Cuts down on waste

Conceptualization and planning

.....

Procurement – sourcing/ purchasing of products and services

.....

Goods collection in warehouses and repacking for transport to final destination

.....

Custom clearance

.....

Transport to the destination country (often multi-stage and using different modes of transport)

Road and air

Funded by the European Union

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Transport to the final destinations – last mile
Road
Storage at the final destination
Light material, but no information on storage.
Operational logistic at final destination - distribution of goods and services
Yes

10. Secalflor Water Retention Panel

Responsible partner: IBF

INVESTIGATION LINE: III

Solution 10 **not on the final List**	**Secalflor Water Retention Panel**
Product / service	*X*
Technology	

I. Basic information

Description of functions

What is the effect or final product?

Secalflor panels are made from 100% natural raw materials consisting of a mix of various minerals, starches and cellulose fibres. Through their specifically engineered properties, they support plant growth across a wide variety of applications.

Description of technology and TRL level (if applicable)

.....

Description of product/service and TRL level (if applicable)

Secalflor panels remain permanently in the ground, where they gradually transform into fertile soil and thus become part of the raw material cycle. This ensures excellent soil compatibility. Their stable, open-pored structure makes Secalflor panels an excellent water storage facility. When installed, evaporation and seepage are consistently reduced, and the stored moisture can be more easily extracted by the roots. All of this means that significantly less water is used during cultivation. The natural, growth-promoting properties of Secalflor panels require less fertilizer and water use, thus noticeably reducing CO2 consumption. In return, faster plant growth binds larger amounts of CO2 from the environment.

Basic conditions of use

Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
To what extent does the use of a given solution or technology depend on climatic conditions?
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

.....

Solution owner and his willingness to provide detailed technical and technological data

Secalfor, contacted but no response

Has the Life Cycle Analysis been already done for this solution?

Don't know

Source of data

Funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

https://www.landscapedepot.ie/product/secalflor-water-retention-panels-pc3542/, **info@secalflor.de** , contacted but no response

References

Please include a description and a photo of any examples of the implementation.

Source: *web page of SECALFLOR*

Thanks to Secaflor panel's water retention properties, vegetation can survive periods of heat and drought longer and grow more efficiently.

Secalflor panels are quick and easy to install and are used in planting environments where growth conditions may be challenging through lack of water. The panels help retain moisture for longer enabling root development especially in young plants. Typical applications are: roof gardens, greening of embankments, reclamation of contaminated ground, parks and amenities, fruit and vegetable plantations and any areas designated for planting which are historically prone to drought.

The panels are lightweight, easy to cut and can be stored indoors indefinitely.

They can be secured in place easily with ground cover pegs.

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

Completely biodegradable

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;

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· *sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;*
· *utilization of local resources and knowledge.*

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

Diminishes the amount of waste in humanitarian setting and also is biodegradable. Can be used in harsh conditions for growing plants.

IV. Logistic supply chains application potential - in which stage?

The 'humanitarian supply chain' *is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs

Can be used in remediation or planting settings

Conceptualization and planning

.....

Procurement – sourcing/ purchasing of products and services

.....

Goods collection in warehouses and repacking for transport to final destination

.....

Custom clearance

.....

Transport to the destination country (often multi-stage and using different modes of transport)

Road/Air

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Transport to the final destinations – last mile
Road
Storage at the final destination
Yes
Operational logistic at final destination - distribution of goods and services
Will need to be stored in a dry area.

11. Cylindrical Jar

Responsible partner: IBF

INVESTIGATION LINE: III

Solution 11 **not on the final List**	**Cylindrical Jar**
Product / service	*X*
Technology	

I. Basic information

Description of functions
What is the effect or final product?
Simple and practical, the wide based and straight sided Cylindrical Jars have a modern profile.

Description of technology and TRL level (if applicable)
.....

Description of product/service and TRL level (if applicable)

- raw material obtained from natural sources such as sugar cane, corn or other bio-sources
- Products made using Bio-based PE can still be classified as food grade.
- It is easily collected in domestic recycling and can be recycled several times with stable quality.
- It can be recycled in the same stream as fossil based PE.
- Simple and practical, the wide based and straight sided Cylindrical Jars have a modern profile.
- from 250ml up to 4000ml
- wide screw neck finish
- easy to use with creams, solids and powders

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
To what extent does the use of a given solution or technology depend on climatic conditions?
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

N/A

Solution owner and his willingness to provide detailed technical and technological data
Pont Europe, contacted but no response

Has the Life Cycle Analysis been already done for this solution?
N/A

Funded by the European Union

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Source of data
https://www.ponteurope.com/sustainability-biobased-pe/,
https://www.ponteurope.com/contact/

References
Please include a description and a photo of any examples of the implementation.

