Effective and efficient global and national plastic pollution prevention

Scientists' Coalition for an Effective Plastics Treaty

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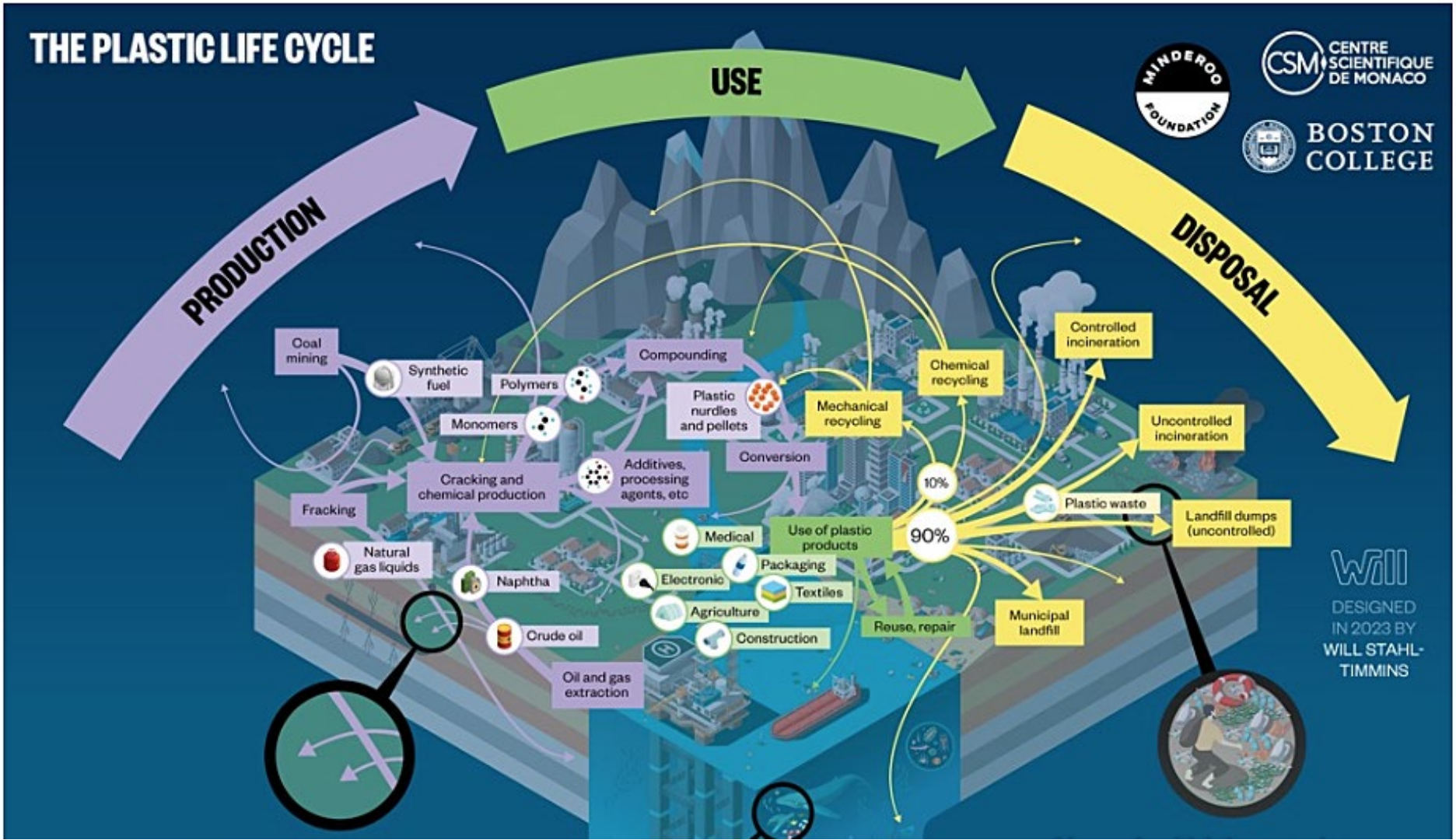
Reuters

Definitions are not limited to plastic ‘products’

Plastics consist of synthetic or semi-synthetic polymers and other chemicals, including additives, starting substances, processing aids and non-intentionally added substances (NIAS), intentionally added and non-intentionally released nano- and micro-plastics.

Primary Plastic Polymers (PPPs) **are microplastic flakes, powders, and pellet)** ‘plastic materials made of synthetic and semi-synthetic polymers that are used for the first time to create plastic products in any form including those made from bio- and fossil-based feedstocks.


THE PLASTIC LIFE CYCLE
PRODUCTION
USE
DISPOSAL
MINDEROO FOUNDATION
CSM CENTRE SCIENTIFIQUE DE MONACO
BOSTON COLLEGE
Coal mining
Synthetic fuel
Polymers
Monomers
Compounding
Plastic nurdles and pellets
Mechanical recycling
Chemical recycling
Controlled incineration
Uncontrolled incineration
Conversion
Additives, processing agents, etc
Cracking and chemical production
Fracking
Natural gas liquids
Naphtha
Crude oil
Oil and gas extraction
10%
90%
Plastic waste
Landfill dumps (uncontrolled)
Use of plastic products
Medical
Packaging
Electronic
Textiles
Agriculture
Construction
Reuse, repair
Municipal landfill
Will
DESIGNED IN 2023 BY WILL STAHL-TIMMINS

Resource extraction

Polymer production

Product manufacturing

Transport and trade

Commercial, industrial and consumer use

Waste management and recycling

Removal and remediation

The full life cycle of plastics

Source: Safer Circular Economy Fact Sheet https://library.sprep.org/content/safer-circular-economy-plastics-pacific-region

Is it essential? Is the function of the alternative polymer or substitute material or product critical for the health, safety, and functioning of society[5]? If not, for example, a substitute simply replacing one single-use application for another may be a case for prohibition or restriction of the item.

