Summary:

Prevention of plastic waste in production and consumption by multi-actor partnerships

PREVENT
Waste Alliance

Wuppertal Institut

Summary of the study

„Prevention of plastic waste in production and consumption by multi-actor partnerships“

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1 Introduction

The increasing littering of the earth with plastic waste has gained enormous attention in recent years, e.g. due to estimates that by 2050 there could be more plastic than fish in the oceans (World Economic Forum et al., 2016).

Plastic has become an indispensable part of our everyday life and contributes to the preservation of natural resources in many areas, e.g. through lightweight construction or the replacement of resource-intensive raw materials.

Nevertheless, the current plastics value chains have some inherent characteristics that are not compatible with the main objectives of waste prevention and a circular economy (Wilts & Bakas, 2019):

- Most plastic products are designed for single use only, without considering their potential for reuse.
- Plastics are mainly used for short-lived products (primarily packaging).
- Plastic products often contain hazardous substances that may be brought back into circulation through recycling (which means that there is a high potential for "qualitative" waste prevention).
- The recycling rates are low and downcycling predominates.

Waste prevention and related measures have the capacity to address most of these problems connected to the consumption of plastic products. In contrast to "end-of-pipe" measures, waste prevention requires the cooperation of various stakeholders at all stages of the value chain. In this respect, waste prevention is not primarily considered as the elimination of plastic altogether, but rather as innovative and smart use of plastic, which ultimately leads to a reduced amount of waste.

The study on the prevention of plastic waste from packaging and single-use products by multi-actor partnerships, which was developed within the PREVENT working group "Conserving resources":

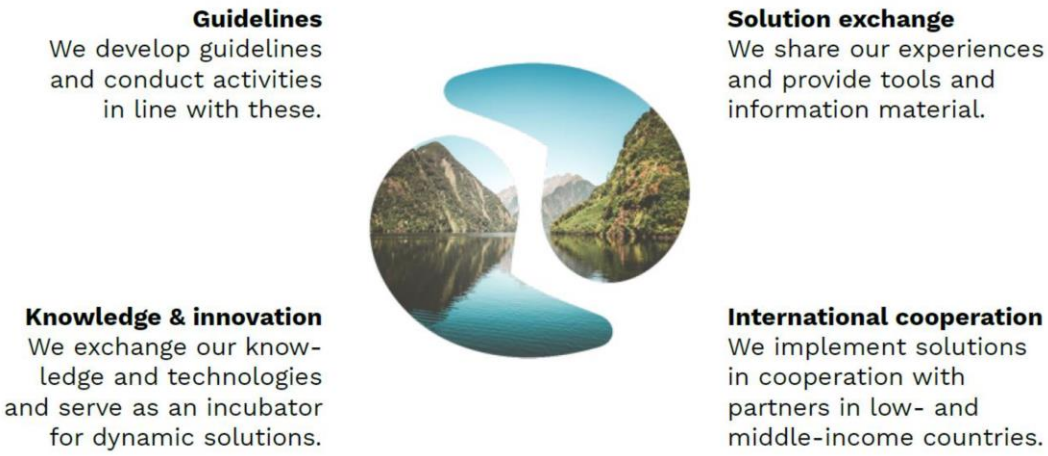
1. provides background information on plastic waste prevention
2. offers a common definition on waste prevention for the joint work
3. presents smart practices implemented by members of the working group and their partners
4. offers recommendations for the further work of the PREVENT Waste Alliance

2 PREVENT Waste Alliance

The PREVENT Waste Alliance, launched in May 2019, is a multi-stakeholder partnership that brings together different actors from the private sector, academia, civil society and governmental institutions.

The Alliance wants to contribute to minimising waste, eliminating pollutants and maximising the reuse of resources in the economy worldwide. Therefore, it strives to develop effective waste management and circular economy approaches. The focus is on waste from plastic packaging and single-use products as well as waste from electrical and electronic equipment. Specific activities by the PREVENT Waste Alliance are shown in **Figure 1**.