Source: *web page of Pont Europe*

Simple and practical, the wide based and straight sided Cylindrical Jars have a modern profile.

from 250ml up to 4000ml
wide screw neck finish
easy to use with creams, solids and powders

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

Bio-based PE plastic is made either fully or partially from renewable plant-based resources such as sugar cane or corn or other biological resources. it can easily be recycled in the same stream as oil based PE for a circular economy.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Funded by the European Union

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Please describe below how the solutions addresses the needs.

It is eliminating fossil plastic based products.

IV. Logistic supply chains application potential - in which stage?

The 'humanitarian supply chain' *is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs

Kitchen equipment, household and domestic items and catering supplies

Conceptualization and planning

.....

Procurement – sourcing/ purchasing of products and services

.....

Goods collection in warehouses and repacking for transport to final destination

.....

Custom clearance

.....

Transport to the destination country (often multi-stage and using different modes of transport)

Air, road and shipping transport

Transport to the final destinations – last mile

Quite a light meaterial

Storage at the final destination

No information provided

Operational logistic at final destination - distribution of goods and services

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Yes

12. Shoes made from BIOWA material

Responsible partner: PRO CIVIS
INVESTIGATION LINE: IV

Solution 12 **not on the final List**	**Shoes made from BIOWA material**
Product / service	**X**
Technology	**-**

I. Basic information

Description of functions

The Product is made mainly from the BIOWA Material.

The Product leverages food byproducts - such as olive pits and walnut shells - to deliver novel bio-based, biodegradable, and elastic materials that have a patent pending. The materials involved has a PCF (Product Carbon Footprint) potentially 60 % lower compared to conventional plastics.

The materials involved only produce biodegradable microplastics, directly addressing a critical environmental concern. Furthermore they safely break down in industrial composting places, meeting EN 13432 standards, which helps reduce the environmental impact.

Description of technology and TRL level (if applicable)

-

Description of product/service and TRL level (if applicable)

The shoe is made from the BIOWA Material which has reached TRL 8.
There are two additional materials:
- Material B (a PHA), which is currently at TRL 4
- Material C (a cross-linked rubber), which is currently at TRL 3.

Basic conditions of use

Please include also minimum requirements of a given solution regarding the availability of public infrastructure.

No requirements.

Please include the optimal scale/size of investment at which their solution or technology makes economic sense.

Non applicable.

What kind of waste the solution is able to utilize or valorise?

The solution provides for the reduction of food waste as it utilizes food byproducts.
Furthermore the solution provides for the reduction of plastic waste.

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To what extent does the use of a given solution or technology depend on climatic conditions?
Non applicable.

Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
Non applicable.

Solution owner and his willingness to provide detailed technical and technological data
KUORI GmbH Switzerland
The Solution Owner willing to provide further information.

Has the Life Cycle Analysis been already done for this solution?
The Company has successfully completed an LCA regarding the main Material and could provide data if necessary.

The Company declares the life cycle assessment of the products as been highly important, since they aim to create circular materials that are less harmful to the environment and human life.

Source of data

1) The Company as the first winner of the Renewable Material of the Year 2023: https://renewable-carbon.eu/news/renewable-material-of-the-year-2023-announced/
2) The web pages: www.kuori.ch
3) The initial mail correspondence over the mail address: info@kuori.ch .
4) The additional information received from:

   Roman Meyer
   Business Development | KUORI

   KUORI GmbH Sales, sales@kuori.odoo.com

References
Please include a description and a photo of any examples of the implementation.

Source: *web page of KUORI GmbH*

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

The development project has been executed jointly with **Wildling Shoes**.

The current focus of the application of the material are: outdoor, sports, footwear, power tools industry. Different applications have been tested with **Decathlon**.

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

Reduce.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

By using plant-based components, the Company reduces reliance on non-renewable resources. Roughly calculated, each ton of KUORI's material prevents approx. 500 kg of plastic waste from reaching landfills. Currently, the granules result in a 40% reduction in CO2 emissions compared to traditional materials in the industry.

The summary of the argumentation for the material:

- 60% less CO2 emissions compared to conventional plastic (LCA)
- 10% microplastic degradation per month (confirmed by independent study at ZHAW)
- the use of food side-streams such as walnut shells and olive pits as biofillers

The solution could be tailored to local availability of waste resources.

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***

Funded by the European Union

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Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
.....
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
Potential application.

13. COUNTLESS - lignin-based platform chemicals

Responsible partner: AIMPLAS

INVESTIGATION LINE: II

Solution 13 **not on the final List**	**COUNTLESS**

Funded by the European Union

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Product / service	
Technology	

I. Basic information

Description of functions
What is the effect or final product?

Production of lignin-based platform chemicals, showing how the chemicals can be applied in different end-use cases, enabling the transition from fossil-based to bio-based chemical building blocks.

The objective is to demonstrate the application of lignin derived bio-based chemicals in:

- Personal care
- Insulation
- Waterproofing membranes
- Wood panels
- Bitumen

.....

Description of technology and TRL level (if applicable)

Catalytic hydrogenolysis process operated in continuous mode into platform chemicals at industrially relevant conditions. TRL 7.