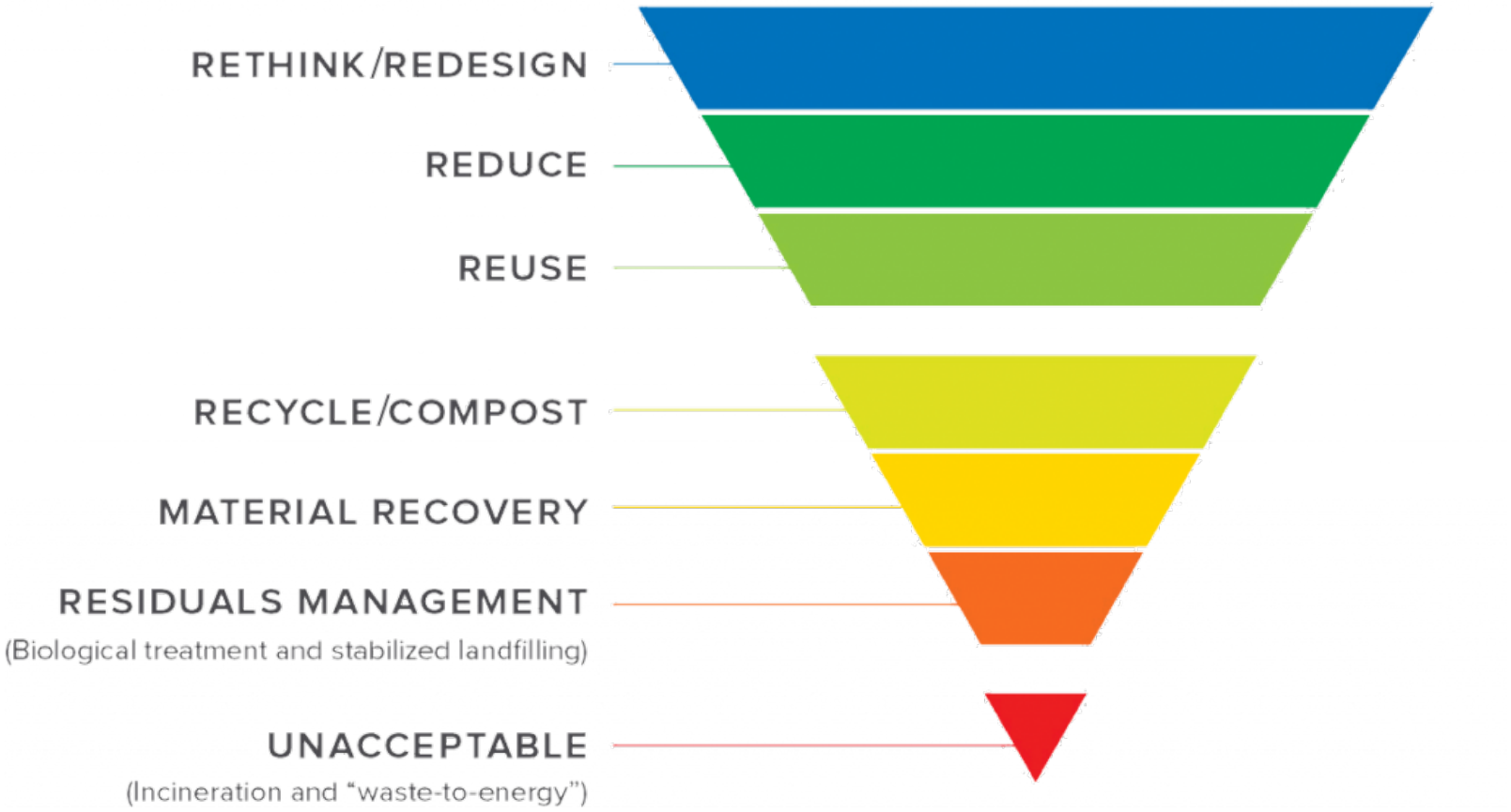
Is it safe? For example, is the polymer or final product toxic or otherwise hazardous in any ecosystem, or to humans, wildlife, and other organisms regardless of intended use and disposal?

Is it sustainable? For example, was the polymer or final product designed for regenerative and restorative circularity, non-toxicity, safe reuse/refill, repair, remanufacture, durability, high standards of biodegradability or compostability? Were the materials grown, harvested, extracted, or otherwise acquired sustainably and equitably?

Is the information transparent and traceable? Is the polymer, material, or product clearly labelled including information about content, safe use, and responsible disposal? Is it traceable/trackable throughout the supply chain?