Figure 1 **Activities of the PREVENT Waste Alliance**



Source: PREVENT Waste Alliance (2020)

The members and partners of the Alliance are involved in thematic working groups (**Figure 2**). This study was carried out in the context of the PREVENT working group on "Conserving resources". Objectives of the working group are:

- Sustainable use of plastics and optimisation of the existing material cycle.
- Effective contribution to the prevention of plastic waste worldwide.
- Promotion of the recycling of plastic, focusing on increasing the use of recycled plastics in new poducts.
- Development of recommendations for action for stakeholders and implementation of these.

Figure 2 **Working groups of the PREVENT Waste Alliance**

Source: PREVENT Waste Alliance *(2020)*

3 Plastic waste prevention

Waste prevention

For the study, the members of the Working Group "Conserving resources" have agreed on a common definition of the term '*prevention*' for their joint work. The definition follows the EU Waste Framework Directive and its waste hierarchy (Directive 2008/98/EC on waste). '*Prevention'* is defined as

"measures taken before a substance, material or product has become waste, that reduce:

(a) the quantity of waste, including through the re-use of products or the extension of the life span of products;

(b) the adverse impacts of the generated waste on the environment and human health; or

(c) the content of harmful substances in materials and products".
(European Parliament and Council, 2008)

Plastic production and plastic waste generation

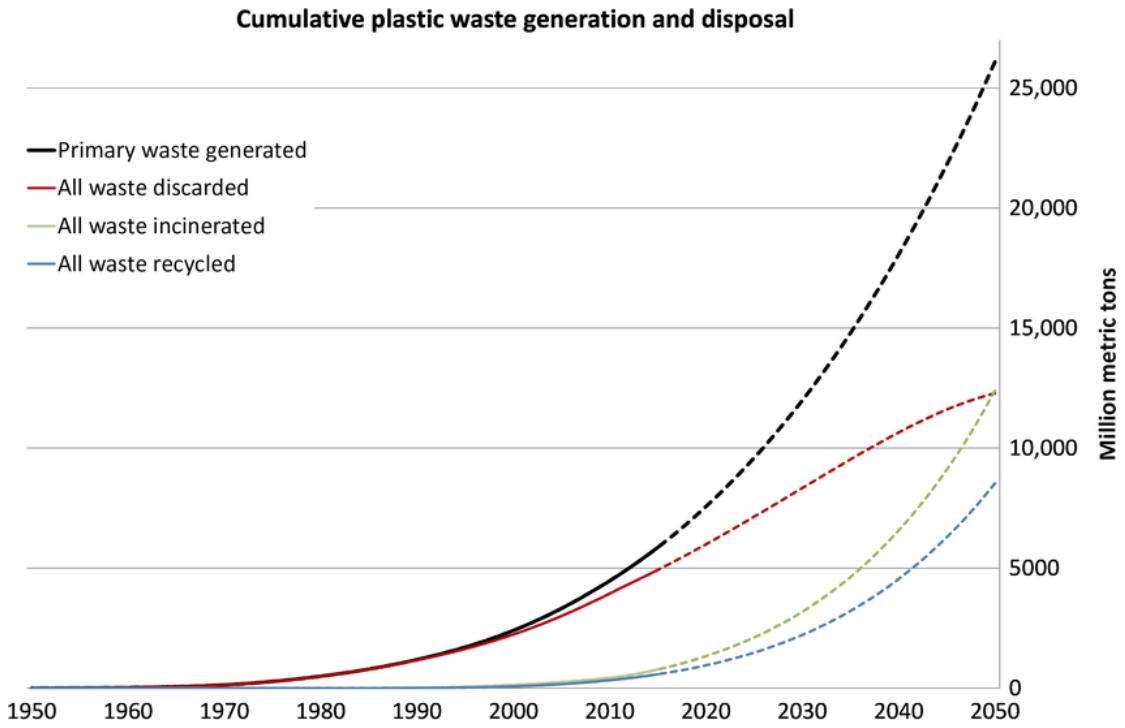
While the annual global production of polymer resins and synthetic fibres in 1950 was around 2 million tonnes, it had increased to 381 million tonnes by 2015.[1] The total production from 1950 to 2015 is estimated at 7,800 million tonnes. Including additives, this amounts to 8,300 million tonnes of virgin plastics (Geyer et al., 2017).

