

INTERSECTING

VOLUME 07/2021

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“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.”

—Alvin Toffler (1980)

That our world is growingly complex is hardly a radical revelation. The challenge is to act accordingly. To widen our knowledge, we specialize and consequently isolate ourselves in various silos.

In face of overwhelming evidence of our interrelatedness and interdependencies, from our bodies to our environment and our actions within it, we have no other choice than to work at the edges and at the crossroads.

INTERSECTING cuts through strategic policy areas from high-income and low-income countries. It builds upon multi-sectoral, multi-disciplinary, and multi-stakeholder approaches.

INTERSECTING is distributed by the Global Solutions Initiative. It is geared towards think tanks, civil organizations, international institutions, in particular the G20/T20. It addresses established and future generations of leaders in public and private spheres.

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Bending the Linear Economy
On Plastics

#transitions #frameworks #responsibility

INTERSECTING

VOLUME 07/2021

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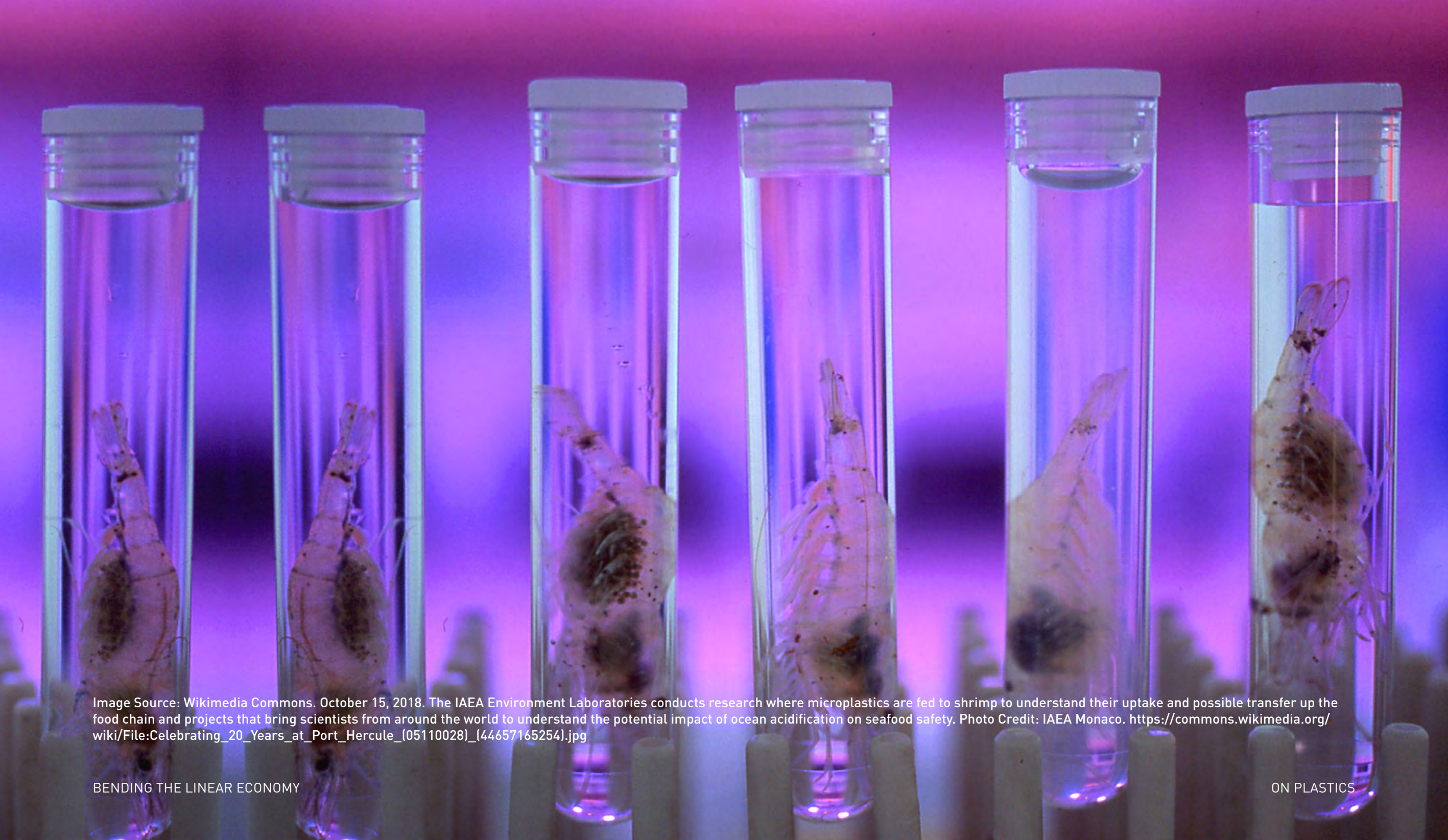


Image Source: Wikimedia Commons. October 15, 2018. The IAEA Environment Laboratories conducts research where microplastics are fed to shrimp to understand their uptake and possible transfer up the food chain and projects that bring scientists from around the world to understand the potential impact of ocean acidification on seafood safety. Photo Credit: IAEA Monaco. [https://commons.wikimedia.org/wiki/File:Celebrating_20_Years_at_Port_Hercule_\(05110028\)_\(44657165254\).jpg](https://commons.wikimedia.org/wiki/File:Celebrating_20_Years_at_Port_Hercule_(05110028)_(44657165254).jpg)

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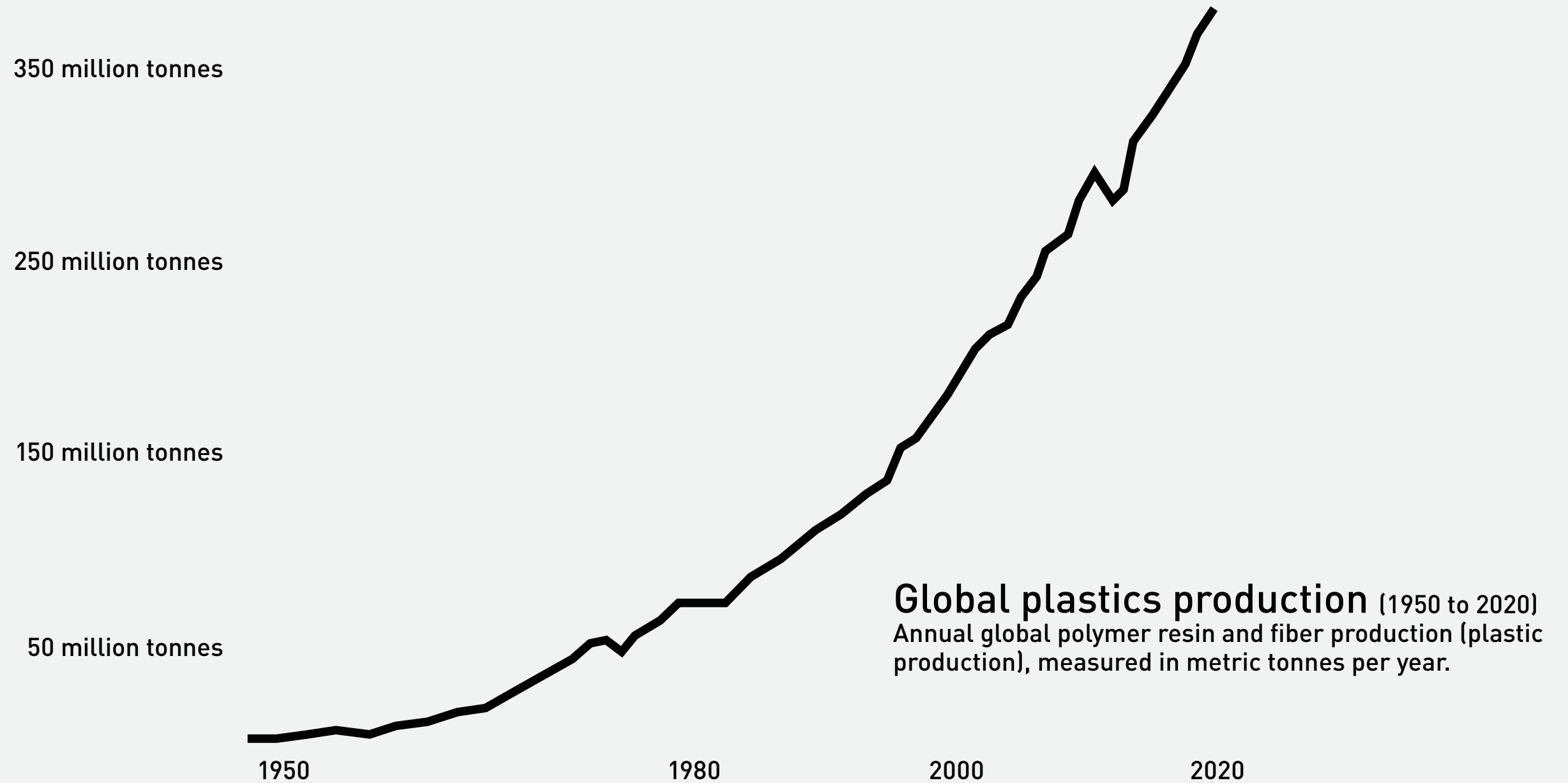
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preface



More than half of the world's polymer production for single-use plastics can be traced back to just 20 companies. While this observation may be disturbing, it promises that changing the processes of 20 companies would have a titanic impact. Image Source: Geyer, R., J. Jambeck and K. Law (2017), "Production, use, and fate of all plastics ever made", Science Advances, Vol. 3/7, p. e1700782.



Less than 10% of all the plastic ever made has been recycled, in large part because it's too costly to collect and sort. Plastic production, meanwhile, is projected to double within 20 years.

Image Source: Wikimedia Commons. December 1944. Sinclair Refining Laboratory at Corpus Christi. Photo Credit: Robert Yarnall Richie photograph collection. [https://commons.wikimedia.org/wiki/File:Sinclair_Refining_Laboratory_-_at_Corpus_Christi_\(8409510090\).jpg](https://commons.wikimedia.org/wiki/File:Sinclair_Refining_Laboratory_-_at_Corpus_Christi_(8409510090).jpg)

In plastics, united we are! But it is time to bend the linear economy and turn 20% of the world economy circular by 2030

In the spring of 2021, the first session of the Circular Economy Solutions Dialogues on plastics kicked-off online, following the Global Solutions Summit which was also held virtually, as the COVID-19 pandemic still held its firm grip on the world with fundamental ramifications on our life.

On the streets, passers-by were wearing single-use polymer masks as they made their way around their daily lives. Many resorted to take-away food in foam containers as restaurants were closed. Coffee shops' refill schemes stopped due to safety concerns. In the U.S., plastic bag bans were even rolled back. Images of disposable masks and other medical devices littering river banks, seashores and even the bottom of high seas soon filled the space on social networks, whereas uneven global access to vaccination highlighted staggering public health inequalities between high-income and low-income regions.