.....

Description of product/service and TRL level (if applicable)

Produce and demonstrate a range of construction and cosmetics products using the lignin-based platform chemicals. TRL 3-4.

.....

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure. Please include the optimal scale/size of investment at which their solution or technology makes economic sense.

The project should have a high scale of investment in order to incorporate the continuous catalytic hydrogenolysis technology to chemical industry of the final destination zone.

What kind of waste the solution is able to utilize or valorise?

Biomass source for chemical production.

To what extent does the use of a given solution or technology depend on climatic conditions?

Climatic conditions do not have impact on the solution.

Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

There is no possibility to refine the solution as an autonomous and mobile unit.

.....

Solution owner and his willingness to provide detailed technical and technological data

The public information related with the project is published on the website **https://countless-project.eu/resources/**

.....

Has the Life Cycle Analysis been already done for this solution?

No information found.

.....

Source of data

https://countless-project.eu/

.....

References

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Please include a description and a photo of any examples of the implementation.

Source: *web page of COUNTLESS project*

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

Using biomass as sustainable source.

.....

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

Increase the use of sustainably sourced biomass.
Reduction of the GHG emissions through improvements in the pilot infrastructure.
Development of bio-based high-value products substituting current fossil-based compounds.

.....

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Funded by the European Union

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Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*
TYPICAL NON-FOOD ITEMS	
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.	
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.	
Medical supplies, wheelchairs, cold boxes.	
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).	
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.	
Paper, printed products, office equipment, electronic waste, etc.	
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.	

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
.....
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
Using bio-based products helps the chemical industry on reducing the fossil-based chemicals and slowly move to bio-based alternatives or low-emission production.
.....

Funded by the European Union

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14. Plastic films from photosynthetic microorganisms

Responsible partner: ITENE
INVESTIGATION LINE: I

Solution 14 **not on the final List**	**Plastic films from photosynthetic microorganisms.**
Product / service	
Technology	X

I. Basic information

Description of functions
What is the effect or final product?
Bioplastics (polyhydroxyalkanoates, PHA) from photosynthetic microorganisms converted into plastic films. The difference with the current production process is that the microorganisms produce PHA using light, inorganic C and releasing O_2. The method is therefore C neutral or negative, does not require aeration and high energy inputs and minimal amounts of feedstocks. From the cultures plastic films can be obtained.

Description of technology and TRL level (if applicable)
TRL 3-4 (proof-of-concept).

Description of product/service and TRL level (if applicable)
Product: TRL 7-8 (prototype demonstration).
Service: TRL 3-4 (proof-of-concept).

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure. Please include the optimal scale/size of investment at which their solution or technology makes economic sense.
We need an investment for scaling up the process and make a good evaluation of the process. . Up to now we have proved the process at lab scale in 3 L reactors, and it is now needed to scale up to a size of around 500 L.
What kind of waste the solution is able to utilize or valorise?
Wastewaters rich in nutrients. Other types of waters can be used, but they have to be rich in nutrients (N and P). Wastes rich in acetate are also suitable since we boost plastic production by injecting small doses of acetate.
To what extent does the use of a given solution or technology depend on climatic conditions?
It is affected. It is affected because this organisms are primary producers, so the idea is to cultivate them outdoors. This means higher productions in summer and lower in winter.
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
"Transportable" demo plant that could be mounted into a truck bed for testing in different environments.

Solution owner and his willingness to provide detailed technical and technological data
Universitat Politècnica de Catalunya, willing to provide further information.

Has the Life Cycle Analysis been already done for this solution?
Yes. Open access.

Source of data
Response to online survey on November 28th and email communication.

References
Please include a description and a photo of any examples of the implementation.
https://promicon.eu/

PROMICON




Funded by the European Union

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II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Biodegradable bio-based product solution.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.
This process uses sunlight, absorbs CO2, and requires minimal organic resources while yielding biodegradable biopolymers such as polyhydroxyalkanoates (PHAs).

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*
TYPICAL NON-FOOD ITEMS	
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.	
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.	
Medical supplies, wheelchairs, cold boxes.	
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).	
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.	
Paper, printed products, office equipment, electronic waste, etc.	
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.	

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

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Identification of needs
.....
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
.....

15. BioSupPack - PHA-based rigid packaging

Responsible partner: AIMPLAS
INVESTIGATION LINE: II

Solution 15 **not on the final List**	**BioSupPack**
Product / service	X
Technology	
I. Basic information	
Description of functions *What is the effect or final product?* Crafting highly performing PHA-based rigid packaging with properties similar to those of conventional petrochemical plastics present in the market for food, cosmetics, homecare and beverage sectors and to establish a new value chain including the development of logistics and management of both brewery and packaging waste.	
Description of technology and TRL level (if applicable) As the project is an Innovative Action TRL is expected as 6-7 for the overall technologies.	

