UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

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The potential of plastic substitutes for the Asia-Pacific Region

Pacific workshop on plastic pollution and material substitutes
Exploring material substitutes and green finance for SDG 14.1 and 12

Fiji 17-19 October 2023

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Rising Trend of Trade in Plastics

It is estimated that there were **369 million tons of plastics traded in 2020 alone, which is $1.2 trillion in value**, a significant increase from $933 billion the year before (UNCTAD, 2022d).

Waste management capacities are being stretched to their limits; thus, it is important to identify what materials or products could effectively and safely substitute plastics and how to implement this transition.

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The distinction between plastic substitutes and plastic alternatives

Plastics substitutes are natural materials that have similar properties to plastics, while plastic alternatives include bioplastics or biodegradable plastics.

Plastic substitutes		Plastic alternatives
Mineral, plant, marine or animal	ORIGIN	Bioplastics or Biodegradable plastics
Recyclable, reusable, biodegradable, compostable, or erodable	PROPERTIES	Recyclable, biodegradable, or compostable (end of life)
Should have lower environmental impact along their life cycle	IMPACT	Should have lower GHG lifecycle emissions when compared to plastics
Should not be harzardous for human, animal or plant life	SAFETY	Should not be harzardous for human, animal or plant life
Non-plastics		**Better plastics**

Source: UNCTAD Vivas Eugui & Pacini (2022). UNCTAD, based on presentation on plastic substitutes HS codes, Life-cycle analysis and tariffs considerations. WTO Dialogue on Plastics.

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Zero Draft text INC-3 on Non- plastic substitutes (Art.6)

- To take measures to foster innovation and incentivize and promote the development and use at scale of **safe, environmentally sound, and sustainable** non-plastic substitutes, including **products, technologies and services**, considering their potential for environmental, economic, social and human health impacts.

- To encourage the of **use of regulatory and economic instruments, public procurement and incentives** to promote the development and use of **safe, environmentally sound and sustainable** non-plastic substitutes.

WTO IDP on Non- plastic substitutes (draft WTO/W10)

- **Promote trade**, including through implementing trade-related measures such as those listed in Annex [X], that **contributes to ending plastic pollution and results in safe circularity**, including trade in:
  - **environmentally sustainable, safe, and effective** non-plastic substitutes and
  - **environmentally sustainable, safe, and effective** plastic alternatives and re-use, repair and
  - **re-fill systems** such as those listed in Annex [X],

  With a focus on those of interest to WTO Members, in particular developing members, including **SIDS, and least developed members, and opportunities for their MSMEs**.

HS Chapter	Description	Number of 6-digit HS Codes
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, n.e.c.	1
05	Animal originated products; not elsewhere specified or included	3
07	Vegetables and certain roots and tubers; edible	8
08	Fruit and nuts, edible; peel of citrus fruit or melons	2
11	Products of the milling industry; malt; starches; inulin; wheat gluten	3
12	Oil seeds and oleaginous fruits, ..., industrial or medicinal plants; straw and fodder	7
13	Lac; gums, resins and other vegetable saps and extracts	4
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	4
15	Vegetable waxes (other than triglycerides); whether or not refined*	1
17	Sugars and sugar confectionery	2
20	Preparations of vegetables, fruit, nuts or other parts of plants	1
23	Food industries, residues and wastes thereof; prepared animal fodder	4
28	Inorganic chemicals; organic and inorganic compounds of precious metals…	2
29	Organic chemicals	2
32	Glass; glass frit and other glass, in the form of powder, granules or flakes*	1
39	Cellulose; Natural polymers…	5
40	Rubber	4
41	Raw hides and skins (other than furskins) and leather	12
42	Articles of leather,…,articles of animal gut (other than silkworm gut)	1
44	**Wood and articles of wood; wood charcoal**	**43**
45	Cork and articles of cork	7
46	Manufactures of straw, esparto or other plaiting materials; basketware…	8
47	**Pulp of wood or other fibrous cellulosic material; recovered (waste and scrap)…**	**17**
48	**Paper and paperboard; articles of paper pulp, of paper or paperboard**	**31**
50	Silk	10
51	**Wool, fine or coarse animal hair; horsehair yarn and woven fabric**	**25**
52	Cotton	3
53	**Vegetable textile fibers; paper yarn and woven fabrics of paper yarn**	**19**
54	Man-made filaments; strip and the like of man-made textile materials	4
56	Wadding, felt and nonwovens, special yarns; twine, cordage, ropes and cables…	4
57	Carpets and other textile floor coverings	1
63	Textiles, made up articles; sets; worn clothing and worn textile articles; rags	2
67	Feathers and down, prepared; and articles made of feather or of down	1
68	Stone, plaster, cement, asbestos, mica or similar materials; articles thereof	1
69	Ceramic products	4
70	Glass and glassware	9
76	**Aluminium and articles thereof**	**17**
94	Furniture,… not elsewhere specified or included	4
95	Toys, games and sports requisites; parts and accessories thereof	4
96	Miscellaneous manufactured articles	1