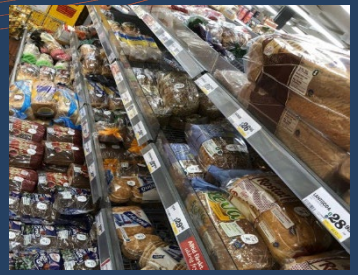
THE ZERO WASTE HIERARCHY 8.0

For detailed version visit www.zwia.org/zwh



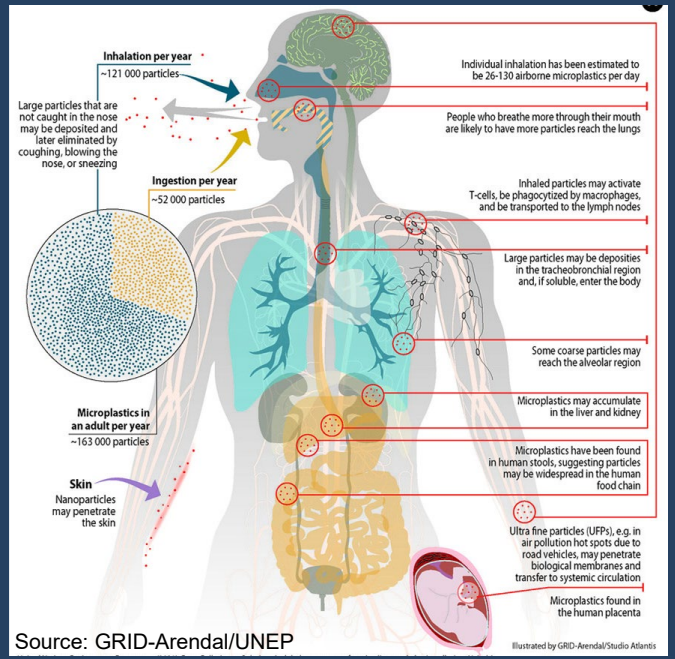
Ohio, USA

Sri Lanka



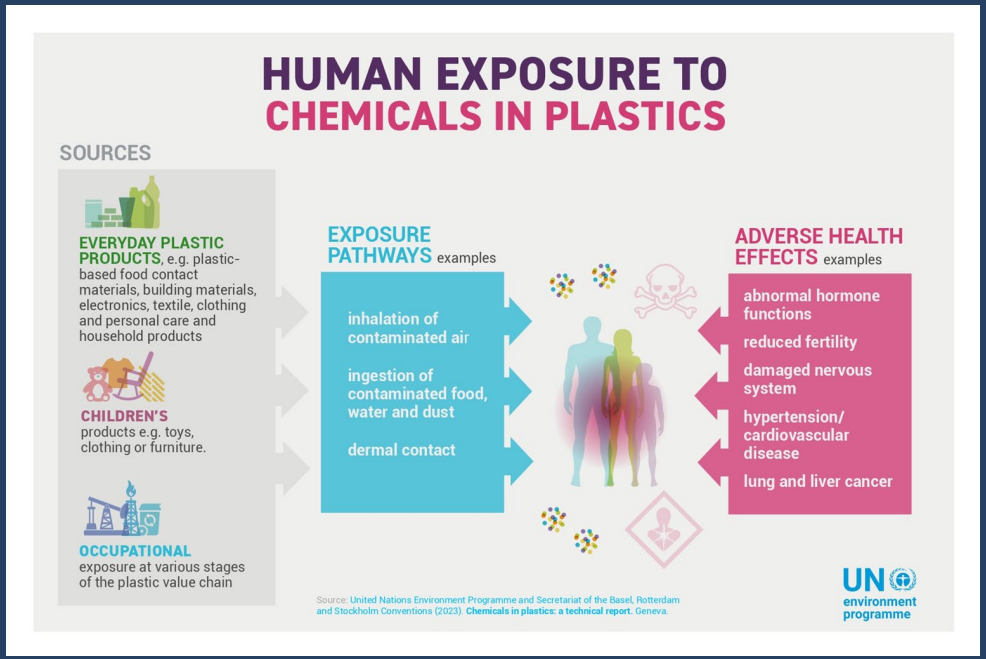
Kenya

Effects of micro- and nanoplastics on human health



Source: GRID-Arendal/UNEP

Effects of plastics chemicals on human health



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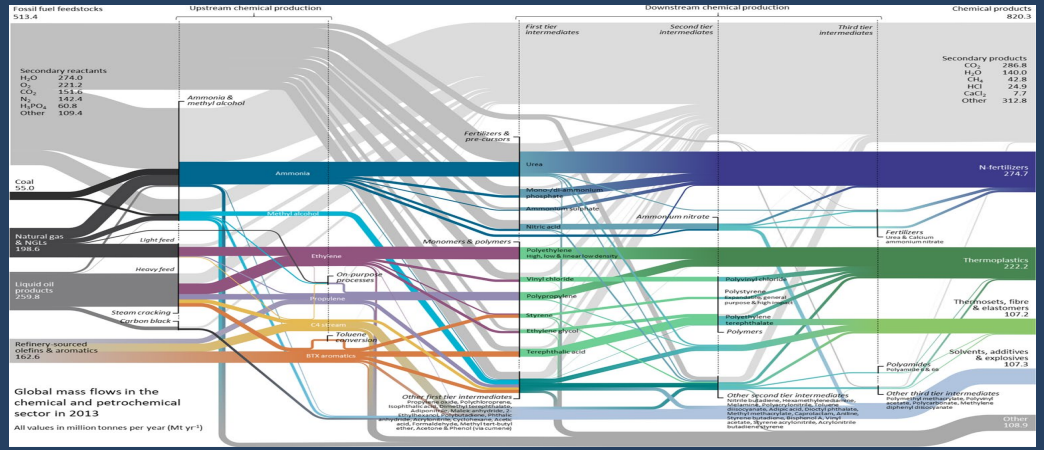
Need for **simplicity** and **transparency**

Plastic are a complex mix of **chemicals**

16,000 chemicals are used in plastics production and products, and many are **hazardous, persistent,** and **cumulative**.



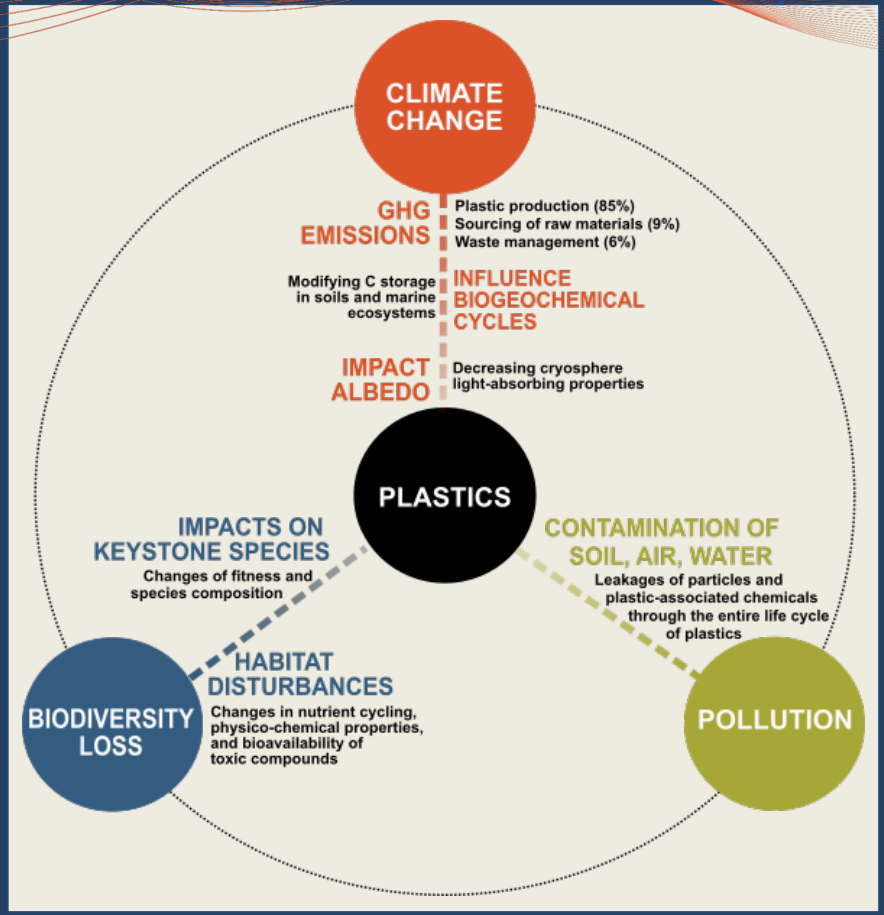
(Levi and Cullen, 2018)

High complexity
Low transparency

Threat multipliers

Planetary boundaries

Need for vertical and horizontal policy integration



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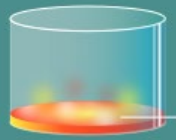
“…global production of primary plastics generated about 2.24 gigatonnes of carbon dioxide equivalent (GtCO2e) in 2019, representing 5.3% of total global GHG emissions …”

Karali, N., Khanna, N., Shah, N. Lawrence Berkely National Laboratory 2024

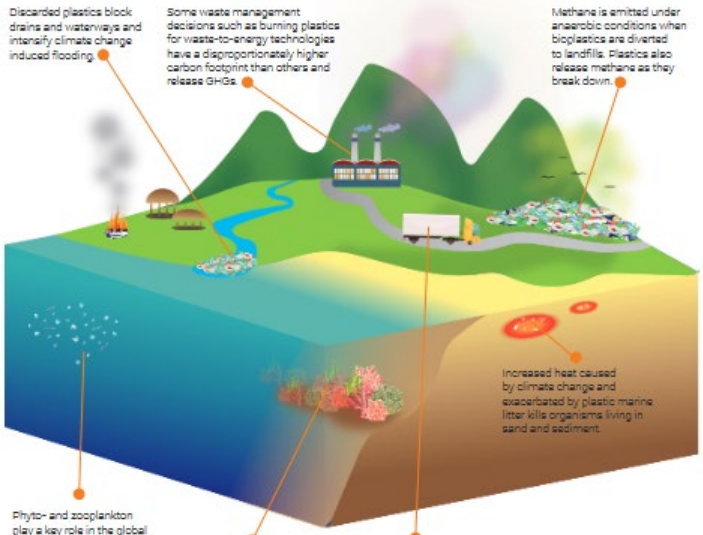
Plastics, Marine Litter, and Climate in the Pacific Region

Global plastics production is a significant contributor to climate change impacts in the Pacific Islands region. Ninety-nine percent of plastics come from fossil fuels, and plastics production is estimated to produce >400 million tonnes of greenhouse gases (GHGs) per year. This figure does not include emissions from waste management (including transport), mismanagement, and degradation of plastic products. Plastics pollution, including marine litter, magnifies climate impacts in the Pacific region and threatens the right to a safe, clean, healthy and sustainable environment.



CARBON BUDGET 2050

By 2050, it is estimated that GHG emissions from plastics could reach over 56 gigatons: 10–19 percent of the entire remaining carbon budget.