The pandemic has exacerbated a problem the world has been ignoring for too long: steadily mounting quantities of plastic waste, with far-reaching visible, and less visible, chemical consequences on the environment, wildlife, and humans. Yet in plastics united we are! Between 1950 and 2015, the world created 6.3 billion tons of plastic waste. It is estimated that 9% was recycled and 12% incinerated, leaving almost 80% to accumulate in landfills or in nature, often in the oceans.

Today, approximately 8 to 12 million tons of plastic waste end up in the oceans every year, making plastic the top pollutant of marine systems. Through interconnected ecosystems, we are now all ingesting plastic. Plastic is everywhere. It flows from about 1,000 rivers, especially from 10 of them, into the seas. Meanwhile, on land, just 20 multinational companies are reportedly responsible for over 50% of the world's total plastic waste, whereas the growth of urbanization yields exponential waste production and dispersion.

Repeated waves of mutating COVID-19 virus strains and lockdowns have severely impacted global growth, with a global decline in 2020 and an uneven recovery in 2021, creating turmoil in energy markets, shaking global logistics and supply chains, widening discrepancies between manufacturing and consuming countries and regions, spurring inflation and, potentially, economic instability.

Cheap and cheerful, the miracle material, plastic, has been mass-produced for the better part of the last century, with a yearly rate of production now topping nearly 400 million tons. Meanwhile, circular economy has declined from 9,1% in 2018 to 8,6% in 2020-21. The pandemic has not reversed pre-existing imbalances and it has even reinforced unregulated waste overflows.

Polymers are everywhere!

It is not only that plastic is no longer all that fantastic, but the prevailing forms of linear, extraction-based economy

have already induced unwanted interconnections of all sorts through powerful market trends. In some cases, the COVID-19 pandemic has only crudely exposed how much the economy relies on informal workers and loosely regulated job markets. Similarly, environmental criminality has targeted weakly protected and globally integrated informal recycling markets much faster than governments. These are only two examples of the many disruptions preventing the delivery of good practices at a global scale, slowing down the transition from consumer awareness and producer responsibility to a truly circular economy.

We have applied the INTERSECTING approach¹ to the issue of plastics as a first step in a wider exploration of how to bend the classical, linear economy. Working across disciplines, spheres of knowledge and policy making has resulted in powerful synergies and enlarged perspectives. We have also found that the risks of disconnections between high-income and low-income economies have grown since the pandemic outbreak.

We are united in and by plastics but reaching out to and implementing large-scale solutions to massively reduce plastic waste depends on working with a fragmented global governance system. Addressing the plastics issue means solving one of the most challenging dilemmas of contemporary economics. The task is urgent as reports show an acceleration of ecosystems degradation and a weak global ability to shape effective global responses.

Plastics is a cornerstone of the linear economy. Addressing the plastics issue is giving way to the circular economy. By 2023, we can increase the share of circular economy beyond its 2018 levels of 9.1%. By 2030, we aim to accelerate the circular economic transformation and reach 20%. Doubling global circularity could reduce global greenhouse gas emissions by nearly 40% by 2030, and help shape robust biodiversity economics.

Moving towards the Agenda 2030 through circular economy is a way to accelerate the shift from the extant norm of 'extracting' to the desired one of 'intersecting'. The INTERSECTING model helps address the problem by (re)connecting practical, local and sectoral endeavors with multilateral agendas. Applying the principles of INTERSECTING to the circular economy and in particular to plastics also helps cut through strategic policy areas in high-income and low-income countries altogether.

This seventh volume of the INTERSECTING series builds on implicit institutional and procedural knowledge of stakeholders from business and politics to society across nine interconnected dimensions:

#markets #transitions #justice
#models #frameworks #benefits
#industry #responsibility #leadership

1. Download INTERSECTING volumes 1 to 7 here:
<https://www.global-solutions-initiative.org/publications/e-book-intersecting/>



“Sunlight can break down marine plastic into tens of thousands of chemical compounds, at least tenfold more complex than previously understood.”

–Woods Hole Oceanographic Institution

Source: Image Source: Wikimedia Commons, December 10, 2016. The Great Pacific garbage patch causes vast quantities of trash to wash ashore at the south end of Hawaii. Very sad to see such scenic coastline spoiled by so much debris. Photo Credit: Justin Dolske. [https://commons.wikimedia.org/wiki/File:Beach_trash_\(30870156434\).jpg](https://commons.wikimedia.org/wiki/File:Beach_trash_(30870156434).jpg)



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Changing together: Plastic soup and multilateral sustainability goals

For most readers of this INTERSECTING issue, there has been no life without plastic. Pretty much every commodity is made of plastic, or at least contains plastic parts. Its origins go back a little over a hundred years. After the German chemist Hermann Staudinger discovered the chemical structure of polymers in 1917, a whole new set of possibilities opened up for the industry almost overnight. With the knowledge of the nature of plastics, there was not much standing in the way of large-scale production (Staudinger

also received the Nobel Prize for this in the 1950s). This era was the beginning enthusiastic mass production of plastics, only that the world didn't know yet the magnitude of the challenges that this invention would create.

The problems are manifold. There are health effects due to the pollution of water and ultimately soil by microplastics, which then enter the food chain of humans and animals. There are considerable costs for cleaning up and for waste disposal, which are mainly paid out of public budgets, financed by taxes; ultimately, they lack other important investments. As sensitivity to global warming is mounting and the problem plastic waste in the oceans has become obvious, the problematic impacts of plastics have gained global public awareness. Plastics are closely linked to the world's oil production and, therefore, harmful greenhouse gas emissions. The Center for Climate and Energy Solutions (C2ES) shows that nowadays "between 4 and 8 percent of oil produced globally is used to make plastics, about the same amount of oil consumed each year by the global aviation sector, with natural gas being a growing source of plastics too."

It was precisely in the 1950s that we encountered the modern plastic boom. Those plastics, such as polyethylene, which is obtained from natural gas, and polypropylene, which is based on crude oil, were produced on such a large scale that they are still the most widely used today. The new plastics, on the other hand, seem to offer everything

that the developing consumer society needs. They are light and malleable, and at the same time strong and durable. On top of that, they were becoming increasingly cheaper to produce. The exact point in time when exactly plastic finally became popular and widespread among the masses depends somewhat on the region, but since the 1970s it was impossible to imagine everyday life without plastic.

In its early days, plastic was used almost exclusively in durable and reusable products. However, with generational changes and further development in the consumer society, a new type of use was added even though it has created problems that extend till date. From the 1970s single-use plastic came into circulation. Plastic had become so incredibly cheap to produce that it could just as easily be thrown away after one use.

It would take a good thirty years before the resulting environmental pollution became a major issue. Today, there is a slow move away from single-use plastics towards reusable or biodegradable plastics. However, the consequences of the plastic revolution of the 20th century will probably accompany us throughout the 21st century.

Meanwhile, the global plastics production grew from 15 million metric tons in 1964 to 311 million in 2014. This is a twentyfold increase in just 50 years. Recently, production has reached close to 400 million tons.¹ On its website, the German Federal Ministry for the Environment, Nature Con-

servation, Nuclear Safety and Consumer Protection writes that “if you put all that plastic on flatbed trucks, it would make a chain that would reach three times around the earth”.

For some years now, research has been conducted into how much waste there is in the world’s oceans. Since then, plastics recycling has steadily gained importance in the debates of national and multilateral policies. Initially, these efforts were to primarily conserve natural resources; now, it is undertaken for its increasing importance to the circular economy and driven by the high level of public interest, especially through associated issues such as plastic waste in the world’s oceans.

The United Nation’s Agenda 2030 includes a series of targets referring to circular economy. Yet, none of the seventeen Sustainable Development Goals specifically targets oceanic plastic soups although their impact is universal and the problem is gaining importance on the international agenda. In July 2017, the United Nations met to discuss the implementation of SDG 14, Preserve and make sustainable use of oceans, seas and marine resources, and adopted the resolution ‘Our Ocean, our future: call for action’. All countries agreed to intensify their efforts to prevent pollution of the oceans, among others, by reducing plastics and microplastics. There was special attention paid to the reduction of Single Use Plastic (SUP), in particular single-use packaging plastics.

In 2021, 78 Member States of the United Nations have endorsed a proposal for an international treaty on plastics and issued The Ocean Day Plastic Pollution Declaration at the High-Level Meeting on Oceans convened by the President of the UN General Assembly in June. The quest for solutions against plastics pollution have long focused on the conservation of natural resources, but this is changing rapidly.

Issued during the T20/G20 Italy, the T20 policy brief 'Localizing the circular economy imperative in a post COVID-19 era: place, trade and multilateralism' values the fact that the "G20 leaders have also moved from 'recognizing' the importance of resource efficiency to 'endorsing' a Circular Carbon Economy (CCE) platform" and now promote a "G20 Resource Efficiency Dialogue and a G20 Platform on SDG Localization and Intermediary Cities". Besides, many individual countries and regions have started to taking action and deal with issues of marine litter, single-use plastics and plastic waste management.

There are examples of changing public and private governance. The European Union has issued a directive on single-use plastics. ASEAN member states have adopted a regional action plan to tackle plastic pollution. At the same time, the New Plastics Economy Global Commitment and Plastics Pact, is a voluntary commitment of the private sector to set concrete targets and goals for a circular economy for plastics. Many "initiatives through corporate and gov-

ernment action are on the rise" but "their voluntary nature is unable to drive systematic change that the entire plastics economy requires", according to the Center for Climate and Energy Solutions.

INTERSECTING enters the global plastics and circular economy debate, to inspire a conducive narrative feeding into the T20/G20 process while building on the momentum of multilateral policy dialogues and commitments to the circular economy.²

The transformation from contemporary linear global economic system to a circular one requires massive systemic, technical and social innovations as well as value networks adapted to them. Changing together and bending the linear economy will only succeed with a multi-stakeholder and multi-level approach, along and at the interfaces of value chains. Beyond the promotion of the basic 4Rs - Reduce, Reuse, Repair and Recycle principles, we put forth the following recommendations at the core of any future change:

1. Adopting a holistic paradigm of economic development and infrastructure delivery that integrates meaningful use and reuse of materials throughout the entire supply and value chains and life cycles;
2. Working with public and private stakeholders to give traction to this new paradigm;

3. Developing better indicators for measuring and monitoring circularity of businesses and economies at an aggregate level;

4. Facilitating inclusive and transparent public participation processes in the circular economy transition and enhancing social benefits to leave no one behind;

5. Mobilizing financial and technical assistance to build up technical and institutional capacities to tackle the circular economy transition challenge;

6. Aligning local and national policies and financial incentives at regional and multilateral level to leverage public engagement and private capital to implement national circular economy transition strategies and accelerate the uptake of technological innovations.