Reducing plastic use is the best way to prevent it becoming waste or hazardous waste. Substitutes can contribute significantly to this aim. A mapping of HS codes of potential plastic substitutes resulted in…

282 HS codes identified
(6-digit)

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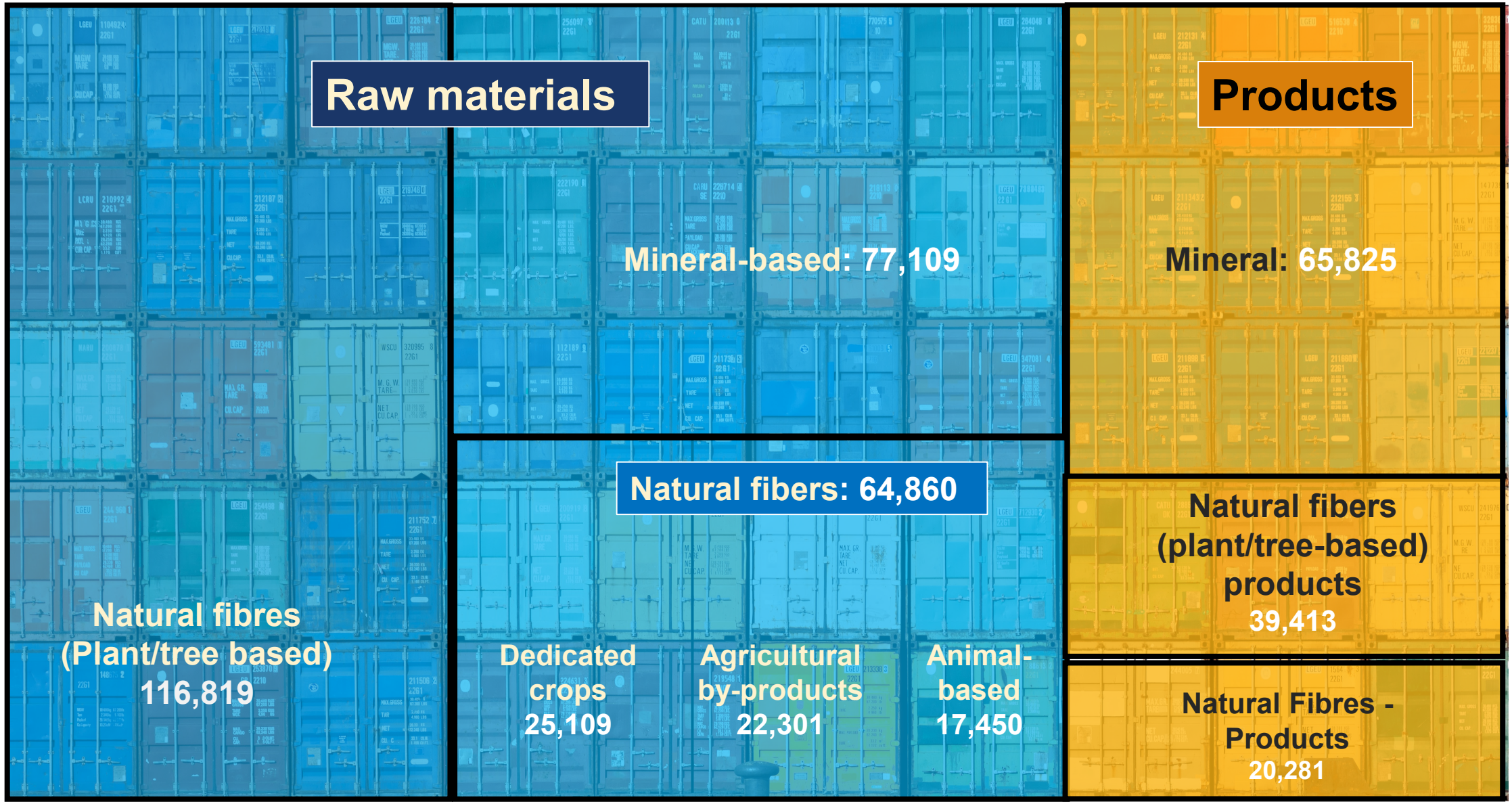
Trade value of plastics substitutes