Of the 407 million tonnes of plastic produced in 2015 (including 25 million tonnes of additives), the largest proportion was used to manufacture packaging, estimated at 146 million tonnes (Geyer et al., 2017). Most packaging plastics are used for less than one year. While an average product lifetime of 35 years is assumed for plastic products used in the building and construction sector, the average for consumer products is 3 years and 0.5 years for packaging (Geyer et al., 2017).

Approximately 6,300 million tonnes of plastic waste were generated between 1950 and 2015. About 9% of this amount was recycled, while 12% was incinerated and 60% ended up in landfills or the environment. Geyer et al. (2017) assume that, by 2050, about 12,000 million tonnes of plastic waste will end up in landfills or in the environment if current trends in production and waste management do not change. **Figure 3** gives an overview of the primary plastic waste generated, all discarded plastic waste, all incinerated plastic waste and all recycled plastic waste.

[1] Annual global polymer resin and fiber production.

Figure 3 **Cumulative plastic waste generation and disposal**



Source: Geyer et al. (2017)

Another study examining global post-consumer plastics flows (Conversio, 2019) found that, in 2018, approximately 360 million tonnes of virgin plastics were produced and 390 million tonnes of plastics (including 30 million tonnes of recycled materials) were converted into plastic products (Figure 4). In 2018, a total of approximately 250 million tonnes of post-consumer plastic waste were generated worldwide, of wich 77 million tonnes were not properly collected (Conversio, 2019, p. 14).

Figure 4 **Global post-consumer plastics flows**

Source: Conversio Market @ Strategy GmbH (2019)

Environmental impacts and risks to human health

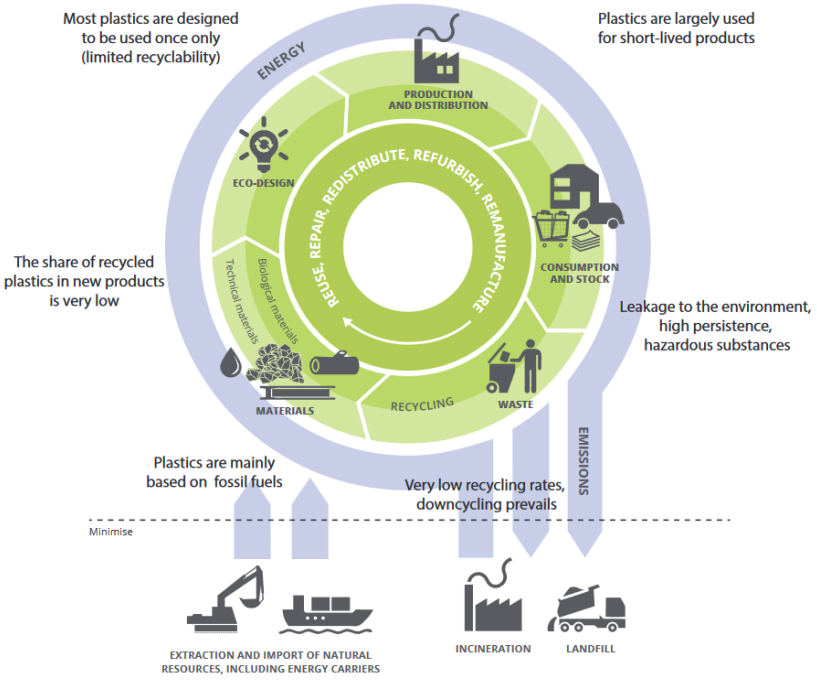
Plastics can contribute to conserving resources and decreasing harmful effects on the environment if, for example, in comparison to the use of other materials, energy consumption and greenhouse gas emissions can be reduced (Pilz et al., 2010). Packaging can also help to reduce food waste by extending the shelf life of food products, thereby reducing negative environmental impacts (Wohner et al., 2019). However, plastic is often produced and used for only a short life cycle, which can lead to resources being wasted and unnecessary greenhouse gas emissions. The burning of plastics at incineration plants that do not meet the latest technical standards, poorly managed landfills as well as improper disposal and littering have negative effects on the environment and human health.