7. Promoting circular economy in national, regional and global COVID-19 economic recovery investment plans.

1. The future of plastics: a new global treaty? — Center for Climate and Energy Solutions (c2es.org)

2. GACERE, ACEA, LAC CE Coalition, G20 Resource Efficiency Dialogue.

A close-up photograph of a child's hands holding a football. The football is made of red and white plastic bags, with some text visible on the bags, including "BELL" and "CRAFT". The child is wearing a white and blue striped shirt. The background is blurred, showing other people and a colorful patterned cloth.

“I grew up in an emerging economy,
at the crossroads of three continents:
Europe, Africa and Asia. At the
time, in my low-middle income
neighborhood and state school,
buying a real ball to play football
was quite a luxury.”

–Alexander CHARALAMBOUS

Image Source: Wikimedia Commons. January 20, 2019. Children from poor areas can't buy real balls so they make them out of plastic bags. Photo Credit: Mepereshka.
https://commons.wikimedia.org/wiki/File:African_football_ball.jpg



Alexander CHARALAMBOUS (ed.)
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The kid and the ball: Can the future of plastics fit into a circle?

Questioning the future of plastics is a story stemming from way back in my life. I remember as a child, spending time with my schoolmates stuffing a plastic soft drink bottle with paper. The bottle was barrel-shaped. However strange it may sound, the intention was to use it as a makeshift ball when playing football. And it worked.

I grew up in an emerging economy, at the crossroads of three continents: Europe, Africa and Asia. At that time, in my low-middle income neighborhood and state school, buying an actual football was quite a luxury for most families. The plastic bottle was a good alternative for a football. It was fairly easy to work with and quite enduring as a base material. Endurance was of utmost importance as not many families could spare the money to buy soft drinks at school. Hence, our raw material for making footballs, was rather scarce.

The bottom-line of this anecdote was that we were inspired by rumors circulating about boys our age in Brazil playing football in the streets with balls made from clothes and other materials. TV programs and our parents only confirmed the rumors, triggering our actions. Quite an inspiration, it was!

We obviously lacked technical skills. And a learning process. We wanted to create a makeshift ball but what exactly did we need to do to make one? With no Google back then, there was not much discussion about knowledge and skills transfer. However, we were fortunately equipped with creativity. Left to our own devices, we did manage to imagine and device a suitable product in the end. But then again, we never won the World Cup as a nation.

The plastic bottle ball kept everyone happy. It was an affordable option for our parents and a less destructive option for our school teachers. After all, how far could a boy kick a plastic bottle? Definitely no broken windows! All in all, both family and school policies were conducive for the continued use of plastic bottles. Acceptance by family and school, meant financing was possible, too. It was not abundant but enough to buy us new plastic bottles when needed.

Interestingly, not all plastic balls were fit for play. Implementation of the concept was largely a matter of skills. It was not easy to select the right paper type to stuff the plastic bottle so that it would not come out after a few kicks or to find the correct angle to bend the lid to avoid getting hurt

when we got hit. Memories of friends mastering these skills came back to me years later when I was discussing with colleagues about solutions to extend the life of plastic bottles beyond their intended use. Simple ideas help achieve incremental gains towards making plastics a resource rather than waste.

These elements, inspiring, learning, enabling, financing and implementing, are what I believe will shape the future of plastics in the years to come.

Inspiring is probably what we have been performing best at so far. Strong images of plastic pollution have alerted people worldwide and raised global awareness to the problem. Stories of people committed to de-pollute pristine beaches from plastics have an inspiring effect, notably on younger generations. At the same time, we have increasingly gotten used to plastic waste surrounding us. In some cases, we even tend to consider this a new normal.

Learning is an ongoing process. We recently learned that 10 rivers are responsible for over 80% of the plastics ending up in the oceans.¹ Is this true? Or is it rather 1.000 rivers to blame?² We have to admit that we still have a lot to learn about plastic waste, and about the impact of plastics on nature, on our economies, and on our lives.

Governments and other stakeholders are much concerned about establishing enabling conditions for sustainable plastics value chains. Indeed, the momentum is good with mul-

tilateral partnerships and agreements promoting a circular economy in the plastics value chain having been established or being discussed, such as the Global Alliance on the Circular Economy and Resource Efficiency, the African CE Alliance, the Latin America and the Caribbean CE Coalition, and the Global Agreement on Plastics. Both producer and government responsibility systems are being designed and enacted in an increasing number of countries worldwide. Other policy models, involving consumer responsibility or third-party coordination are also applied.

Next to a conducive policy environment, financing is crucial for scaling up the uptake of circular economy across global and local plastics value chains. Moving away from unsustainable investments is an essential first step. Increasing sustainable investments is equally important. But the devil is in the details as we need to diversify sustainable investments beyond the usual suspects, like renewable energy production and energy efficiency, if we are to address circularity in the plastics value chain. There is also a growing interest in blended finance, which gives access to a broader investor mix and enables flexibility in terms of both scaling investment and distributing risk.

Last, but not least, is implementation. Innovation and technology form the backbone for scaling up circular economy uptake. However, the pathway is full of hurdles. Let me give you an example. The households or consumer goods sector, particularly in food packaging, account for the most

plastic waste produced. Yet developing solutions upstream and downstream the sector remains challenging. Currently, recycled PET is the only plastic material which has a recognized standard for food grade recycling, although substantial efforts are being made to recycle the components of flexible plastics into food grade products. However, legislation for food grade recycled products is quite stringent and significant research is required to assure that recycled packaging is safe for consumers.

With no silver bullet in the horizon, the future of plastics may take several forms. Whatever it may be, prospects have never been better to push for increased sustainability in the sector.

A circular economy approach across the plastics value chain seems to emerge as a key resolution to halt the plastic waste tide and increasing sustainability in the sector. Yet, as I feel increasingly optimistic, I can't help wondering when we finally do solve the problem of plastic waste, would our kids as well as kids in emerging economies still want to use make-shift plastic footballs to play?

1. Christian Schmidt et al. (2017), "Export of Plastic Debris by Rivers into the Sea" in Environmental Science & Technology, Vol. 51, No. 21; Prachi Patel (2018), "Stemming the Plastic Tide: 10 Rivers Contribute Most of the Plastic in the Oceans", in Scientific American 318, 2, 15-17.

2. Lourens Meijer (2021), "More than 1000 rivers account for 80% of global riverine plastic emissions into the ocean", in Science Advances 7(18).



transitions

Image Source: Sept 24, 2021. 'Green Friday' demonstration in Rome.
Image by Nicolas J.A. Buchoud, all rights reserved ©.

markets transitions justice

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Tamara VELDBOER and Ana Birliga SUTHERLAND
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Vesna LAVITZAR
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1.6. Insight/example: The Prevent Waste Alliance
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“Today’s sustainability heroes have pinned the woes of the world on plastic. The public is flooded with images of injured sea animals. In spite of plastic being ubiquitous, our throwaway culture has made it infamous, but let us travel along the complete plastics value chain.”

-Tamara VELDBOER, Ana Birliga SUTHERLAND

Image Source: Wikimedia Commons. March 2, 2017. Hand prosthesis made for war wounded children at the Biotech Center of the University of Trento. Prosthesis are cheaper and more functional, thanks to new materials. Laboratorio di Tecnologie Biomediche. Photo Credit: Alessio Coser. <https://commons.wikimedia.org/wiki/File:ALE7854.jpg>



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Plastic—fantastic? Rethinking our relationship with our most controversial material

Today's sustainability heroes have pinned the woes of the world on plastic, a condemnation all the more serious given the material's presence in just about every consumer-citizen's life. From the food we eat and the clothes we wear to the cars we drive, plastic is everywhere. Cheap and cheerful, this miracle material has been mass produced for the better part of the last century, with the yearly rate of production now topping 380 million tons.¹ While originally developed to protect and preserve natural resources, like wood, stone and

ivory, plastic has been critically scrutinized for its production: from its sources - coal or oil - to end-of-use. The public is flooded with images of injured sea animals. In spite of plastic being ubiquitous, our throwaway culture has made it infamous. However, does it deserve its vilification?

Ultimately, the material itself has its advantages. It is in the way we produce, use and value it that creates harm. Some benefits are clear. For example, plastic-packaged food lasts longer, and the material's lightweight profile means better fuel economy when used in vehicles.² Overconsumption and end-of-use mismanagement, however, are rampant. It is time for a new plastics economy, guided by circular economy principles, where pollution and waste are kept out by design and unnecessary use is eliminated.³ The first step to downscaling linear practices is in changing how we value a material that has long been branded disposable.

Let us journey along the value chain, highlighting the steps producers, brands and consumers can take to make plastics fantastic once again.

Producers

More than half of the world's polymer production for single-use plastics can be traced back to just 20 companies.⁴ While this observation may be disturbing, it promises that changing the processes of 20 companies would have a titanic impact. It's time to invest in primary plastic production for what it truly is: a sunk cost. Investments can instead be poured into the deployment of novel delivery models, sub-

stitute materials and improved recycling infrastructure (e.g. reusable formats, biodegradable materials or those with high material content, deposit/return schemes). But time is running out. Producers do not have the leeway for consumers to demand change, legislators to force change or brands to strengthen requirements. There is a wealth of opportunities provided by the circular economy - ones which do not waste any valuable resources - from tangible materials to intellect, time and money. It's time to turn off the tap instead of producing more. We need action that makes the most of what we already have.

Brands

The onus falls on producers to change how plastic is made. However, what can brands do once the material ends up in their hands depends on the product it will be used for. Suitable r-strategies can be proactively employed. For instance, consider the retail chain Lidl's waste management company PreZero, which efficiently manages collection, sorting and recycling, driving innovation in the industry.⁵ Similar to producers, brands have a responsibility to publicly make commitments and act on them, while understanding that the gravity of the plastic problem goes beyond good PR. Setting targets and being transparent about progress and willingness to pay higher prices for recycled plastics send a signal to the world that brands mean business. This sets the stage for further impact. Luckily, acting alone isn't necessary nor wise. Brands can work towards better plastic management in collaboration with partners to identify and implement

the most relevant circular strategies for their business or making use of free digital tools.^{6,i} Beware that 'one size fits all' solutions will not suffice. Circular strategies for plastics are heavily context-dependent. Swapping plastic for new materials, such as those marketed as compostable, will not be effective in areas without widely available infrastructure for composting, for example. Instead, a reduction in single-use and virgin materials should always be the first step.