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The project uses atmospheric plasma technology for the pre-treatment of beer bagasse, as well as for the pre-treatment of new PHA-based packaging waste. In this way, in both cases the subsequent hydrolysis processes are favored in the first case, and PHA degradation in the second.

.....

Description of product/service and TRL level (if applicable)

PHA-based products. TRL 3-4 (Upscaling the production to demonstration level).

.....

Basic conditions of use

Please include also minimum requirements of a given solution regarding the availability of public infrastructure. Please include the optimal scale/size of investment at which their solution or technology makes economic sense

As the solution is related with PHA rigid packaging, the main requirement is that humanitarian chain leaders use this type of packaging on the location of destiny. The size of investment depends on the cost of changing traditional packaging with PHA packaging.

What kind of waste the solution is able to utilize or valorise?

By using enzymatic recycling, PHA/PHB wastes can be transformed into a source of carbon.

To what extent does the use of a given solution or technology depend on climatic conditions?

The bio-based solutions provided by the project does not depend on climatic conditions.

Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

Not applicable.

.....

Solution owner and his willingness to provide detailed technical and technological data

Data provided by public deliverables on the project website https://biosuppack.eu/downloads/public-deliverables/. Further deliverables can be uploaded in the future as soon as they are completed.

.....

Has the Life Cycle Analysis been already done for this solution?

Work package 6, the deliverable is not uploaded yet.

.....

Source of data

https://biosuppack.eu/

.....

References

Please include a description and a photo of any examples of the implementation.

No information found.

.....

II. End-of-life stage addressed by the solution

The project implements mechanical and enzymatic recycling processes to reintroduce materials in the production step and/or recover carbon sources for the fermentation process (>30% carbon source supply).

Packaging based on PHA obtained from a by-product of the beer industry will be more sustainable than those manufactured from conventional materials. These containers, once their useful life has ended, will subsequently be recycled enzymatically to obtain the starting monomers and polymerize again, closing the cycle and following a circular economy model.

Regarding mechanical recycling, apart from the identification and separation technologies, the evaluation of the mechanical recycling of the new material to a pilot plant is contemplated using conventional treatment and processing technologies. On the other hand, the enzymatic recycling process is at a lower level of development compared to mechanical recycling, since it is a newer technology and requires greater research in terms of selection and production of enzymes capable of degrading the PHA, for example.

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.....

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
- *ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;*
- *sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;*
- *utilization of local resources and knowledge.*

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Bio-based products. Marketable products in food, beverage segments. Also improving the barrier, hydrophobic and squeezable properties of PHA-based packaging.
Related with the expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
- Reducing the amount of packaging that goes to landfill or incineration.
- Reducing the greenhouse gas emissions in the whole value chain, by saving non-nenewable carbon-based resources or increasing the use of renewable resources (i.e. beer spent grains).

The project contemplates the adaptation and validation of sorting technologies for packaging manufactured in PHA, considering that they arrive mixed with packaging waste based on other plastic materials.

.....

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations".*
Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

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Identification of needs
.....
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
To minimise environmental impact of the packaging of the supply chain, PHA-based packaging helps to reduce the amount of packaging that goes to landfill or incineration, because it can be transformed into carbon using enzymatic recycling. .....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
As well as said at the "Procurement" stage, PHA-based packaging gives more circularity to the supply chain, specially at the solid waste management during the stages where most of the wastes are generated. .....

16. Research and development of packaging products made of biodegradable and biobased polymers

Responsible partner: ITENE
INVESTIGATION LINE: I

Solution 16 **not on the final List**	**Research and development of packaging products made of biodegradable and biobased polymers.**
Product / service	X
Technology	X
I. Basic information	

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Description of functions
What is the effect or final product?
Bottles, bags, trays, agricultural plastics and many other applications that are bio-based and biodegradable.

Description of technology and TRL level (if applicable)
TRL 7-8 (prototype demonstration)

Description of product/service and TRL level (if applicable)
TRL 7-8 (prototype demonstration)

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
Not given.
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
Not given.
What kind of waste the solution is able to utilize or valorise?
Depends on the grade of the polymer chosen for each application.
To what extent does the use of a given solution or technology depend on climatic conditions?
No.
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
Not known.

Solution owner and his willingness to provide detailed technical and technological data
Universitat Jaume I, willing to provide Bio4HUMAN partners more information on the solution.

Has the Life Cycle Analysis been already done for this solution?
Yes. Confidential information.

Source of data
Response to online survey on November 27th.

References
Please include a description and a photo of any examples of the implementation.
NA.

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Biodegradable items.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.
Biodegradable products of use in humanitarian settings, such as bottles, bags and trays. Such solutions could reduce the amount of waste generated after use.

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*

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Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
.....
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
.....

17. Compostable Food Prep Gloves

Responsible partner: IBF
INVESTIGATION LINE: III

Solution 17 **not on the final List**	**Compostable Food Prep Gloves**

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Product / service	*X*
Technology	

I. Basic information

Description of functions
What is the effect or final product?
Irish made compostable plastic bags

-manufactured from recycled plastic materials

-suitable for day to day use and food preparation

Description of technology and TRL level (if applicable)
.....