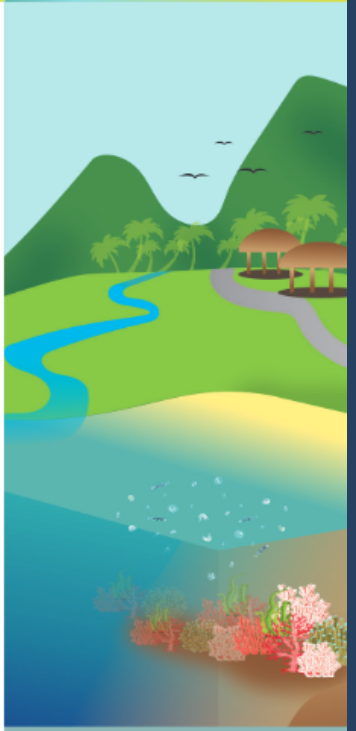
UN environment programme | 50 1972-2022

RECOMMENDATIONS

An urgent and coordinated global response is needed that reflects the needs of the Pacific Islands as one of the regions most affected by climate change. The priority is for the world's major producers to cease the production of unnecessary and toxic fossil-fuel based plastics. Pacific Islands countries can also protect themselves by developing robust plastic pollution prevention policy frameworks which

- Restrict the importation of problematic plastics including pre-production pellets and plastic products
- Shorten plastics supply chains within the region
- Legislate container return schemes (prioritising reuse/ refill)
- Regulate the 'light weighting' of plastics[1]
- Legislate reverse logistics such as backhauling within the region
- Legislate extended producer responsibility schemes that repatriate post-consumer plastics back to site of production for responsible management outside the region
- Strengthen compliance and enforcement of waste dumping (including lost and discarded fishing gear)
- Ban waste-to-energy incineration

1 'Light weighting' becomes a false solution when it involves reducing the weight of each packaging unit while increasing overall production units. Light weighting can undermine the reusability and recycling and can distract from the need to scale refill and reuse models.



Further reading:

The Clean Seas Campaign on Marine Litter (UNEP)

Global Partnership on Marine Litter (UNEP)

Plastic and Climate Change: The Hidden Costs of a Plastic Planet (CIEL)

UNEP's Beat Pollution Campaign

This factsheet has been developed by Dr Trisia Farrelly, Massey University, New Zealand, and Dr Sascha Fuller, The University of Newcastle, Australia, in collaboration with the Center for International Environmental Law and the United Nations Environment Programme.

Virgin plastics or Primary Plastic Polymers (PPP):

‘Plastic materials made of synthetic and semi-synthetic polymers that are used for the first time to create plastic products in any form.’ This …includes …[all PPPs] made from bio-based and fossil-based feedstocks.

(*Scientists’ Coalition Response to the Revised Zero Draft, 21 March 2024*)

The plastic pollution crisis can only ever be addressed if countries collectively commit to dramatically reducing the global supply of hazardous and unsustainable plastic chemicals, polymers, and products.

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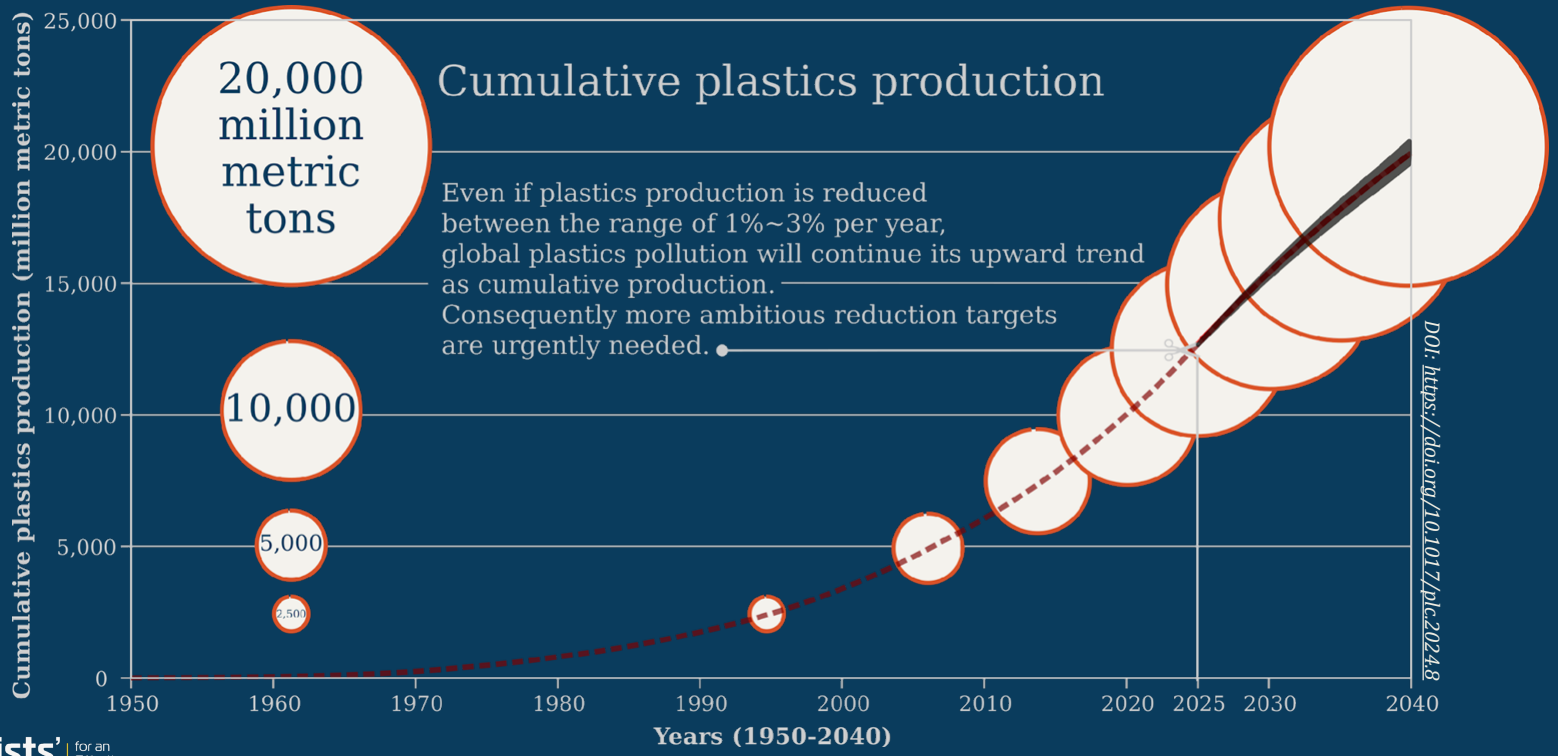
The challenges we face for INC-5



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The challenges we face prior to INC-5

- A global binding PPP reduction target supported by mandatory **national PPP reduction targets** to reduce the complexity and overall global volume of plastics produced.
- initial targets to stop growth, followed by legally binding **national reduction targets.** *Financial, capacity, and technical* support will be required.
- Mechanisms to evaluate targets, and progress towards them, by a body of scientists and experts, **free of Conflicts of Interest.**
- **Start from the essential use criteria** and then applying an integrated safety, sustainability, essentiality, and transparency criteria, assessments and associated comprehensive regulatory framework to support reduction.