Consumers

Consumers may be unaware of their plastic footprint or uncertain how to cut it. Hence, taking it slow and understanding how and where to best phase out plastic is the first step. R-strategies are particularly relevant, from favoring products without unnecessary plastic (refuse) and incorporating reusable items (e.g. water bottle) into everyday life (reduce), to engaging with local schemes for reuse and recycling. Consumers have a special role to play in shaping the actions of brands and governments. They vote with their wallets and have the voices to spur change at the local level, in areas such as improved infrastructure for plastic waste management.

No panacea for plastics: Collective steps towards downscaling linear practices

While all the actors in these three distinct steps have their role to play, collaboration between value chain actors must be at the center of reversing the global plastic panic. Across continents, inspiring, voluntary and regulatory initiatives are

abundant. We have the knowledge and solutions but to actually change behavior across the board we must recognize that cutting our plastic dependence and continuing to use material, where beneficial, are not mutually exclusive. At Circle Economy, we believe in collaborative action towards joint objectives, driven by metrics that quantify the impacts of circular strategies by making them comparable as well as uncovering their efficacy. The result? Making plastic truly fantastic once again.

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“Unless the circular economy is implemented on a global scale, a country or a city committed to becoming completely circular will likely face challenges when partaking in the global market.”

-Vesna LAVTIZAR

Image Source: Wikimedia Commons. September 28, 2015. Photographed at the port of Antwerp, Belgium. Photo Credit: Alf van Beem.
[https://commons.wikimedia.org/wiki/File:CMA_CGM_Laperouse_\(ship,_2010\),_Deurganckdok,_Port_of_Antwerp,_Belgium,_pic1.JPG](https://commons.wikimedia.org/wiki/File:CMA_CGM_Laperouse_(ship,_2010),_Deurganckdok,_Port_of_Antwerp,_Belgium,_pic1.JPG)



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Circular economy in a global market perspective

The transition towards the circular economy (CE) brings changes to the markets, both locally and globally. When implementing CE, consumption decreases, higher quality products are designed to be long-lasting, easy-to-repair, refurbished and recycled; where applicable, products are offered to the market as a service rather than an item to be owned.

In our globalized and capitalist world, CE faces many challenges. Today, price is often the most important factor for the customer to choose product A over product B. However, low-priced products are usually not designed with their environmental impact in mind. As such, they are difficult to repair, refurbish or recycle. To tackle the significant environmental impact (i.e. GHG emissions) created from the imports of products imported from some countries, Europe encourages the adoption of the “Farm to fork” strategy. In Slovenia, this practice is gaining momentum. However, it is

still practiced at a small scale. Local farmers have difficulties competing with low prices set by bigger international farmers, who use conventional and environmentally unfriendly farming practices.

Unless the circular economy is implemented on a global scale, a country or a city committed to becoming completely circular will likely face challenges when partaking in the global market. The global market should have to accept policies which will, for example, allow the import of materials, resources and products that comply with CE practices. With design for the environment (DfE) products, regions and countries will ultimately achieve a higher material self-efficiency as the recycling of materials increase within their borders.

However, such recycled materials can also be traded among countries, which create changes in the global trade flows. There will be incentives to increase the use of secondary materials over virgin materials. With the increasing demand for secondary materials, trading with virgin materials would be expected to decrease, which can in turn substantially affect countries or regions that currently depend on the export of these virgin materials.

Circular economy may further promote recycling within regional or national borders. However, where recycling technologies are not available, waste can be traded and recycled elsewhere. In some cases, waste is sent to third countries for recycling, where there may be a relatively

lower environmental standard. For example, the program to export plastic scrap to China intended for recycling ran until 2018, despite China ranking second in the world for mismanaged plastic waste.¹ Instead, recyclable waste could be sent to countries with staffed facilities that employ high-quality recycling and uphold acceptable environmental standards.

Material flows can be more easily monitored and the external impact, connected to resource exploitation and utilization, can be more easily identified on a local and regional level. Pandemics, changes in countries' political decisions and regimes as well as natural disasters and accidents highlight our dependency on global markets and vulnerability when international trade flows are interrupted. Particularly the COVID-19 pandemic has made us realize the importance of becoming more self-sufficient and resilient. Biological cycles can be readily practiced on a local level. In Slovenia, for example, municipal biowaste is collected separately. Around 48% of households in Slovenia have their own composts.² If waste is not composted at home, organic waste is anaerobically treated in biogas plants to produce biogas that to generate electricity, composted (compost sequesters carbon) or biologically stabilized.³

The city of Maribor with its recent project Urban Soil for Food went a step further. They aimed to increase the city's food self-efficiency, promote circular economy, reduce carbon footprint and re-connected citizens with nature.

Unused land was transformed into gardens and were freely available to 66 households in the city to produce their own crops. Vertical planting spaces were also established in compact settlements to enable urban farming. Citizens were given training on gardening, ecological food production, composting and similar topics. Part of the project included the construction of a device for processing biodegradable waste, where heat and biogas are generated as well as chemical analysis of the compost to determine its safety for use in gardening. A web portal was further established to connect local farmers and producers with local customers.

One of the known and comprehensive concepts which aims to build self-reliant and decentralized societies based on regional circulation is the Japanese "Regional circulating and ecological spheres" (R-CES) concept.⁴ Locally available resources are utilized in a sustainable manner, circulated locally and exchanged with neighboring regions according to the region's unique features. However, the essential factor for success is the strong support from the community.

We are left with these important questions. How can a city, region or country achieve complete circularity when material supply chains and waste flows are global and businesses operate internationally? How will a shift to utilization of secondary materials instead of virgin materials affect the global market and countries that economically depend on the export of virgin materials? Can we really become circu-

lar in the global market, where each nation has a different pace of transition towards circularity? Is regional circularity the solution to achieving a global circular economy and what will be in the global impact? Can regional circularity coexist with the global market, international trading agreements and the desire of customers for product diversity?

These questions make us realize the power of the circular economy to bring changes in our society and everyday lives. This is why the transition has to be well thought out, all-inclusive and just.

1. <https://knoema.com/infographics/qjigabe/the-main-sources-of-plastic-waste-in-the-ocean>
2. https://www.stat.si/dokument/9173/hrana_med_odpadki.pdf
3. <https://www.stat.si/StatWeb/news/Index/8433>
4. <https://www.env.go.jp/en/wpaper/2018/pdf/04.pdf>

“How can a city, region or a country achieve complete circularity when the material supply chains and waste flows are global and when businesses operate internationally?”

–Bezawit ESHETU



Image Source: Recycling lorry with passengers in a street of Cairo, Egypt. Photo Credit: Alh1. https://www.flickr.com/photos/allan_harris/3155969995.



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African Circular Economy
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of thought providing an alternative development approach which can accommodate the four pillars of sustainability - environmental conservation, economic viability, social equity and cultural vitality - in a comprehensive and systemic way. Hence, there is the need for advocating the concept across stakeholders.

MK: Where does circular economy transition stand in Africa?

BE: At this juncture, it is important to observe mega trends influencing the production and consumption patterns in Africa: increasing population, increasing middle class with better purchasing power and market niche, rapid urbanization, rapid industrialization, improving Infrastructure and financial systems, rapidly increasing penetration and coverage of digital technology, amongst others. These drivers are shaping the continent's path from predominantly an agrarian-led economy to an industry-led economy, from a predominantly consumer-based society to a manufacturing society. This is manifested in the flourishing industry parks and zones, enhanced technology transfers as well innovations, and inclusion in the global value chains and markets. On the one hand, Africa has full knowledge of the adverse impacts and costs incurred due to industrialization in developed nations. Ironically, it is also directly affected by the negative impacts like climate change resulting from the cost of inaction! On one hand, Africa took this historic opportunity to learn from the mistakes of developed na-

On the circular economy transition in Africa

Martin KOCHHAN (MK): Why have you chosen to focus on circular economy advocacy?

Bezawit ESHETU (BE): There is a simple answer - we can no longer afford to continue extracting our finite natural capital and neither can the planetary boundaries assimilate the waste generated from manufacturing process and consumption patterns of humans. The ever-increasing Green House Gas (GHG) emissions being in the forefront. On a more human level, our markets are now driven by emerging consumer behavioral changes. There is increasingly more demand for sustainable products and services by consumers. The economic feasibility of global markets is based not only on higher profit margins and market systems with strong, interlinked global value chains, but also on environmental sustainability and their capacity to address social factors like creating dignified employment opportunities. The concept of circular economy is one school

tions. It learned to better adapt and mitigate the impacts of climate change emanating from the existing GHG emissions and, most importantly, is exploring partnerships and collaborations to design and develop sustainable models (e.g. green economy and circular economy). For the transition to be inclusive, fair and equitable, Africa needs to build its technical and innovative capacity as well as its institutional and legislative frameworks through such strategic partnerships.

MK: The transition to a circular economy takes place at different paces. In your opinion, which countries are the pioneers in the African continent and what can other countries learn from them?

BE: Beyond creating awareness and advocacy, systemic transitions require strong political will and commitment from policy designers and decision makers. Developing a clear and tangible road map that sets the tone in addition to identifying enablers and barriers to capture opportunities is key milestone to instigate policy dialogues and related documents. The case for Circular Economy is no different. Countries like Senegal and Morocco have already developed roadmaps; others like Ghana and Ivory Coast have them in the pipeline. Countries like Gambia and Botswana revised their respective commitments to reduce their national GHG emissions and adapt their plans to counter the impacts of climate change by incorporating circular economy mitigation strategies. Organizations like African

Circular Economy Network (ACEN), a pan African non-profit organization, created a platform to convene more than 40 countries to guide the private sector's discourse on the transition to circularity. A ministerial-level regional forum, the African Circular Economy Alliance, was launched in 2017 by Rwanda, South Africa and Nigeria. In November 2019, the Durban Declaration for environmental sustainability made by African ministers for the environment further marked the first pan-African policy announcement that included circular economy ambitions for the continent. On a more practical level, even though many circularity principles are deeply embedded in African traditional production and consumption practices, there has been little mention of case studies from Africa, until recently. Footprints Africa together with ACEN compiled existing initiatives and best practices across the continent. The report is instrumental to identify which sectors have potential to amplify the transition, the barriers, possible areas of partnerships and, most importantly, inspire innovators and entrepreneurs to adopt circular business models. In this regard, countries like South Africa, Nigeria, Kenya, Ethiopia, Rwanda, Egypt, Ghana and Uganda are setting up start-up incubators and business accelerators focusing on Circular Agribusiness and Waste Management. In my view, the following are necessary for the actual value of circular economy to flourish: innovative solutions to manage waste rather than end of life products; principles to keep waste and pollution out of the system; designs to keep products and materials longer in use; and regenerative natural ecosystems.

MK: How can multilateral and international development cooperation support circular economy uptake in Africa?