Description of product/service and TRL level (if applicable)
manufactured from recycled plastic materials

-suitable for day to day use and food preparation

-available in Small, Medium and Large size

-sold in packs of 100 gloves (or packs of 2400)

-thick, durable, cost effective and very popular

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
What kind of waste the solution is able to utilize or valorise?
To what extent does the use of a given solution or technology depend on climatic conditions?
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

.....

Solution owner and his willingness to provide detailed technical and technological data
Earth 2 Earth, contacted but no response

Has the Life Cycle Analysis been already done for this solution?
Don't know

Source of data
https://cleanfast.ie/earth2earth-compostable-food-prep-gloves-100-gloves.html?srsltid=AfmBOoocZY3LfHl90W8MeIRVEe0bqKrA9eNBxyQE5faGAjMRNOCyf8IR,
info@earth2earth.com

References
Please include a description and a photo of any examples of the implementation.

100% compostable, manufactured from recycled plastic and made in Ireland. No need to create any pollution and the glove is made in Ireland. Also, Earth2Earth Compostable Food Prep Gloves are very hard wearing.

Source: *web page of Earth 2 Earth*

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II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

100% compostable

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.

Reduces waste and the product is compostable.

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*

Funded by the European Union

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Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
Food preparation gloves
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
Road/Air
Transport to the final destinations – last mile
Road
Storage at the final destination
No specific requirements
Operational logistic at final destination - distribution of goods and services
Yes

18. AI-Core integrated engine designed specifically for dealing with complex science and engineering problems

Responsible partner: ITENE

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INVESTIGATION LINE: I

Solution 18 **not on the final List**	**AI-Core is an integrated engine designed specifically for dealing with complex science and engineering problems.**
Product / service	X
Technology	X

I. Basic information

Description of functions
What is the effect or final product?
From new biopolymers to simulation software to evaluate the feasibility of new products from fermentation.

Description of technology and TRL level (if applicable)
AI-Core incorporates complementary modules for machine learning, systems modelling, advanced control and mathematical optimization – all working coordinately.
Technology: TRL 5-6 (validation in relevant environment).

Description of product/service and TRL level (if applicable)
Product: TRL 5-6 (validation in relevant environment).
Service: TRL 3-4 (proof-of-concept).

Basic conditions of use
Please include also minimum requirements of a given solution regarding the availability of public infrastructure.
NA
Please include the optimal scale/size of investment at which their solution or technology makes economic sense
NA
What kind of waste the solution is able to utilize or valorise?
Solid urban biowaste (e.g. household organic waste).
To what extent does the use of a given solution or technology depend on climatic conditions?
Don´t know.
Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)
Under study.

Solution owner and his willingness to provide detailed technical and technological data
IDENER, not willing to provide B4H partners more information on the solutions.

Has the Life Cycle Analysis been already done for this solution?
Do not know.

Source of data
Response to the online survey on November 27th.

References
Please include a description and a photo of any examples of the implementation.

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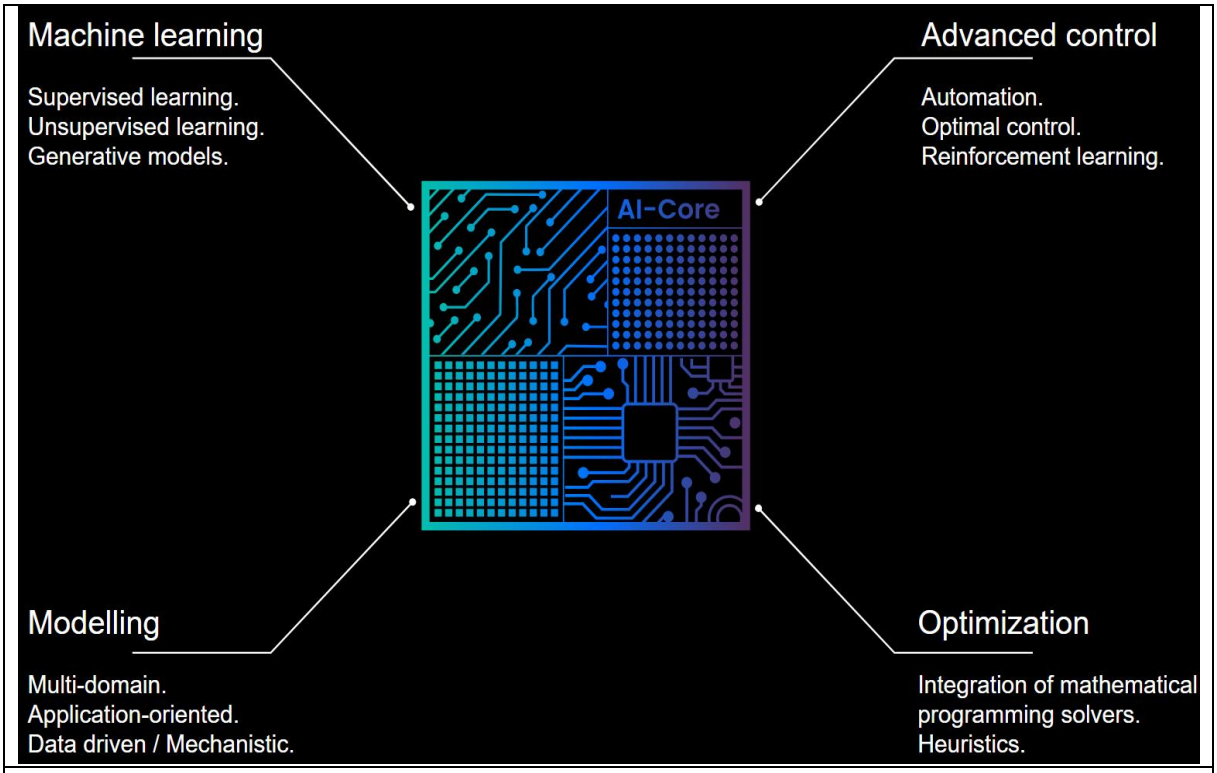