Rethinking and improving plastics

In many cases plastic products follow the linear economy approach of "take-make-dispose". However, to protect resources and the environment it is necessary to rethink and improve the use of plastics. The focus in a circular economy is on the prevention of waste and the reuse, repair, redistribution, refurbishment and remanufacturing of products (**Figure 5**). Regarding the prevention of plastic waste, this includes aspects such as:

- promoting a product design that generates as little waste as possible
- considering the entire life cycle of products when selecting materials
- avoiding the use of (potentially) hazardous substances
- encouraging reusable options
- expanding and improving the separate collection of plastic waste
- introducing and expanding deposit and return systems
- designing recyclable products
- expanding the markets for recycled and renewable plastics

Figure 5 **Environmental issues arising along the plastics value chain**



Source: Wilts & Bakas (2019)*; EEA*

4 Plastic waste prevention by multi-actor partnerships

In 2015, the United Nation member states adopted the Sustainable Development Goals (SDGs) (United Nations, 2020). One of the targets they set is to substantially reduce waste generation by 2030 through prevention, reduction, recycling and reuse (SDG 12.5). They emphasise the importance of multi-actor partnerships and the need to promote these to achieve the SDGs (SDG 17):

> "A successful sustainable development agenda requires partnerships between governments, the private sector and civil society. These inclusive partnerships built upon principles and values, a shared vision, and shared goals that place people and the planet at the centre, are needed at the global, regional, national and local level" (United Nations, 2020).

Multi-actor partnerships bring together people from practice and science as well as other actors to jointly tackle challenges. They have the advantage of connecting partners with complementary types of knowledge. In addition, cooperation like this can help to gain new insights together, facilitates the implementation of these findings and thus has a greater impact. It is particularly relevant when dealing with complex issues such as the prevention of plastic waste, where isolated solutions fail.

The study presents the following practical examples of how to prevent plastic waste from packaging and single-use products contributed by the members of the PREVENT Waste Alliance and their partners and networks. The focus is multi-actor partnerships that involve stakeholders from various sectors such as businesses, civil society, science and governmental institutions. What was important when selecting the examples was their transferability to other countries.

Education & consulting

1 | Environmental education in Indonesian primary schools
2 | Reduction of airline passengers' waste. A gamification experiment
3 | Promoting circular solutions in the gastronomy sector

Establishment of reusable and low packaging options

4 | Zero waste stores
5 | Reusables for the sea. Exemplary deposit system
6 | Lending reusable bags
7 | Deposit system for reusable coffee-to-go cups

Development of waste prevention infrastructure

8 | Ethical recovery and processing of plastic waste using a social inclusion model
9 | Environmental citizenship approach to developing and implementing a zero-plastic waste strategy
10 | Litter traps to retrieve floating plastic

Innovative products

11 | An ocean friendly straw
12 | Reusable packaging service for e-commerce
13 | Device deposit for modular smartphones

Studies on plastic waste prevention

14 | Zero waste flights
15 | Reducing the use of stretch film. Success factors of eco-innovations

Guidelines & overviews of best practice examples

16 | Best practice guide for reducing marine litter
17 | Guideline for the eco design of plastic packaging

The study provides further information on the examples, lessons learnt as well as key findings.

5 Recommendations

Based on the impressive number and range of ongoing projects, policy measures and strategies that aim to prevent plastic waste and related environmental impacts, the study draws conclusions to the following questions:

- What can be considered crucial success factors for effective and efficient plastic waste prevention?
- What additional measures and activities will be necessary? What role might the PREVENT Waste Alliance play?
- Where are the gaps with regard to necessary policy frameworks on the national, European and global level?

Success factors

Plastic waste and, in particular, its prevention have become an important policy issue, highlighting the growing role of waste prevention in the transition towards a circular economy. In its plastics strategy, the European Commission notes that plastic recycling has not kept pace with the increasing global production of plastics and that plastic waste leaking into the environment poses a severe threat, not only to marine ecosystems but also to economic activities such as fishing and tourism. These environmental burdens can to some extent be managed by end-of-pipe measures in developed countries with sufficient financial resources; these options are clearly unrealistic for most developing and emerging countries.