Essential use concept

1. The use of a plastic is necessary for health or safety or is critical for the functioning of society.

2. There are no acceptable alternatives.

*"**A** fundamental shift in regulatory thinking from "risk" to "hazard" and from "safety" to "essentiality".*

"Great potential to speed up the regulation of harmful substances [and plastic products]*"*

Simplification

plastic chemicals (hazardous chemical families)

polymers (e.g. non-essential thermosets)

products (potentially categorized by use e.g., beverage containers)

Precautionary principle

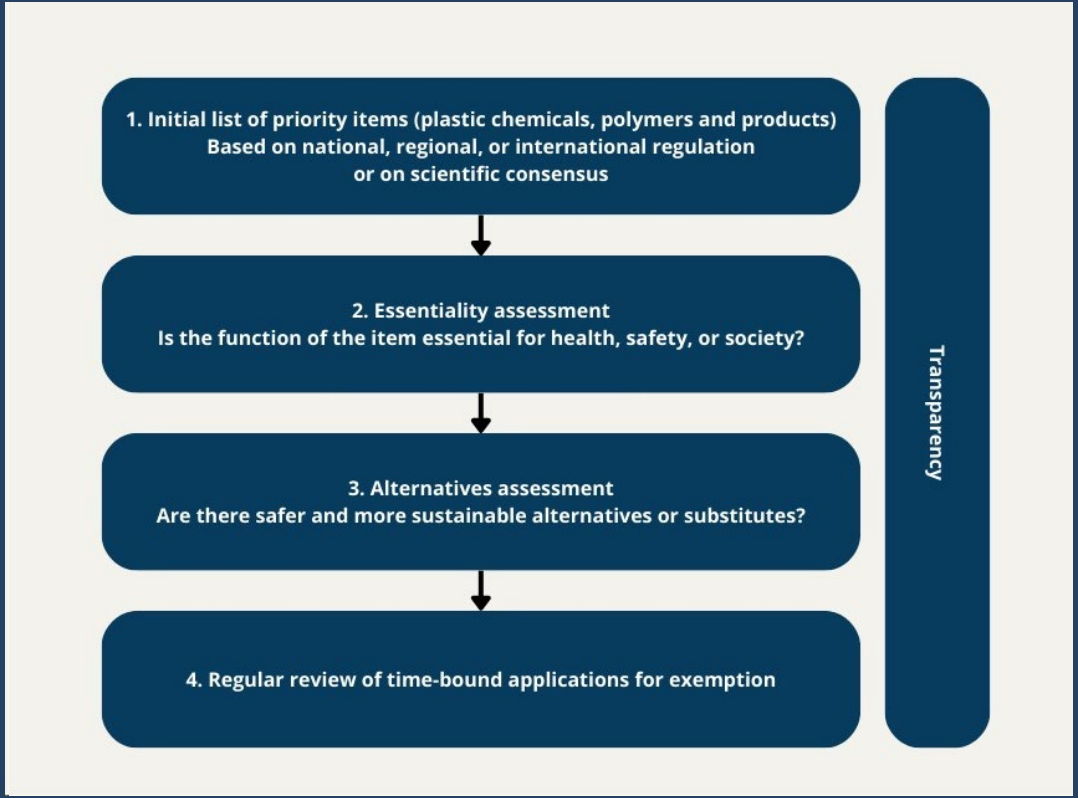
Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Hazard-based safety criteria

Sustainability standards

- Three pillars of sustainability
- Waste hierarchy
- Full life cycle.
- Sustainable design
- Guides incentives for safe and sustainable alternatives and substitutes.

A Start and Strengthen Approach



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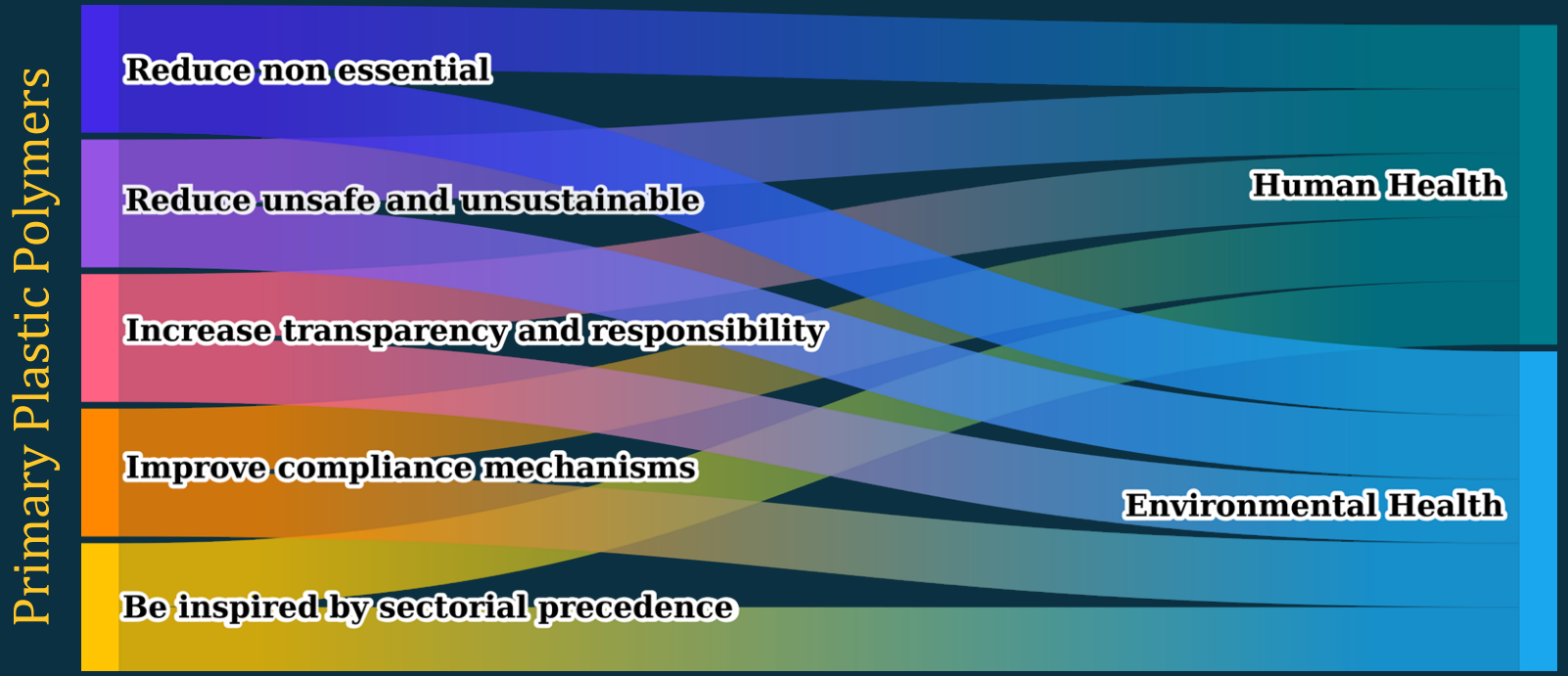
PRINCIPLES OF JUST TRANSITION

"Just Transition" is a principle, a process and a practice. The principle of just transition is that a healthy economy and a clean environment can and should co-exist. The process for achieving this vision should be a fair one that should not cost workers or community residents their health, environment, jobs, or economic assets.