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.
Recycle materials (for a service or technology solution).

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

Please describe below how the solutions addresses the needs.
AI-based service to reduce complexity, predict, optimize outputs from a biological system (bio-based product or bio-based technology).

IV. Logistic supply chains application potential - in which stage?

***The 'humanitarian supply chain'** is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

Funded by the European Union

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COMMODITY TYPE	PACKAGING
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*

TYPICAL NON-FOOD ITEMS
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.
Medical supplies, wheelchairs, cold boxes.
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.
Paper, printed products, office equipment, electronic waste, etc.
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs
.....
Conceptualization and planning
.....
Procurement – sourcing/ purchasing of products and services
.....
Goods collection in warehouses and repacking for transport to final destination
.....
Custom clearance
.....
Transport to the destination country (often multi-stage and using different modes of transport)
.....
Transport to the final destinations – last mile
.....
Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services
.....

19. BRILIAN - the adoption of sustainable and cooperative business models in rural areas

Responsible partner: AIMPLAS
INVESTIGATION LINE: II

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Solution 19 **not on the final List**	**BRILIAN**
Product / service	
Technology	

I. Basic information

Description of functions

What is the effect or final product?

BRILIAN will support the adoption of sustainable and cooperative business models in rural areas to incorporate agricultural by-products valorisation, seeking to increase and diversify primary producers' income.

Description of technology and TRL level (if applicable)

(TRL 0 -4) BRILIAN will set-up 3 cooperative pilots working with 10 value chains for the validation of a group of actions for bio-innovation (ABI), which will enable the proposition of specific cooperative business models. These business models will consider organizational and logistic optimization but also economic, social and environmental aspects, thanks to the Optimization Toolkit.

.....

Description of product/service and TRL level (if applicable)

(TRL 0 -4) The Actions for the Bio-Innovation are (ABI): Forging robust rural bio-communities, Integration of short supply chains, Achieving circularity and sustainability and Production of value-added bioproducts.

Basic conditions of use

Please include also minimum requirements of a given solution regarding the availability of public infrastructure. Please include the optimal scale/size of investment at which their solution or technology makes economic sense.

The project is on a pilot phase level. At this point, there are three pilots located in different regions of the centre-east EU. The replication of the solution is meant to be extended to rural EU areas. Nevertheless, there is no information about the investment of the whole system infrastructure, even though they are based in already existing

What kind of waste the solution is able to utilize or valorise?

The proposed solution incorporates agricultural by-products valorisation, seeking to increase and diversify primary producers' income.

To what extent does the use of a given solution or technology depend on climatic conditions?

Information about climate conditions variability of the project is not provided.

Is it possible to refine the solution as an autonomous and mobile unit? (if applicable)

However, due to its small-midsize scale, it could be replicated on an existing rural. This solution could not be proposed as a mobile and autonomous unit.

Solution owner and his willingness to provide detailed technical and technological data

.....

Has the Life Cycle Analysis been already done for this solution?

.....

Source of data

https://www.cbe.europa.eu/projects/brilian

References

Please include a description and a photo of any examples of the implementation.