The challenge of implementing plastic waste prevention is significant. The plastic family consists of thousands of materials used in wide-ranging applications that span across various economic sectors. Some of these applications even help implement waste prevention, for example by reducing food waste or enabling lightweight design solutions. Moreover, prevention is expected to overcome inherent technical barriers, consumption patterns, established value chains and economic barriers. The analysis conducted in this study also reveales opportunities to make preventing plastic waste more effective.

Success factors for plastic waste prevention
▪ Efforts to increase plastic waste prevention need to become - focused - better coordinated - more explicit in terms of scope and ambition.
▪ Priority for prevention should be given to - the most impactful plastic types - plastic products that are designed to be used once and for a very short time - non recyclable plastic products.
▪ Such prioritisation would help - direct and structure prevention efforts - reduce environmental impacts more quickly - bear significant results in terms of reducing the waste generated.
▪ Move beyond the generic approval of waste prevention and instead - make prevention efforts more concrete and easier to communicate - highlight the very specific opportunities and challenges.

Necessary next steps

Financial sustainability

Given the effectiveness of financial instruments in shaping waste policies, countries could make better use of available financial instruments to reduce plastic consumption and contribute to waste prevention. These instruments could explore using state funds and involving voluntary public-private partnerships, for example to provide eco-modulated packaging fees that not only promote recycling but also prevent packaging waste at source. Beyond public measures and initiatives, the different good practice examples raise the question of financial sustainability:

- Where does waste prevention actually pay off?
- Where does it require additional investments?
- What are the amortisation periods?

The PREVENT Waste Alliance with its diverse group of stakeholders could be the perfect platform to reduce these uncertainties and exchange relevant experiences.

Qualitative waste prevention

A further possible intervention point with specific relevance for the PREVENT Waste Alliance could be qualitative waste prevention, which is often overlooked even though it is part of the official definition of waste prevention: Reductions in hazardous substances lead to cleaner supply chains. It is thus important for all stakeholders to address these aspects and focus more on qualitative prevention.

Synergies with other efforts

Waste prevention is still too often approached as an isolated area, while links and synergies with other efforts (e.g. the circular economy) are still in their infancy. The identification and processing of these links would increase the effectiveness and efficiency of the measures implemented and facilitate a more comprehensive approach to environmental issues, for example burden shifting between plastic packaging and packaging made of extremely resource-intensive aluminium, or trade-offs between packaging waste prevention and food waste prevention.

Conclusions with regard to required policy frameworks

Specific waste prevention targets

The waste prevention policy domain in general lacks initiatives that include specific targets, and plastic waste prevention is no exception. Very few countries have put in place quantitative targets, although some have adopted qualitative ones. These include plans to decouple waste generation from economic growth or targets on reuse. On the other hand, most countries have decided to collect data and information to develop indicators and monitor progress towards implementing waste prevention. Again, a lot of the indicators are related to the consumption of plastic carrier bags, which in turn is related to the corresponding EU legislation.

Evaluation of measures and targets

Another aspect is the lack of evaluation of measures implemented and targets agreed. Unfortunately, there are very few cases in which the initiatives adopted have been properly evaluated; therefore, most of the good practices identified lack the evaluation element that could help draw conclusions on their effectiveness. Without proper evaluation, we cannot draw conclusions on the effectiveness of measures and the ambition of targets. Most of the initiated measures showcased in this study and national waste prevention programmes are still ongoing and have not yet been evaluated. In the coming years, such evaluations will help achieve a better understanding of which of the implemented measures, specifically which types of targets and incentives, have proven to be most effective.

Multi-actor cooperation

The PREVENT Waste Alliance could play an important role in highlighting the fact that successful plastic waste prevention will not be achieved by single actors; neither companies, NGOs nor countries. The diverse network of PREVENT Waste Alliance members should emphasise the role of international coordination in order to create level playing fields, to avoid unnecessary administrative burdens from scattered regulation and to create synergies between the different ongoing activities and strategies that are currently developed alongside the plastics value chain.

How your organisation can participate

- Are you active in the field of waste management or a stakeholder in plastic and/or electronics value chains?
- Do you already have activities and partnerships on an international level?
- Do you want to intensify your cooperation with partners in low- and middle-income countries to make value chains suitable for the circular economy and improve local waste management?

Then you are welcome to participate in the PREVENT Waste Alliance.

In case of question please contact: contact@prevent-waste.net

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