Export represented $388 billion, approximately 2/3 represents exports of raw materials ($258 billion)



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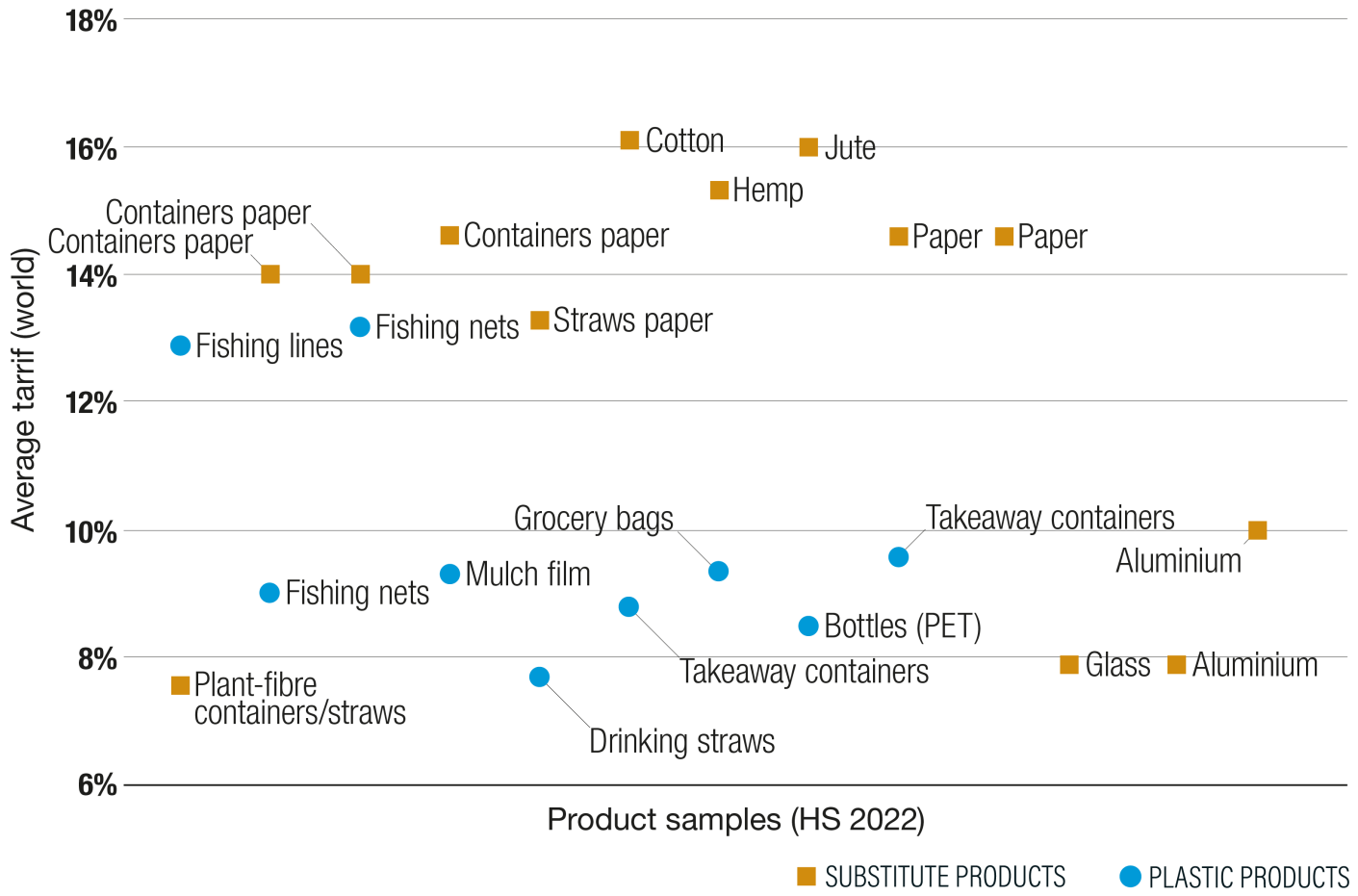
Average import tariffs on plastic products vs material substitutes

Substitutes often face higher import tariffs than their plastic equivalents.