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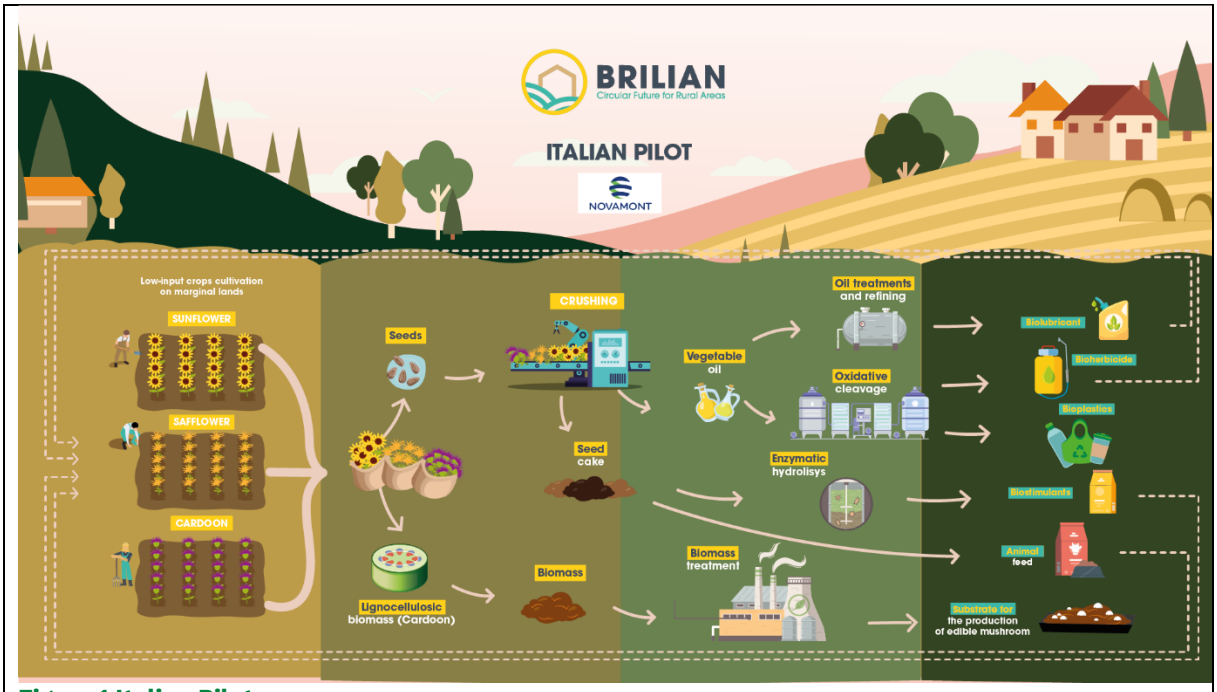

Figure 1 Italian Pilot

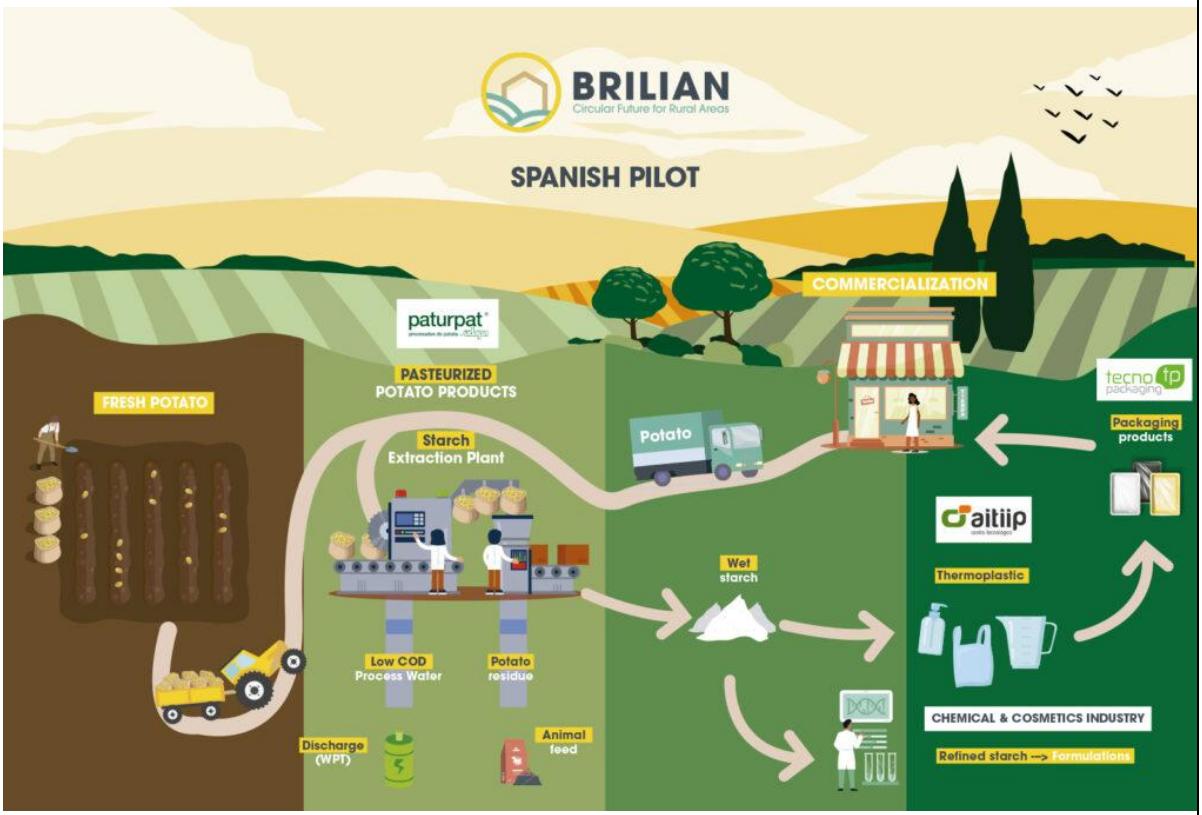

Figure 2 Spanish Pilot

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Figure 3 Danish pilot

Source: *web page of BRILIAN project*

II. End-of-life stage addressed by the solution

Please describe if the solution refers to 4R Principle (Reduce, reuse, recycle, recover) biodegradability, composability or other means of end-of-life stage.