BE: Adopting circular economy practices will require a global, systems-level approach comprising a range of actors spanning the public and private sectors, involved from the design stage until implementation at scale. Development partners can play pivotal role, like so:

- Use their convening potential and forging partnerships for knowledge transfer, networking and resource mobilization amongst stakeholders, including Member States, the private sector and the civil society. Beyond the exchange and dissemination of knowledge and information, facilitating partnerships by organizing regional forums, summits, conferences, technical working groups and expert meetings, they can create a solid platform for developing and articulating common positions and action plans.
- Conduct trend analyses, research and provide policy advisory services for Member States, which can be translated into context appropriate circular economy strategies and policies for developing countries and economies in transition. Flagship publications for different UN organizations are aspiring examples (e.g. global outlook reports on environment, waste and industrialization; Global Material Flows Database).
- Develop and implement cross-cutting programs and initiatives which incorporate circularity and sustainability principles in different thematic sectors.

MK: A circular economy might challenge some business models. How do you convince African business leaders that a shift to a circular world is, in the long run, beneficial for everyone?

BE: For Africa, being the youngest continent with an increasing unemployment rate, the selling factor for embracing circular economy is its capacity to absorb the young graduates, It is not only about creating employment opportunities but also engaging them to be creative and innovative. At the same time, they should be able to monetize their ideas and aspire to generate wealth.

Enhancing productivity and competitiveness of the manufacturing sector in the global market requires fulfilling international sustainability standards, measures, certification and ecolabeling. These investments are compensated and rewarded with corresponding premium price incentives and profits. The added value of mainstreaming circular concepts, principles and approaches in the manufacturing sector can be reflected through economic advantages.

Ensuring food security for their nation is a primary concern of many sub-Saharan African countries. With circular economy, we can build food systems that prevent food waste and redistribute surplus edible food to people who need it. Inedible food by-products and human waste become inputs for new products.

“The EU recognizes the salience of human rights and includes them in trade and other negotiations. However, we also see many Global North countries shipping their waste to Asia, claiming it to be recyclable.”

–Miko ALINO and Satyarupa SHEKHAR



Image Source: Wikimedia Commons. July 18, 2017. XM chemical production plant by the Xicheng Canal, just where it meets the Jinghang Canal, in Wuxi city, Jiangsu (China). Photo Credit: Bjoertvedt. https://commons.wikimedia.org/wiki/File:Jiangsu_Wuxi_Beitang_-_Fengxiangcun_area_-_XM_chemical_by_Xicheng_canal_IMG_7053.jpg



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Break Free From Plastic
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economic activities that can contribute to climate change mitigation and avoid significant harm to environmental objectives. The regulation notably excludes waste incineration, including those that generate energy, as it undermines efforts to reduce waste, promote recycling and transit to a circular economy. It means that those planning to build such plants cannot receive climate-related subsidies or investments.

However, the sectoral implementation of Nationally Determined Contributions (NDCs) recommends introducing energy feed-in tariffs for waste-to-energy (WTE) projects, as part of climate mitigation plans, even though they are high carbon-intensive sources of energy. It is perhaps controversial that international financial institutions, such as the Asian Development Bank, actively promote carbon-intensive thermal technologies for waste treatment. The European Union and Germany could urge relevant financial institutions to adopt the EU Taxonomy Regulation by withdrawing financing for highly polluting activities such as waste incineration.

The EU Taxonomy Regulation can guide many governments in Asia who have started recognizing the need for a sustainability taxonomy framework to define which economic activities and industries can be considered as environmentally sustainable. A number of countries such as South Korea, Singapore and Malaysia, as well as the ASEAN, have developed their own taxonomies to guide financing decisions when it comes to environmental projects.

On European Union climate diplomacy and Asia

Martin KOCHHAN (MK): The European Union and Germany are often seen as a first mover when it comes to environmental regulation and standards. What can they do to advance the circular economy agenda in Asia?

Miko ALINO (MA) and Satyarupa SHEKHAR (SS): The European Union's Waste Framework Directive provides the legal basis for managing waste. It is premised on the waste hierarchy, which sets a priority order for all waste prevention and management legislation and policy, making any waste disposal a last resort. The EU Taxonomy Regulation lists

MK: Many countries have introduced or are in the process of introducing Extended Producer Responsibility (EPR) regulation. The idea is to make polluters pay for single use plastic brought into circulation and, thereby, creating an incentive to replace it with more sustainable alternatives. Is this system effective in curbing the production of throwaway plastics?

MA & SS: Extended Producer Responsibility regulations are a positive step towards making businesses responsible for the waste generated as a result of their direct and deliberate choices in production processes, and delivery systems. Well-designed EPR programs should not be limited to a mere collection of fees to pay for collection or disposal. Rather, they should encourage businesses to reduce plastic in production, final products and packaging, to redesign packaging and delivery systems, and to increase their reusability and material recovery schemes.

When correctly designed, EPR would not count disposal technologies such as waste incineration, chemical recycling and co-processing as aiding in material recovery. The Technical Expert Group on Sustainable Finance recommended excluding burning refuse-derived fuel (RDF) in cement plants because of established negative health and environment impacts as well as their role in undermining waste minimization. RDFs, however, are still part of the EU Taxonomy, likely due to lobbying by the cement industry. In 2020, a cement company in the Philippines, Holcim, burned almost 130,000 tons of municipal and agricultural waste (including plastic

discards), claiming that these efforts were intended to “lower the carbon footprint and consumption of non-renewable resources”. This action ignored the contamination of soil and water as well as impediments to health and food safety due to incineration, evidenced by a similar incident in a Swiss village.

We find businesses attempting to undermine and subvert good policies. Many fast-moving consumer goods companies (FMCG), such as Coca Cola, Unilever, Nestle and Proctor & Gamble, rely on producer responsibility organizations (PRO), which are third-party businesses often set up by the FMCGs themselves, to manage their single-use plastic waste. One example is Terracycle that has been sued for misleading labels regarding the recyclability of materials.

In another instance, we see a McDonald’s franchisee suing to stop a single use packaging tax in Tübingen, Germany. This is a clear attempt to intimidate cities that want to follow the Tübingen style of quickly reducing immense quantities of single-use packaging.

MK: Some companies and institutions propose chemical recycling as the magic bullet for the plastic crisis. Could this technique be the missing puzzle piece to the solution?

MA & SS: The plastic industry promises that technology would turn used plastics back to reusable plastics. However, a study has found that only three dozen chemical recycling

projects are operational and none of them engage with this plastic conversion technology. In reality, chemical recycling facilities process plastic waste into fossil fuel, which is later burned. It does not address the root of the problem: more and more plastic waste is being produced daily and this cannot be managed in an environmentally-sound and financially viable manner.

RDF for waste treatment is seen as a climate mitigation activity by our project. GIZ partnered with cement company Holcim and the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) to update a handbook on co-processing municipal waste in cement kilns — a carbon-intensive waste treatment option that is gaining traction as a quick fix to waste problems. In India, GIZ led the Climate Smart Cities Assessment Framework, in cooperation with the Ministry of Housing and Urban Affairs and National Institute of Urban Affairs. In an Assessment Framework booklet, waste-to-energy (WTE) and RDF are among waste treatment processes that account for reduced greenhouse gas emissions, even though both thermal technologies are known to be carbon-intensive activities.

What we urgently need is real and meaningful actions. We need governments and businesses to put more resources in establishing zero waste systems by shifting from decentralized waste management programs to reuse models.

MK: The informal sector plays a vital role in the recycling business in many countries in the Global South. However, the working conditions are often detrimental to the waste pickers' health. What can be done to improve their situation?

MA & SS: In many cities in Asia, waste management infrastructure significantly relies on waste pickers and informal recyclers for collecting, sorting, reducing the amount of waste burned, and diverting waste from landfills. By involving these workers, governments are not only achieving higher recycling rates, they also create opportunities for social mobility. We need to equip these workers with the technical capacity, infrastructure and financing so they can organize themselves into formal contractors or service providers to support remanufacture, repair, recycle and reuse systems in a community or city.

The EU recognizes the salience of human rights and includes them in trade and other negotiations. However, we also see many Global North countries shipping their waste to Asia, claiming it to be recyclable. In reality, much of this is municipal waste, including diapers, menstrual waste and single use plastics, that can only be burned. This has led to waste filling vast pristine fields and forests, rendering the land unsuitable for cultivation or habitation. Instead, many Global North businesses are paying waste picker groups and PROs in the Global South to collect and dispose plastic waste to earn credit. The response to the resulting human rights violations and compromises cannot and should not – be only the

transfer to relatively cleaner technology to ensure recovery of materials that promises minimal impact on humans and the environment.

MK: International cooperation agencies work with Asian governments to make their countries greener and more sustainable. Some projects were a success, some did not manage to achieve the intended outcomes. How can the cooperation be improved going forward?

MA & SS: Cooperation agencies share policies, practices and technologies but these do not help address the root of the problem. We need to shut down the plastic production tap. For instance, in the Philippines, GIZ is active in climate-focused projects such as Cities Finance Facility and pilot food hubs to support cities to develop financially sound business proposals for low carbon and climate resilient infrastructure projects. Yet, its business partners, like Holcim and Geocycle, have expanded their co-processing capacity in the Philippines. In 2020 alone, Holcim burned almost 130,000 tons of municipal and agricultural waste (including plastic discards), claiming that these efforts are intended to “to lower the carbon footprint and consumption of non-renewable resources”.

The Waste Solutions for a Circular Economy in India project, funded by the German, Danish and British governments, introduced a grant funding mechanism that awarded partial grants for RDF units, which are seen as a climate mitigation

activity by the project. Similarly, GIZ is working with the Alliance to End Plastic Waste, a consortium that includes some of the world’s biggest fossil fuel and chemical companies.

Instead of wasting investments in these technological fixes, international cooperation agencies should focus on reducing plastic production in the first place. EU cooperation agencies should embody the principles of the EU’s Waste Framework Directive and Taxonomy Regulation. They should facilitate similarly ambitious policy frameworks and finance real solutions that help developing countries transition to climate-friendly reuse systems.

Conclusion

In conclusion, we see that the EU and Germany, in particular, have some noteworthy legislations. However, many of the practices amount to double standards, waste colonialism and environmental racism. We see many of these governments promoting “net zero” rather than zero emissions. Plastic neutrality, plastic offsets and plastic credits are a rehash of the dubious market-based schemes for carbon trading and offsets, which failed to reduce carbon emissions. We call on all EU countries to enforce the same standards of health and environmental protection internationally as it does for Europe. We need a new global treaty to address the plastics crisis that is legally binding and covers harms along the full life cycle of plastics with an open mandate to discuss specific elements and mechanisms.

“From the climate crisis to socioeconomic tensions, COVID-19 is far from the only challenge looming over entrepreneurs. But with tight timelines, margins and budgets, can their businesses stretch any thinner?”