Just Transition Alliance

The Scientists' Coalition position - The path forward



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Dedicated scientific body

essential use, hazard-based safety, and sustainability criteria for plastic chemicals, materials and products and the assessment of non-plastic substitutes

approaches to group chemicals of concern as well as plastic products

initial lists of groups of chemicals and products of concern for the annexes of the treaty

procedures for *reviewing and amending annex lists*

recommendations to the COP for amending those annexes

guidelines to facilitate national implementation

assessments for exemption requests

30 Sustainable, transformative, and resilient for a Blue Pacific SPREP PROE

Scientists' Coalition for an Effective Plastics Treaty

ISBN: 978-982-04-1280-4

Fact Sheet

A Global Plastics Treaty Guided by Indigenous Pacific Wisdom

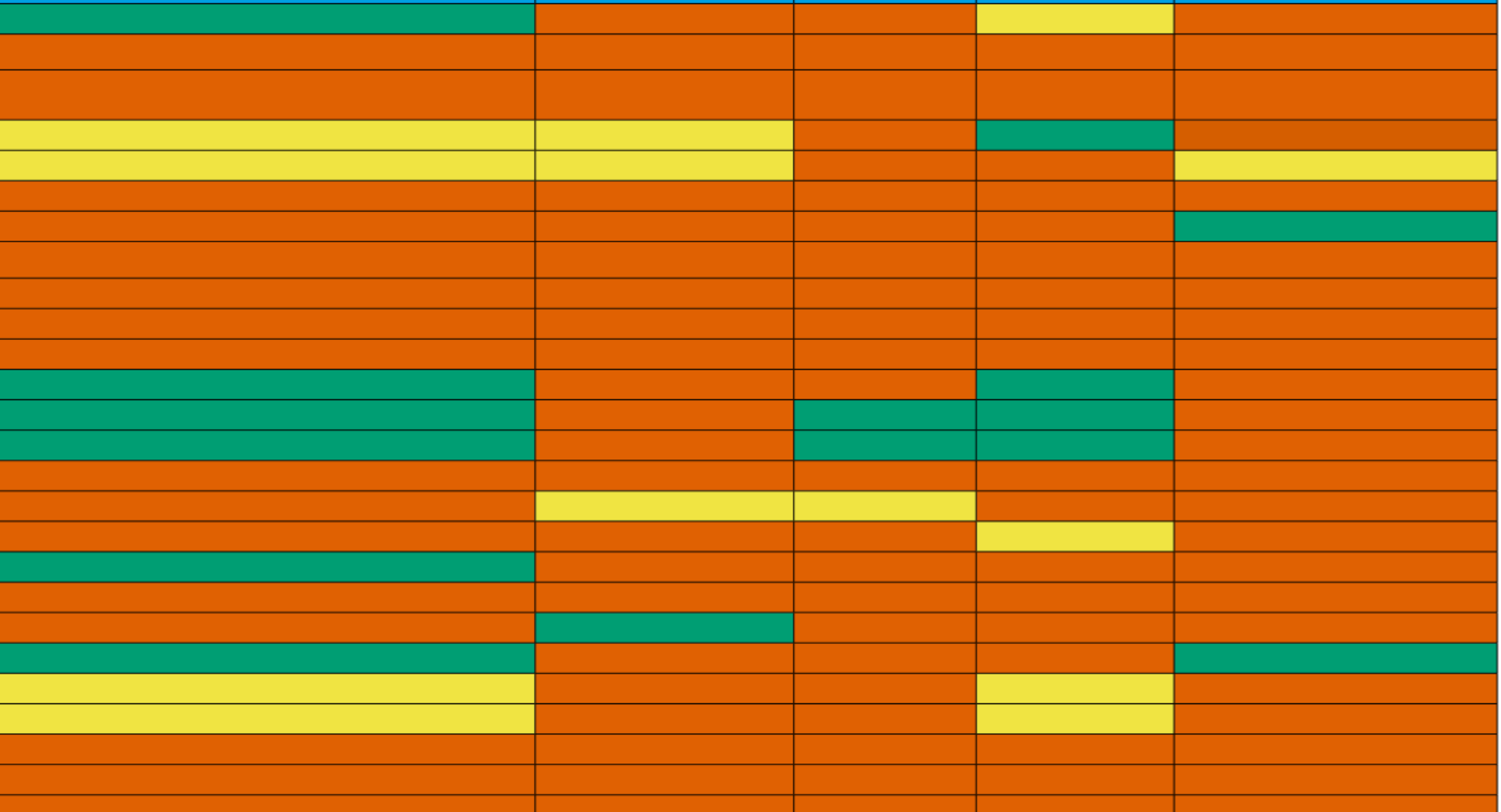
Some important Indigenous Pacific Islands Peoples' contributions INC negotiations:

- Ensure ecosystems thrive so humans can survive.
- Strengthen culture, well-being, livelihoods, and resilience.
- Respect long-term intergenerational knowledge in place.
- Ensure intra- and intergenerational equity and justice.
- Promote integrated, relational, and holistic worldviews (systems approach).
- Share Indigenous science, knowledge and practices with free, prior, and informed consent.
- Support equitable and inclusive processes, practices, and outcomes.
- Protect the rights and concerns of diverse Indigenous Pacific Islanders.
- Promote zero-waste, safe, restorative materials, products and systems.
- Boost local economies supportive of safe, sustainable, and essential substitutes for plastics.
- Halt harmful and non-essential plastics trade and manufacturing in the region.
- Reject unsafe and unsustainable waste management technologies.

Indigenous Pacific Islanders' roles are vital in shaping and implementing the GPT and they will greatly contribute to science-policy interfaces. However, they will need support to secure their full, meaningful and empowering participation in the INCs, intersessional, and the COPs.

In the words of a Vanuatuan oral tradition[2] "Let's draw our bows back to the past to better reach toward our target in the future".


Plastics Impacts on Human Health in the Pacific Region
Indirect and direct health hazards from plastics pollution include
Direct health impacts
The Business of Plastics:
The impacts of plastics pollution on human rights in the Pacific Region
A CLEAN, HEALTHY, AND SUSTAINABLE ENVIRONMENT IS A HUMAN RIGHT
Plastics Pollution Policy Gaps in the Pacific Region
Weak plastics policy cannot
A safe(r) circular economy
for plastics in the Pacific Region
Plastics, Marine Litter, and Climate in the Pacific Region


Trade in non-hazardous, recyclable and reusable plastics
National reduction targets
Virgin plastic use
Market Restrictions
Promotion of traditional solutions

PREVENTION

Eliminate hazards along the entire life cycle of plastics. All plastics policy should draw explicit links between plastics pollution and

- climate change
- biodiversity loss
- microplastics
- toxic chemicals
- human rights

Restrict importation of pre-production pellets and plastic products, and packaging including the following:

- Best practice on pellet handling
- National reduction targets, caps, and graduated taxes on imports of pre-production pellets and problematic plastic products
- Incentives for traditional and plastic-free reusable and refillable alternatives and systems.