Important to promote more policy coherence in tariff schedules vis-à-vis potential control measures and incentives

Source: UNCTAD, based on OEC data 2020 and HS 2022 codes.
Note: Aluminium, paper, cointainer paper and fishing nets are repeated because of different items represented in different HS codes.

PNG exports of Non-Plastic substitutes (2021)

Fiji Exports of Non-Plastic substitutes (2021)

Material substitution: Life-cycle views matters!

COUNTR

Please select or
for cor

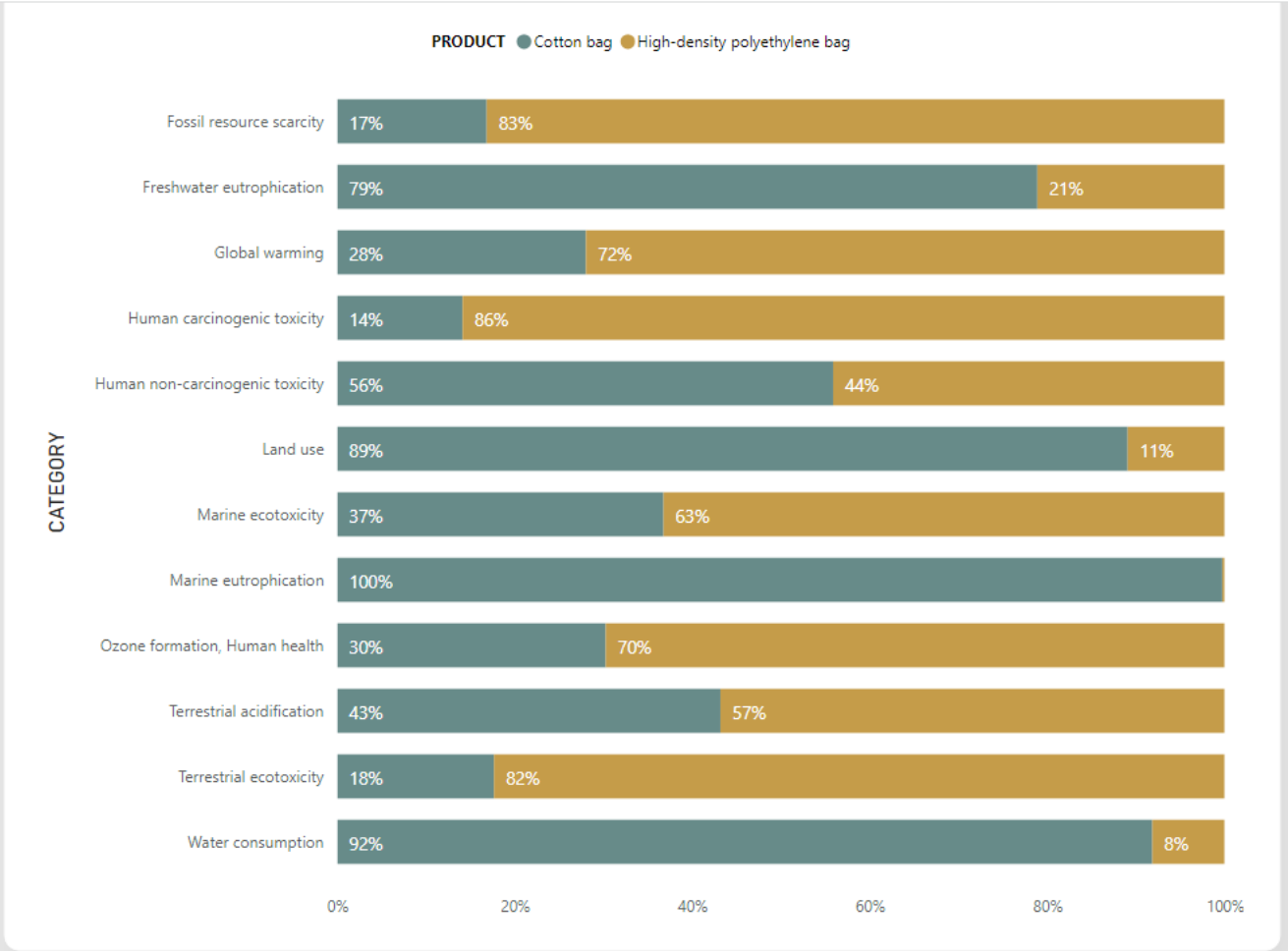
- Bangladesh
  - a) Reuse
- D.R. of the C
  - a) Reuse
- Ethiopia
  - a) Single
- Ghana
  - a) Reuse
- Kenya
  - a) Single
  - b) Reuse
- Nepal
  - a) Single
  - b) Reuse
- Nigeria
  - a) Single
  - b) Reuse
- Pakistan
  - a) Reuse
  - b) Reuse
- Rwanda
  - a) Reuse
- Senegal
  - a) Single