–Simon BALDWIN

#COVID-19_We Will Win

Enhanced Social Distancing Campaign



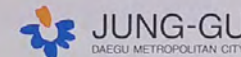
Keep a 2-meter distance from each other



Avoid visiting a crowded place



Wear a facemask (Do not eat on the street)



JUNG-GU
DAEGU METROPOLITAN CITY



DAEGU JUNGBU
POLICE STATION

Image Source: October 2021. Waste collection and COVID-19 in Daegu, South Korea.
Image by Nicolas J.A. Buchoud, all rights reserved ©.



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Entrepreneurship in Southeast Asia and its impact

From the climate crisis to socioeconomic tensions, COVID-19 is far from the only challenge looming over entrepreneurs. But with tight timelines, margins and budgets, can their businesses stretch any thinner?

Traditionally, start-ups build their business until they have a large enough platform to inspire change. Elsewhere, grants support the product development of purpose-driven organizations. Founders should not have to choose between the two.

With the global situation still shaky, there is no reason to return to how things were so why not try a new approach, namely business-profit-purpose?

Better businesses need better models

Networks of entrepreneurs, mentors, stakeholders and funders are formalizing into Entrepreneur Support Organizations (ESOs). These organizations guide founders to build businesses, often with a profit-purpose focus. They are perfectly placed to establish new business models. The circular economy ties profit and purpose together to promote closed-loop production: reducing new creation, reusing what exists and recycling anything else. This establishes a circle of sustainable resource usage.

Across Southeast Asia, there is political desire to combat marine plastic waste, exemplified through the ASEAN community's proposed plan.¹ Locally, ESOs are accelerating start-ups participating throughout the circular economy, tackling issues from plastic alternatives to better waste management. The Incubation Network's Plastics X Circularity Curriculum² is giving other ESOs the ability to support accelerator programs by sharing relevant tools³ at scale.

While the problem in our region is great so is the opportunity for change. The WWF estimates that 60 per cent⁴ of plastic waste in the ocean came from five Asian countries. Circulate Capital found that over 80 per cent⁵ of recycling in two of those countries had to cease operations during the pandemic. Yet, eradicating plastic leakage in India and Indonesia alone by 2030 would eliminate nearly 150 million tons of greenhouse gas emissions. That is equal to closing 40 coal-fired power plants.

Consumer inputs accelerate change

In Southeast Asia, there is hope. 93 per cent of Singaporeans reported⁶ they will “do their part” to minimize the impact of climate change. For the greatest impact, solutions must be developed within communities. Greenhope,⁷ from Jakarta, develops compostable bioplastics using Indonesian ingredients that they distribute in Africa, Asia, Europe and the United States.

For a start-up to grow, solid foundations are needed. ESOs have a multiplier effect in incubating start-ups: a small input can dramatically improve outcomes. This creates further opportunity within the communities investing in the solution.

Experts have estimated⁸ that if just one subset of European Union manufacturers used a circular economy model, they could save an annual net worth of over US\$340 billion. The business case is strong but the circular economy still faces barriers within the market, or the lack thereof.

A structured approach with regional initiatives leading to action can help unite stakeholders to reduce plastics in the ocean, while spreading wealth. Business, profit and purpose form a circle that extracts less virgin materials, while creating more opportunities using existing waste to tackle the volume of plastic in Southeast Asian waters.

Innovating in an inclusive way

Competition poses a threat to circular economy, as organizations compete to create their own supply chains, excluding smaller players. However, the marine plastics crisis is too big to face alone. We must collaborate to achieve this shared goal.

With supportive infrastructure, we can engage previously excluded entrepreneurs. Companies with diverse teams (i.e. gender, backgrounds, nationalities) have been found⁹ to be more innovative and are able to generate higher revenue from new products and services. ESOs and other ecosystem players have to join forces to build one inclusive circular economy, where power can be shared with all stakeholders, from CEOs to informal waste workers.

The Incubation Network encourages diversity by catering to different learning styles. When the ‘Circular Innovation Jam’ had to pivot online, a more diverse cohort of participants with land-based or household duties could join, such as a West Javanese team of older women who shared a single computer. Nearly 9 out of 10 start-ups in this program had at least one woman on their team. This is more than quadruple¹⁰ the global average of female founders.

Business, profit and purpose are not opposites; they complement each other to create impact. We already have

most of the necessary elements to solve the marine plastic crisis. Now, we need the entrepreneurs to bring them to life and the support organizations to catalyze their growth.

This combination will snowball, scaling the business-profit-purpose model. With inclusive innovation, we can mobilize people from diverse backgrounds. Simultaneously, we can prevent plastic from entering the ocean and create new economic opportunities. By taking a purposeful and inclusive approach, we can close the circle.

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“PREVENT brings together practitioners for a technical peer-to-peer exchange. Currently, more than 250 members from the private sector, academia and civil society collaborate in the alliance.”

—Nicole BENDSEN and Eva DÖRR

Image Source: Wikimedia Commons. July 24, 2015. Image of people cleaning up Amsterdam channel plastic, from a boat produced from that kind of plastic. Netherlands. Photo Credit: Bjoertvedt. https://commons.wikimedia.org/wiki/File:Amsterdam_canal_plastic_reusage_IMG_8028.JPG



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INSIGHT/EXAMPLE: The Prevent Waste Alliance

We strive to reduce waste pollution in low- and middle-income countries by developing functioning waste management and circular economy approaches. This is the mission of the PREVENT Waste Alliance, a multi-stakeholder initiative, founded by the German Federal Ministry for Economic Cooperation and Development (BMZ). Since the launch of PREVENT in 2019, the number of members has grown steadily, as has public interest in circular economy solutions. Currently, more than 250 members from the private sector, academia, civil society and public institutions

collaborate in the alliance (e.g. Alba Group, Nestlé, Wuppertal Institute, WWF, IUCN, Plastic Bank and Yunus Environment Hub, among other diverse actors). The success of every network depends on the active engagement of its members. So how does PREVENT ensure engagement and tangible results?

What sets PREVENT apart from other organizations is its focus in bringing together practitioners for a technical peer-to-peer exchange. Networking, partnership building and knowledge exchange are the core functions of the alliance. Members engage in thematic working groups, which focus on various topics related to E-waste, plastic waste, framework conditions or awareness raising and behaviour change. Each working group is led by members with the support of the PREVENT secretariat.

In the working groups, different perspectives are linked, cross-sectoral international partnerships are formed and activities are jointly implemented. For example, a sub-working group on plastic credits, which consist of plastic credit operators, industry as well as environmental NGOs and researchers, jointly developed a discussion paper on the risks and opportunities of this new financing mechanism. The paper outlines the quality requirements and standards needed to ensure that plastic credit schemes lead to more circularity and do not undermine incentives for EPR and waste prevention.

Another publication which was developed in a co-creation process by PREVENT is the EPR Toolbox, a collection of internationally relevant ideas and thoughts, on the topic of EPR for packaging. Its aim is to promote knowledge exchange and to advance the development of EPR systems worldwide. The toolbox has been downloaded 800 times so far and the EPR video series, available on YouTube, has been viewed more than 1,000 times. The WWF transformed the content of the toolbox into a massive open online course (MOOC). In cooperation with the EU-funded project “Rethinking Plastics”, implemented by GIZ and Agence Française de Développement (AFD), the toolbox was translated into Vietnamese and Chinese, and will soon be available in Bahasa and Thai. The toolbox serves not only as a guide for practitioners but also contributes to the international debate on EPR. The Ellen MacArthur Foundation, for example, cited the toolbox in its position paper on EPR. Moreover, the toolbox was presented at two side events at the World Circular Economy Forum 2021.

Apart from networking and knowledge exchange, PREVENT Waste Alliance focuses on piloting solutions. In 2020, PREVENT called for innovative and scalable solutions that contribute to a circular economy in low- and middle-income countries. Eight pilot projects were selected and are currently being implemented by PREVENT members and partner organizations in 15 countries worldwide. In Indonesia, for example, a project that links all players of the plastic recycling value chain – from households to plastic producers globally

– through digital technology is being implemented. A block-chain app and a global online marketplace is being piloted. In June 2022, the secretariat will organize a ‘Pilot Project Festival’ for all the participating eight projects to share lessons learned, insights and scaling opportunities.

To address the top of the waste hierarchy, PREVENT will launch three new innovation programs aimed at supporting the development and scaling of solutions for waste prevention. The innovation programs focus on e-waste refurbishment, prevention of single-use plastics in the food sector and behaviour-centred design strategies.

In conclusion, the way that PREVENT Waste Alliance works can be summarized in four statements:

1. We share our knowledge around the topic of circular economy.
2. We connect different perspectives and act in international cross-sectoral partnerships.
3. We incubate and pilot scalable circular economy solutions worldwide.
4. We contribute to shaping international guidelines and standards for circular economy solutions.

For more information on PREVENT, its products and projects, visit the website of PREVENT Waste Alliance: <https://prevent-waste.net/en/>



frameworks

Image Source: September 2021, IUCN, Marseille, the Post 2020 Global Biodiversity Framework (GBF) pavilion. Image by Nicolas J.A. Buchoud, all rights reserved ©.

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"The Circular Business Models are providing a service to our society without being paid adequately for it, while linear business models are causing higher societal costs but are easily getting away with it."

–Siddharth PRAKASH and Clara LÖW

" THE FUTURE BELONGS TO
THOSE WHO CAN IMAGINE IT,
DESIGN IT AND EXECUTE IT. "

HH SHEIKH MOHAMMED BIN RASHID AL MAKTOUM

Image Source: A construction site near the Emirates Tower in Dubai, UAE, in Jan. 2020. In Jan. 2021, the UAE Cabinet approved the Emirates 'Circular Economy Policy' and the creation of the UAE Circular Economy Council, aiming at 'generating considerable economic proceeds for the country.' Image by Nicolas J.A. Buchoud, all rights reserved ©.



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Will circular business models save the world?

Circular Economy is one of the main building blocks of the European Green Deal. The EU is implementing a transformative industrial strategy for a clean and circular economy, paving on the way towards carbon neutrality by 2050. Among other things, the Circular Economy Action Plan,¹ which was published by the European Commission in March 2020, is perceived as a major milestone in contributing towards a radical shift in the production and consumption patterns in the EU. We note that scientific, political and economically oriented views shape and classify the circular economy very

differently.² In 2020, the European Commission defined Circular Economy as follows: In a circular economy, the value of products and materials is maintained for as long as possible. Waste and resource use are minimized, and when a product reaches the end of its life, it is used again to create further value.

The recent Circularity Gap Report 2021³ estimates that doubling global circularity will reduce global greenhouse gas emissions by 39 percent by 2032, which leaves us well below a 2 degrees increase in temperature. This way, a Circular Economy will support greenhouse gas mitigation targets, which currently are not ambitious enough to help achieve the goals of the Paris Agreement.