Regulate domestic manufacturing of plastic products and tourist services including the following:

- Caps on virgin plastics
- National targets for recycled content
- Toxic additive restrictions
- Eco levies for tourist services
- Incentives for durability, reuse, refill, repurpose, repair, and eco-design

MANAGEMENT

- Invest in reduce, reuse, refill, repurpose, and repair infrastructure
- Establish safe(r) recycling alternatives
- Develop sustainable financial mechanisms
- Legislate extended producer responsibility
- Standardise monitoring, evaluation, and reporting of plastics imports, plastics manufacture, and plastics pollution and marine litter (including impacts on economic development)
- Safely remove, retrieve, and repatriate plastics, including marine litter supported by mandatory backloading/reverse logistics

Vinaka vakalevu

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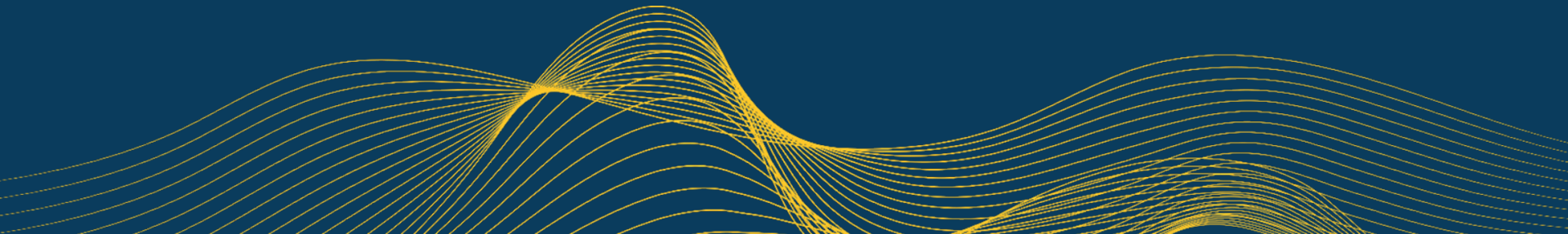
scientists.coalition@ikhapp.org



Plastic alternatives and non-plastic substitutes

(including supportive systems, services and technologies)

A simple and easy way to distinguish between these two categories is as follows:

- Plastics alternatives = 'better plastics'
- Plastics substitutes = 'non-plastic' materials

[1]Art. 1 (4) Convention for the Protection of the Ozone Layer defines **'alternative substances'** as those which reduce, eliminate, or avoid adverse effects to the ozone layer.
[2]See Plastics 101 fact sheet.
[3]See Bioplastics 101 fact sheet.

UNITED NATIONS UNCTAD

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**

VS

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.

Key Terms

There is a lack of consistency regarding the use of the terms below which can result in considerable confusion.

Bioplastics is a term that includes plastic materials made of biodegradable polymers (including those from fossil carbon sources) and plastics composed of bio-based polymers (*Fig1- in blue and green*).[1] The term is not used consistently leading to confusion; therefore, its use is not recommended.[8]

Bio-based plastics are composed or derived, (entirely or partially), from renewable, biological products (including plant/forestry, animal, and marine biomass). They are not necessarily biodegradable or compostable *(Fig 1-in green*).[6]

Biodegradable plastics can be made from renewable or fossil carbon sources and are intended to biodegrade more rapidly than conventional plastics but require specific conditions (*Fig 1- in blue*).[1]

Biodegradation of plastics is a 'system property' requiring a) material properties that allow for microbial conversion into methane or carbon dioxide, water, mineral salts, new microbial biomass, and b) suitable conditions in the receiving environment (microorganisms, temperature, pH, moisture etc.) such that biodegradation can take place.[1]

Compostable plastics are a subset of biodegradable plastic (*Fig 1- in purple*). While some are intended to be 'home compostable', most need to be collected and transferred to appropriate industrial facilities.[7]
This distinction may not be adequately labelled on products.

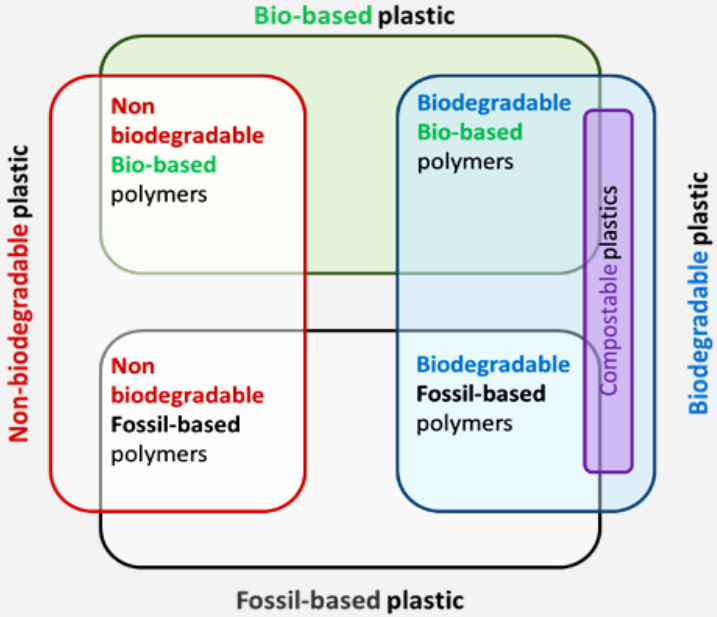


Fig 1. Categories of bio-based, fossil-based, biodegradable, and non-biodegradable plastics. The conflated term 'bioplastics' comprises i) fossil-based biodegradable polymers, ii) bio-based biodegradable polymers and iii) bio-based non-biodegradable polymers.[1]

Substitute Products

The terms plastics alternatives and plastics substitutes can be applied to materials but exclude final whole products.

Concerns have been raised that some substitute products may contain harmful substances.

The main material of a substitute product may be non-plastic such as new and recycled paper and board food contact materials but still contain toxic substances including some per- and polyfluoroakyl substances (PFAS), organophosphate esters (OPEs), and plasticizers[4].

Why it is important for the Global Plastics Treaty to address this topic?

Absence of consistent definitions and product labelling: The terms “bioplastics”, “bio-based”, “biodegradable” and “compostable” plastics are inconsistently applied due to a lack of universally adopted definitions. This results in ambiguous product descriptions and/or labelling, and confusion relating to material properties, disposal pathways, and potential benefits. [9-11]

Ecological effects: As with conventional plastics, bio-based and biodegradable plastics may contain a variety of chemicals including those shown to adversely affect human health and the environment. [12-14] If biodegradable plastics accumulate in the environment, they may generate microplastics and/or release chemical additives more rapidly than non-biodegradable plastics.[15]

Reducing plastic production is crucial and cannot be achieved by substituting fossil-based carbon with bio-based sources [5] as high use of bio-based sources would also result in increased demand for monocropping leading to biodiversity loss, increased use of synthetic pesticides and fertilizers, water, GHGs, and potentially land diversion from food production.