Please select only one scenario at a time
for correct information

- Bangladesh
  - a) Reuse of substitute product (3-years)
- D.R. of the Congo
  - a) Reuse of substitute product (1-year)
- Ethiopia
  - a) Single use
- Ghana
  - a) Reuse of substitute product (1-year)
- Kenya
  - a) Single use
  - b) Reuse of substitute product (2-times)
- Nepal
  - a) Single use
  - b) Reuse of substitute product (4-times)
- Nigeria
  - a) Single use
  - b) Reuse of substitute product (2-times)
- Pakistan
  - a) Reuse of substitute product (3-years)
  - b) Reuse of substitute product (4-years)
- Rwanda
  - a) Reuse of substitute product (1-year)
- Senegal
  - a) Single use
- U.R. of Tanzania
  - a) Reuse of substitute product (3-years)
- Uganda
  - a) Single use
- Zambia
  - a) Single use

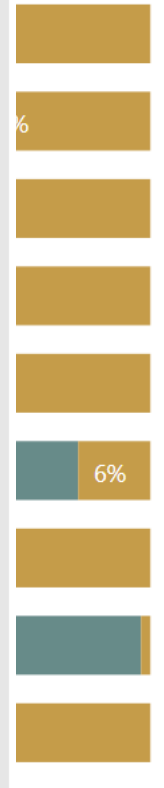
CATEGORY

- [x] Select all
- [x] Fossil resource scarcity
- [x] Freshwater eutrophication
- [x] Global warming
- [x] Human carcinogenic toxicity
- [x] Human non-carcinogenic toxicity
- [x] Land use
- [x] Marine ecotoxicity



FUNCTIONAL UNIT AND REFERENCE FLOWS

Functional unit	Plastic product	Substitute product	Uses
"Carrying 5 kg of items in four year's	208 High-density polyethylene	1 cotton bag	Reuse of substitute product



soft Power BI

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Case Study: Bamboo as an alternative to plastics

Bamboo can be used to replace a variety of products often made of plastics.

Furthermore, the ban on single-use plastics in many countries opens possibilities to use bamboo as their substitute. Increased reliance on bamboo as a plastics substitute may also contribute to tackling marine plastic pollution (UNCTAD 2021).

Examples include:

- Roofing sheets – bamboo roofing is quieter in the rain, lightweight, strong and doesn't have any adverse health impacts;
- a single bamboo straw can replace 360 single-use plastic straws, this has the potential to reduce plastic pollution particularly by companies and hotels.

Image source: [Commodities at a glance: Special issue on bamboo (unctad.org)]

Notpla

Making packaging disappear

An all-natural packaging solution made from seaweed and plants that is naturally biodegradable and home-compostable, just like a piece of fruit.

One innovation is a takeaway food container coated with seaweed, a revolutionary move for the takeaway industry that has traditionally relied on plastic or chemicals to hold food.

Image source, NotPla: https://www.notpla.com/products/

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BIO-LUTIONS
Fibre Based Solutions

Bio-Lutions converts agricultural residues into self-binding, durable natural fibres to make biodegradable and compostable single-use disposables and packaging.

The process uses a wide range of agricultural residues such as wheat straw, hemp shives, nettle, reed, banana stems, vine shoots and more.

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Image source, Bio-Lutions: https://www.bio-lutions.com/

Bananatex

The world's first durable, technical fabric made purely from the naturally grown Abacá banana plants is Cultivated in the Philippine highlands.