We would like to raise a couple of questions which are framed in two hypotheses. The hypotheses can be looked at as an inventory of aspects that the Oeko-Institut is working on.

Hypothesis 1: There is no invisible hand in circular markets.

One of the notions within the Circular Economy discourse is the high potential attributed to Circular Business Models (CBM). Packaging-free supermarkets, repair cafés, second-hand shops, leasing and sharing models, marketing of durable, refurbished or remanufactured goods and upcycling initiatives – the list is long and growing. Environment and society will benefit from CBMs' activities as long as they

effectively lead to an absolute reduction of pressure on the environment. Therefore, a typical narrative has been built on the assumption that a direct interaction between companies offering CBMs and consumers actively demanding them will transform production and consumption patterns.

Is this really the case? According to an OECD-study,⁴ in most sectors, the market penetration of circular business models remains limited and is usually no more than 5 to 10 percent in economic terms. In other words, 90 to 95 percent of business models are still based on the linear take-make-waste approach. Our experience has shown that the prevailing economic rationale for both businesses and consumers, which is built on the principle of saving or, in other words, minimizing individual costs, will hinder sustainable transformation processes at the global level.

For instance, the German Packaging Act stipulates that distributors of non-recyclable packaging should pay a higher license fee to producer responsibility organizations (PRO) than those that use recyclable packaging. In practice, however, this rule is hardly applied because the competing PROs fear losing customers if they charge higher license fees for non-recyclable packaging. This has limited the impact of the Extended Producer Responsibility (EPR) mechanism.

There is no doubt that consumers and businesses are an integral part of any transformation process. We, however, perceive the main responsibility on the side of policy-making

for setting the conditions in a way that CBMs can flourish in the mass market. Thus, we think that the potential for CBMs to succeed, under current framework conditions, is limited and, without reinforcements, they will not lead a large-scale transformation of the mass market.

Hypothesis 2: Call a spade a spade: current economic conditions and political priorities will prolong Circular Business Models' exclusivity.

Looking into statistical data, we can see that a significant reduction in the use of raw materials for business and consumption has not yet taken place and waste volumes continue to be at very high levels. Even though some reports suggest a decreasing material or waste intensity in a few sectors and countries (i.e. decreasing amount of material consumed or waste generated against per unit increase in the Gross Domestic Product), the much-propagated absolute decoupling of resource use and economic growth has turned out to be wishful thinking at a global scale.

According to an OECD study,⁵ global materials use is projected to more than double from 79 giga tons (Gt) in 2011 to 167 Gt in 2060, assuming a stable material relative decoupling. Knowing that a large share of greenhouse gas emissions is directly or indirectly linked to materials management and use, increasing material use will likely jeopardize the global climate goals of the Paris Agreement. Thus, under current

economic and political framework conditions, we question the ability of CBMs to achieve high market penetration and contribute towards an absolute reduction of material use and greenhouse gas emissions.

Here are some practical examples. We have shown in our studies⁶ for the German Federal Environment Agency (UBA), that the lifespan and use time of electrical and electronic appliances have been on the decrease. Repair and refurbishment businesses are just not economically competitive enough when compared to very lowly priced and increasingly cheaper new products. Although the EU Ecodesign Directive has passed a number of repairability-related requirements for some product groups, they might not be sufficient to substantially increase the use times of products, especially if new products continue to be offered at throwaway prices.

We recommend that minimum durability and quality standards for the products are required, even if they may lead to an increase in the initial costs of products.; these would help save overall societal costs. In a recent study for the Federation of German Consumer Organisations (vzbv),⁷ we projected annual savings of about 3.7 billion Euro and a reduction of almost 4 million tons of greenhouse gas emissions in Germany if the lifetime of smartphones, washing machines, televisions and notebooks were extended according to consumers' expectations.

What do we conclude from this hypothesis?

In order to bring the Circular Business Models to the mass market, we need to reverse the incentive patterns. This includes ambitious minimum durability standards for products, high taxation and disincentives for resource-hungry products and services as well as substantial positive incentives, subsidies and tax rebates for CBMs. The existing political priorities seem to be operating otherwise, as the above exemplify. At the end of the day, the Circular Business Models are providing a service to our society without adequate recognition. On the other hand, linear business models are incurring higher societal costs, by way of externalizing of these costs, and yet are able to easily get away with it.

1. https://ec.europa.eu/commission/presscorner/detail/en/ip_20_420
2. Kirchherr et al. 2017 Resources, Conservation and Recycling, p. 221-232
3. <https://www.circularity-gap.world/2021>
4. <https://www.oecd-ilibrary.org/docserver/g2g9dd62-en.pdf?expires=1615968817&id=id&accname=ocid56027324&checksum=C39C0C126A76489102F3033F472DA8E7>
5. <https://www.oecd.org/environment/waste/highlights-global-material-resources-outlook-to-2060.pdf>
6. <https://www.umweltbundesamt.de/publikationen/influence-of-the-service-life-of-products-in-terms>
7. <https://www.vzbv.de/pressemitteilung/studie-zu-langlebigkeit-von-produkten-qualitaet-zahlt-sich-aus>

“To tackle the plastic crisis, the Bio-Circular-Green Economy (BCG) model as brought up by the Thailand Environment Institute comes at the right time.”

–Kai HOFMANN and Christoffer BRICK



Image Source: Perishable goods placed on a polystyrene foam tray and wrapped in plastic foil. Wikimedia Commons. April 2012. Food products in Hong Kong. Photo Credit: Simmremmai. https://commons.wikimedia.org/wiki/File:HK_Westwood_Welcome_Shop_粟米_sweet_corn_玉米_Cling_film_保鮮紙_plastic_wrap_April-2012.jpg



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Upstream policies towards a circular plastics economy

Between 1950 and 2015, the world created 6.3 billion tons of plastic waste. It is estimated that 9% was recycled and 12% incinerated, leaving almost 80% to accumulate in landfills or in nature, often in the oceans. Today, approximately 8-12 million tons of plastic waste end up in the oceans every year, making plastic the top pollutant of marine systems.

Over half of land-based plastic waste leakage comes from just 5 countries: China, Indonesia, the Philippines, Vietnam and Thailand. Marine plastic pollution is detrimental to

marine ecosystems, harming marine wildlife and creates negative implications for ecosystem health. Plastic pollution also poses risks for human health. The presence of plastic in seafood, including fish and shellfish, and their subsequent consumption by the public has led to concerns about chemical bio-accumulation in the food chain. Research has found microplastic contamination in tap water and bottled water across several regions, including Europe, the United States and Asia.¹ When looking at plastics as part of waste streams, the dominant solutions and approaches in the last decades have been about improving waste collection, sorting and recycling, where 'recycling' mostly meant open loop down-cycling.² When plastics are considered part of a real circular economy, the post-consumption (i.e. waste component becomes far less prominent; but "maintaining the value of products, materials, and resources (...) in the economy for as long as possible"³) becomes the new focus. To 'maintain the value', in the case of plastic packaging, means to move from single-use to reusable packaging due to its lower environmental footprint.⁴

Fostering such a transformation requires a multitude of policies, from standardization to economic incentives. For example, in the EU the new Single Use Plastic Directive bans certain single-use plastic (SUP) products, such as straws, cutlery, cups and the likes. Importantly, it also explicitly covers products made from bio-based and biodegradable plastics as they are often promoted as an alternative. In addition to single-use plastic products, packaging can also

be affected by the ban. Whether food packaging is subject to the ban depends if it could be carelessly discarded due to its volume or size.¹

Another important approach to prevent plastic in the environment is through national legislation targeting Extended Producer Responsibility (EPR), such as the amended German Packaging Act which puts forward a deposit obligation on disposable plastic beverage bottles and beverage cans. From 2024, it would also include milk and dairy products containers.

Further, the amended act requires a minimum recycled content, also known as recyclate, of 25% for disposable beverage bottles made of polyethylene terephthalate (PET), and this increase to 30% in 2030. Consumer communication plays a significant role in raising awareness and sharing best practices about disposing plastic items that cannot be avoided, such as wet wipes or sanitary pads.

Lastly, from 2023 onwards, catering establishments (i.e. restaurants or food delivery services) must offer reusable packaging as an alternative to disposable containers for food and drinks that are handed out for take-away.

Upstream measures in Southeast Asia

The EU and German examples cannot be transferred directly and applied to the Southeast Asian context. Infrastructure, markets, systems and legislations differ substantially. For example, while Thailand has banned SUP applications it is only now thinking about introducing an EPR system that could easily take another 5 years to be implemented.

However, many countries are now moving from downstream waste management and sorting to upstream policy measures. “These aim at reducing the waste volume so they address different material cycle steps and levels in the waste hierarchy,” explains Clara Loew, a researcher at the German-based Öko-Institut, a think tank for applied ecology.

The project Collaborative Actions for Single-Use Plastic Prevention in South-East Asia (CAP SEA) supports Thailand, Malaysia and Indonesia to design and implement such upstream measures to prevent SUPs from entering the market in the first place. CAP SEA is financed by the German Ministry of Environment and Nuclear Safety (BMU) and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ):

1. Prevention by re-use: Packaging waste can be significantly reduced through reusable beverage and food containers and also refilling solutions for household products like shampoos and detergents. For reuse systems to flourish, they need a

functioning market. On the supply side, we need companies offering solutions and alternatives to single-use plastics. To this end, CAP SEA, in partnership with ENVIU, has set up three start-ups in Malaysia and Indonesia that will provide reuse solutions. For example, ENVIU has developed food containers and established (reverse) logistics to provide food delivery in reusable packaging. On the demand side, GIZ and ENVIU cooperate with existing food delivery platforms and municipalities to scale up outreach to the customer base. The Shah Alam Municipality in Malaysia, the Phuket Municipality in Thailand and possibly the Jakarta metropolitan area in Indonesia support such activities. CAP SEA supports these municipalities to develop SUP action plans and policies, such as the Green Public Procurement, which outlines ways to increase reuse and prevent single-use plastics. In Phuket, CAP SEA has supported the governor and the municipality to create a business community made up of hotel associations, restaurants and malls to promote the uptake of multi-use packaging and SUP prevention. This is aimed at rebranding the famous tourist island as sustainable.

2. Design for recycling and recycled content: Another approach on the policy-side is to ensure that the plastic that is used for a product (e.g. a plastic drinking bottle) is easy to recycle. As a general rule of thumb, products consisting of one polymer are easier to recycle than compound materials (e.g. sachets). This, in combination with recycled content requirements similar to those in Germany, contributes to reducing the use of virgin plastic, thereby closing the loop

further. Within the CAP SEA project, government agencies, standardization bodies, industry representatives and other relevant stakeholders work to develop Design for Recycling Standards in the three countries. While CAP SEA hopes to introduce a minimum requirement for recycling content and design-for-recycling, we also aim to introduce an ambitious standard, albeit voluntary, which could be certified by the existing type 1 eco-label system in the region.