The project aims to provide added-value farm by-products such as:

1. Italian Pilot: Vegetable oil, cardoon biomass from cardoon, safflower and sunflower farms
2. Spanish Pilot: Packaging, chemical and pharma products from processed potatoes.
3. Danish Pilot: vegan protein, supplements and bioactive compounds suitable for applications in food and adhesives from rapeseed cake.

III. Needs of the humanitarian sector and / or of the solid waste management constraints in the humanitarian settings addressed by identified solution

We are looking for:
***1) bio - based products / services** in order to diminish the amounts of waste generated by humanitarian interventions*
***2) bio - based technologies** in order to cope with the amounts of waste generated in the humanitarian context.*

The expected characteristics of the bio-based solutions potentially applicable in the humanitarian context:
· ability to eliminate the humanitarian waste, i.e. plastic, aluminium, metal, glass, paper & cardboard, organic, wood, medical and chemical;
· sustainability – addressing environmental, economic, and social factors; be adaptable to local conditions; provide long-term benefits without unintended negative consequences;
· utilization of local resources and knowledge.

In case of a doubt as for the applicability of a given product, service or technology in the humanitarian context – please consult the Humanitarian Assessment Report prepared by People In Need and Polish Humanitarian Action. The Report is enclosed; also available in the SharePoint.

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Please describe below how the solutions addresses the needs.

The application of this solution could be replicated and used in waste generated by rural communities; however, the products or technologies could not diminish the amounts of waste generated by humanitarian interventions.

On the other hand, in a mid-long term view, these cooperative business models could be very helpful for rural empowerment.

IV. Logistic supply chains application potential - in which stage?

The 'humanitarian supply chain' *is defined as: "The planning, procurement, storage, transport and delivery of different forms of supplies, works & services used for projects and to respond to emergencies. This includes the flow of supplies from origin to destination but also more complex work of forecasting, optimising resources, value for money to ensure the most efficient process, and decreasing the carbon footprint of related operations"*

Type of waste in humanitarian context:

COMMODITY TYPE	***PACKAGING***
Grains, cereals	*Virgin woven PP bags*
Cornmeal, fortified flour	*Hybrid paper bags and PP woven bags with PE*
Fortified vegetable oil	*Steel cans, plastic bottles, cardboard cartons*
Specialised nutritious food products	*Metallised flexible plastic sachets and pouches, plastic box liners, cardboard cartons*
TYPICAL NON-FOOD ITEMS	
Tents, shelter kits, tarpaulin, synthetic sleeping mats, blankets, clothes, mosquito nets, timber, cement.	
Nutrition-specialized products, such as Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Foods (RUSF); for example, Plumpy'Nut, vitamin A supplements, iron-folic acid supplements, and micronutrient supplements. These can be on tinplate or laminated packaging structures.	
Medical supplies, wheelchairs, cold boxes.	
Jerrycans/buckets (water containers), water purification tablets (Aquatabs, PUR), Water pumps, hygiene products (soap), menstrual hygiene products (single-use pads, reusable pads-ex. AFRIpads), water testing products, chemicals (such as chlorine), and equipment (for pump mechanics).	
Stoves (fuel-efficient saving stoves), seeds, farming tools (hoes, axes, rakes, watering cans, buckets), storage (bags and sacks), fertilizers, pesticides, etc.	
Paper, printed products, office equipment, electronic waste, etc.	
Petroleum, oil, and lubricants. Electrical transformers with polychlorinated biphenyls (PCBs). Chemicals such as acid, chlorine, and pesticides. Asbestos-containing materials. Treated timber, etc.	

Please indicate the link of the supply chain for which the solution can be applied? Describe how.

Identification of needs

.....

Conceptualization and planning

The empowerment of rural biocommunities could be a big help when planning future humanitarian actions.

Procurement – sourcing/ purchasing of products and services

The Spanish Pilot is developing bio-products that can be used in packaging and pharma applications. So it could be an interesting procurement line in the future.

Goods collection in warehouses and repacking for transport to final destination

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Custom clearance

.....

Transport to the destination country (often multi-stage and using different modes of transport)

.....

Transport to the final destinations – last mile

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Storage at the final destination
.....
Operational logistic at final destination - distribution of goods and services

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