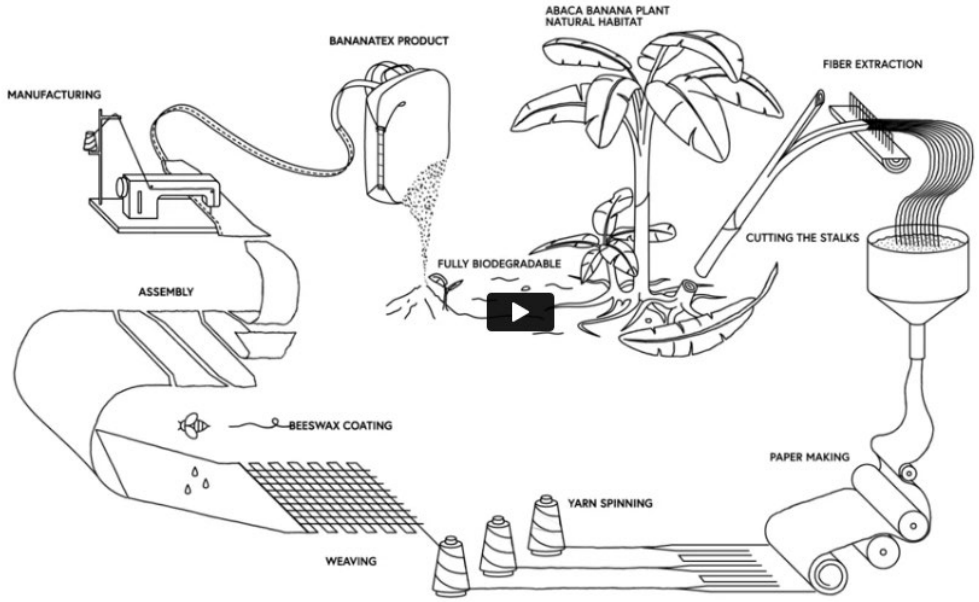

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Image source, Bananatex: https://www.bananatex.info/index.html

Gaia Biomaterials

Biodegradable fishing nets

(alternative plastic)

UNCTAD-SMEP project developing renewable-based, biodegradable and compostable fishing nets.

Based on PBAT, PLA and Calcium Carbonate. (Biodolomer®)

Images source: UNCTAD

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£5m in projects funded through SMEP (2021)

Smepprogramme.org

Organisation/ Project Name	Consortium Members/ Partners	Description of Project	Geography
Blue Skies Pty Ltd.	Waitrose & Partners	Blue Skies aim to establish a multi-stakeholder Research and Development Hub, which addresses single-use plastic in the agri-business to the point-of-sale value chain. The hub will initially address single-use plastic in disposable workwear and agri-film.	Ghana
Chinhoyi University of Technology (CUT)	Kudiwa Waste and Energy Solutions	Utilising plastics waste as a feedstock, Chinhoyi University will be establishing a manufacturing facility for plastic roof tiles with solar power features to address household energy needs.	Zimbabwe
The Council for Scientific and Industrial Research (CSIR) – South Africa	Elizade University, Nigeria	CSIR will undertake research and development into bio-degradable mulch film to replace Polyethylene (PE) mulch used in the agriculture value chain, tailoring biodegradation rates to climatic and soil conditions.	Nigeria
The Flipflopi Project	Coastal Oceans Research and Development – Indian Ocean (CORDIO) East Africa; Northumbria University, School of Design; University of Portsmouth	The Flipflopi Heritage Boats Project aims to establish a closed-loop waste management centre for the Lamu archipelago.This is linked to a heritage boat building centre, that aims to scale up plastic boat building in the region.	Kenya
Gaia Biomaterials	Kompost-it; Alnet; Sustainable Seas Trust	Gaia will undertake research and development into alternative biodegradable solutions for fishing nets, also working alongside regional fishing industry associations to ensure user acceptability, thus tackling the challenges of ghost nets in the marine environment.	Democratic Republic of Congo
International Synergies Limited (ISL) Limited	Maxwell Stamp Limited	ISL aim to address plastics pollution reduction through industrial symbiosis and will research, identify, and develop innovative reuse solutions for local uptake.	Bangladesh
PA Consulting	Global Access Diagnostics Ltd (GAD); PulPac	PA Consulting will research and develop compostable lateral flow test cassettes applying dry moulding of cellulose fibres obtained from sustainable sources as an alternative to single-use plastic.	To be confirmed
RiverRecycle Limited	Beach Clean Up Ghana Ltd.; Ambitious.Africa	RiverRecycle will implement a patentable remediation system to collect plastic waste in rivers, utilising this as feedstock to end products, specifically plastic boards and pyrolysis oils.	Ghana
University of Cambridge	Nepal Communitere; Field Ready	The University of Cambridge will establish multiple small-scale plastics remanufacturing units, producing building and construction products suitable for local construction requirements.	Nepal
University of Warwick	Environmental Sustainability Associates Limited (ESAL); De Montfort University (DMU); Chatham House (CH); GIVO; Zero Waste Goods Limited (ZWGL)	The University of Warwick will implement a technology-enabled plastic waste management system, processing waste plastics into flake products and pyrolysis oils.	Nigeria

Thank you
Merci

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Sustainable Manufacturing and Environmental Pollution Programme

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UNCTAD Ocean Economy