The **infrastructure needed for the industrial degradation of bio-based and biodegradable plastic waste is lacking** in most locations including across the Pacific Islands region. Separating biodegradable from non-biodegradable plastics can be challenging. Poor separation leads to contamination which can compromise the recycling of conventional plastics. In addition, industrial degradation seldom hold plastics with biodegradable properties long enough at optimal conditions for complete biodegradation. [16, 17]

Specific considerations relating to biodegradable and compostable plastics:

In certain applications, the property of biodegradability could offer advantages over conventional plastics, provided that complete mineralization is achieved within an appropriate product-specific timescale, and that chemical additives do not result in environmental harm. Any benefits of biodegradability must be assessed and prioritized according to the zero-waste hierarchy. [19, 20]

Standards for biodegradability and compostability: Biodegradation is an essential part of natural biogeochemical cycles, and degradation rates vary considerably depending on the physical, chemical and biological properties of the receiving environment (e.g., soils or oceans compared to industrial facilities).[21] Most plastic biodegradation standards rely on laboratory tests and/or relate to degradation in industrial facilities which may not be relevant where the plastics are used or disposed of in natural environments.

How the Global Plastics Treaty can most effectively address this topic:

Regulate all plastics (regardless of carbon source)

Establish an independent, multidisciplinary expert body to develop safety, sustainability, and essentiality criteria for all plastics, including the extraction of feedstocks intended for bio-based plastics production, and chemicals associated with bio-plastic polymers and products.

Mandate clear, consistent definitions for bio-based, biodegradable and compostable plastics, and **accurate labelling** based on international independent standards including information on renewable feedstock content, transparency regarding associated chemicals, and disposal.

Promote the use and development of comprehensive, inclusive, and harmonised life cycle assessment (LCA) tools to evaluate the environmental, health, and socio-economic impacts of bio-based and biodegradable plastics throughout their life cycles, including associated chemicals and persistent particles. [24-26]

Require international biodegradation standards appropriate to the potential end-of-life environment: Standard tests should demonstrate environmentally relevant biodegradability without the release of toxic chemicals, across environments (e.g., in different soil types, at the sea surface, marine and freshwater sediments), and waste management (e.g., sewage, digester, and home and industrial composters).

Design products for reduction, reuse, repair, remanufacture, repurpose, and recycling while ensuring they do not interfere with existing recycling schemes.

Plastics Alternatives are plastics not made with conventional fossil-fuel based **polymers**[2] In other words, plastics alternatives are bioplastics3. Despite UNCTAD's definitions below, bioplastics are not necessarily 'better plastics'.

Plastics Substitutes are all other non-plastic materials that may be used to replace synthetic fossil fuel-based polymers and bioplastics. Some examples are glass, leather, wood, silk, paper, cotton, wool, stone, ceramic, and aluminum.

Safety, Sustainability, Essentiality, and Traceability Criteria for Plastic Alternatives and Substitutes

Any substitute or alternative should be assessed for its essentiality and demonstrably safer and more sustainable than conventional plastics. When considering alternatives and substitutes, delegates may consider the need to assess alternative polymers and substitute materials, products, and approaches against the following set of criteria. These criteria should be grounded in the prevention and precautionary principles and guided by a toxic-free zero-waste hierarchy. These criteria will need to be developed by an independent body of experts including independent scientists, Indigenous rights holders, and community experts.

Limitations of standards

- Variations across standards
- Testing requirements may not reflect real world contexts (such as access to industrial composting infrastructure).
- The existence of a standard does not mean this is the right approach to take in all circumstances (there may be options higher up the waste hierarchy)
- Packaging standards does not assess the product itself.
- May not include integrated and holistic life cycle approach assessment including sustainable biomass extraction
- May not assess for hazardous plastic chemicals
- May not assess for the three pillars of sustainability in a balanced manner.
- May not assess for transparency.

Hazard-based safety standards

‘Hazard’ generally denotes inherent properties of substances, materials or activities known to cause direct damage or harm to the environment and human health, particularly in the context of chemicals.

It is, therefore, distinct from sustainability*, which is primarily concerned with designing sustainable circular systems, including carbon and material footprints*.

Transparency and traceability standards

Data disclosure required for

- accurate hazard-based safety assessments and sustainability assessments
- baseline assessments, monitoring, and reporting
- all stakeholders and consumers
- Accurate labeling
- Customs control
- Compliance, enforcement, accountability, compensation for loss and damage

Limitations of labels for biodegradability and compostability

- Most problematic labelling
- Consumers prefer compostable plastics but access to industrial composting facilities extremely limited.
- Confusion between home and industrial composting
- Labels for marine, soil, or water biodegradability risk giving consumers the impression that it is acceptable to dispose of plastic packaging in those environments.

RELIABILITY

Build your claims on a reliable basis

- Accurate and scientifically true
- Robust and consistent
- Substantiated data and assumptions

RELEVANCE

Talk about major improvements, in areas that matter

- Significant aspects ('hotspots') covered
- Not masking poor product performance, no burden shifting
- Genuine benefit which goes beyond legal compliance

CLARITY

Make the information useful for the consumer

- Exclusive and direct link between claim and product
- Explicit and easy to understand
- Limits of claim clearly stated

TRANSPARENCY

Satisfy the consumer's appetite for information, and do not hide

- Developer of the claim and provider of evidence published
- Traceability and generation of claim (methods, sources, etc.) published
- Confidential information open to competent bodies

ACCESSIBILITY

Let the information get to the consumer, not the other way around

- Clearly visible: claim easily found
- Readily accessible: claim close to the product, and at required time and location

Label	Name & Description	Geographic Relevance	Net Assessment	Rationale
	**OK biobased by TÜV Austria** – certifies products on the basis of the determined percentage of renewable raw materials (percentage Biobased) (TÜV AUSTRIA 2019a).	EU	 Negative	– **Relevance**: Does not address sustainability of feedstocks – **Clarity**: use of 'chasing arrows' misleading
	**USDA Certified Biobased** – the label displayed on a product certified by USDA is designed to provide useful information to consumers about the biobased content of the product, though it does not certify whether the biobased content was sustainably sourced. ASTM D6866 compliant (United States Department of Agriculture [USDA] 2019).	North America	 Mixed	– **Relevance**: Does not address sustainability of feedstocks + **Clarity**: specifies that it refers to the product
	**Roundtable on Sustainable Biomaterials (RSB) Excellence in Biomass and Biofuel Certification** – verifies that biomaterials, biofuels and biomass are socially responsible, environmentally sustainable and credibly sourced (Roundtable on Sustainable Biomaterials [RSB] 2019).	Global	 Positive	+ **Relevance**: Addresses sustainability of feedstocks + **Reliability**: Credible multi-national organisation

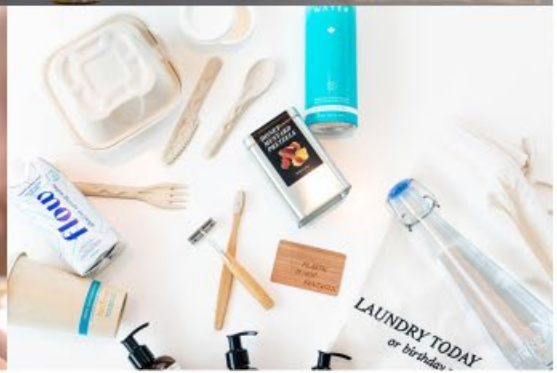
Alternatives & Substitutes











Setting the scene for day three