To tackle the plastic crisis and move towards a more circular economy, a wide range of innovations and changes are necessary. “The CAP SEA project comes at a good time, where the Thai government is giving importance to this topic, especially with the Bio-Circular-Green Economy (BCG) model,” says Dr. Wijarn Simachaya, President of the Thailand Environment Institute and Chairperson of the Circular Economy Sub-committee of the National BCG Committee.

1. Merlin N Isaac, et al: Effect of microplastics in water and aquatic systems (nih.gov)
2. Ellen Mc Arthur Foundation: Project Mainstream analysis – for details please refer to Appendix A in World Economic Forum, Ellen MacArthur Foundation and McKinsey & Company, The New Plastics Economy — Rethinking the future of plastics, (2016, <http://www.ellenmacarthurfoundation.org/publications>).
3. EU Commission Definition of „Circular Economy“, source
4. A lower environmental footprint depends on the number of reuse cycles. A vast majority of LCA studies shows that reuse is better for the environment than
i. (EU Directive, Art. 122019/904)



“A major concern is that circular economy policies can often be in conflict with each other. For instance, recycled materials will comply with existing standards for eco-labeling.”

–Venkatachalam ANBUMOZHI

Image Source: Wikimedia Commons. August 22, 2019. Near Wuwu village in Shenbei District, Shenyang, Liaoning, China. The African swine fever outbreak in 2018 was originated here. People are reselling recyclables and plastic bottles for money. Photo Credit: Enming Yan. https://commons.wikimedia.org/wiki/File:Wuwu_13.jpg



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Financing circular economy futures in the Global South

The 11th ASEAN and East Asia Summit (EAS) Economic Ministers' Meeting reiterated that marine debris pollution, especially plastic litter and microplastics, is a global concern and that global cooperation in this area is needed. This follows the previous commitments made by the G20 Leaders on promoting sustainable consumption and production to reduce the marine plastic debris. This begs the question why are leaders suddenly concerned about the use of plastics and no longer give sole priority to its multiple economic benefits? The material is cheap, lightweight and easy to make. These qualities have led to a boom in the production of plastic, a petroleum by-product, for rapid uptake by industrial and domestic consumers. Since the 1970s, the production of plastic has outpaced that of almost every other material in developing countries. China is the world's biggest contributor of plastic waste, responsible for 8.9 million metric tons annually, followed by five Southeast Asian countries, namely Indonesia, the

Philippines, Vietnam, Thailand and Malaysia. Collectively, the five ASEAN countries generate 8.9 million metric tons of mismanaged plastic waste every year. Indonesia, for instance, contributes 3.2 metric million tons a year, with half ending up in the seas.

The capacity of developing countries in the Global South to cope with plastic waste is already overwhelmed. Only nine percent of the nine billion metrics tons of plastic produced in developing countries has been recycled. If the current consumption and waste management practices continue, then there will be around 12 billion tons of plastic waste in landfills and oceans by 2050. If the growth in production continues without change, the plastic industry may account for 20 percent of the world's total oil consumption with resultant adverse effects on climate change.

Earlier this year, realizing the severity and urgency of the problem, countries like Thailand, Indonesia and Malaysia started implementing a roadmap aimed at introducing a blanket ban of several types of plastics by 2025. The roadmaps coincide with recent efforts by private retailers who are implementing their own recycling measures. It resulted in innovations like the use of plant-based and biodegradable polymers, improved technologies for recycling plastics and reducing plastics toxicity, thus laying the foundation for a circular economy. Positive trends are building on a global move towards circular economies. However, more work is needed to develop coherent and

robust policy frameworks and drive financial innovation if circular economy principles are to deliver the maximum economic, environmental and social benefits.

In a circular economy for plastics, optimum use of scarce resources is done through reuse, repair and recycling, compared to the wasteful extractive linear system of manufacturing and consumption, in which products are disposed of quickly after use. There are three building blocks of circular economy, namely (1) materials and product design, (2) new business models and (3) enabling policy conditions. However, the transition to a circular economy for developing countries in the Global South will be very slow due to many existing barriers, unless there are targeted policy interventions. In a recent Economic Research Institute of ASEAN and East Asia (ERIA) study, it was concluded that business barriers for increasing the resource efficiency through a circular economy approach are institutional, organizational, behavioural and market based. Furthermore, they are all combined into a web of constraints. A wider range of policy measures is, therefore, needed at various levels, including changes to public spending, regulatory framework and consumer engagement.

Circular economy for plastics cannot be considered in isolation – as just another environmental, economic or trade policy. It is all that and more – a truly cross-sectoral effort, built around people's needs, and should be

addressed together with companies and local governments. Existing policies related to waste, resource efficiency, extended producer responsibility, eco-design and green labelling are of high significance. The design and reusable content of plastic products could trigger changes in the production process that can extend benefits into the reusability and remanufacturing of plastics. However, a major concern is that these policies can often be in conflict with each other. For instance, companies that show interest in the use of recycled plastic materials in their products may still choose to go with virgin materials because they are uncertain if recycled materials comply with existing requirements for eco-labelling. In addition, waste-related rules that aim to control movement of plastic wastes in order to avoid illegal exports can have the unintended consequences of raising the transport cost for products that are at their end of lifecycle – plastics that could have been intended for reuse and remanufacturing.

When it comes to new policies, governments of Global South countries have a variety of untested tools, ranging from eco-innovation regulations, durability labelling, public procurement, market-based economic instruments and the development of quality standards for secondary raw materials. Therefore, a new approach in policy-making is required, one that takes into consideration potential adverse effects of different fiscal policy measures and mitigates any negative impacts. This new approach could be called 'policy mixing for circular economy'. Its objective

should be to reset financial systems in line with long-term risks of resource depletion and opportunities for innovation. It is necessary that any potential policy mix must be coherent, consistent and predictable.

Despite high-level enthusiasm, progress in understanding the significance of circular economy and investor appetite for circular economy projects are limited. For example, waste-to-energy capacity additions have stagnated in some mature markets in Southeast Asia. In part, this stagnation is due to policy reversals or uncertainty, which undermine the stable revenue models that support circular economy investments. Public budgets can continue to play a central role in circular economy projects by guaranteeing revenues, especially in new markets and for newer technologies. Revenue security plays a decisive role in making circular technologies more attractive than linear alternatives and provide investors the confidence to deploy capital over longer periods.

Development finance institutions (DFIs) are critical in paving the way to open new circular economy markets and securing private investment, for the following reasons: establishing a track record for investment, facilitating the regulatory change needed for commercial investment and supporting project pipeline development through project preparation facilities. In sectors such as construction, electronics and agriculture, DFIs can unlock more capital by partnering local banks and asset managers to

co-finance projects and by developing fixed income and structured financial products for other institutional investors. In instances where commercial opportunities do not exist, development banks can leverage private investment through risk-sharing tools, such as guarantees and political risk insurance, and their ability to source and coordinate catalytic finance from donors and philanthropists.

In contrast to the growing cost-competitiveness of material recycling and the adoption of circular business models, fewer viable alternatives exist in many sectors with a significant share of plastic use. These sectors include industry, transport, forestry and land use. In some cases, circular economy solutions for these sectors are technically viable but not yet economical due to high capital costs and lack of incentives or revenue models. Many assets in the linear economy are long-lived, ranging from around 15 years for cars and buses, up to 50 years for fossil fuel power plants and 100 years or more for buildings. As a result, past financing decisions have locked in linear production models. Consequently, assets in such resource models need to be retired early and this requires a transformation of the utilities and cities that have historically relied on the very same. Empowering city governments to implement circular economy would mean developing capacity to more effectively finance the appropriate circular infrastructure as well as aligning national and local fiscal regulations with investments.

Without viable technological and financial solutions, it is impossible to completely remove all plastics from the Global South within a short time frame. Strengthening circular economy thinking in the plastics value chains as part of a broader, long-term financing strategy towards more sustainable production and consumption will help reduce plastic pollution significantly. The time is ripe for action but academics, regulatory agencies and businesses from multiple points in the plastics value chain must work together with finance institutions to find innovative and workable financial solutions to successfully enable a circular economy transition.

Anbumozhi V, K Ramanathan and H Wyes (2020). Assessing the Readiness of Industry 4.0 and Circular Economy, Economic Research Institute for ASEAN and East Asia, Jakarta
<https://www.eria.org/publications/assessing-the-readiness-of-industry-40-and-the-circular-economy/>

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<https://www.eria.org/publications/industry-40-empowering-asean-for-the-circular-economy/>



“Every year 4.8 million tones of waste in Indonesia are considered mismanaged, in which 48% of it is openly burned, while the rest are dumped on land, or leaking into waterways and the ocean.”

–Kirana AGUSTINA

Image Source: March 11, 2019. Acara Peluncuran “National Plastic Action Partnership” launch of the process. Photo Credit: <https://maritim.go.id/acara-peluncuran-national-plastic-action-partnership/>



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Indonesia's national plastic action partnership

To solve a problem, one should be willing to dive deep into the issue and look at the context through multiple lenses. As the largest archipelagic nation, Indonesia is geographically located in a strategic position between the Pacific and the Indian Ocean, and in the heart of the coral triangle region;¹ the global hotspot of marine biodiversity. Indonesia has always been blessed with all manners of marine natural resources, from 76% of the world's coral species to 37% of the world's coral reef fish species; from the world's most extensive mangroves area and species to seagrass. The list goes on. This complex ecosystem is the source of food security, medicines, marine tourism industry and more. If not managed well, Indonesia may not be able to protect its ocean's health. This cannot be forsaken, if not for its citizens, then for the whole world since we are all connected to the Ocean and its resources.

Scientific reports² stated that Indonesia might have become the world's second marine debris polluter –and this is a wake-up call for the country. During the G20 Summit in 2017, the President of Indonesia, Joko Widodo, officially stated that Indonesia had been targeting a reduction of marine plastic debris by as much as 70% by 2025. Since then, the momentum has grown stronger, political commitment has increased and the relevant stakeholders are willing to come on board in achieving this common goal. The focus has never been sharper. Many stakeholders have started to change their businesses practices by avoiding a linear industrial model and developing circular business models. The linear model is seen as the main current and future threat to the quality of life on Earth, for humans, plants as well as animals.

According to a report by the National Plastic Action Partnership (NPAP),³ it is estimated that every year 4.8 million tonnes of waste in Indonesia is considered mismanaged, of which 48% is openly burned, while the rest are dumped on land or leaked into waterways and the ocean. Indonesia now strives to lead the world by example. It wants to demonstrate how a country can translate its political commitment into actions, including becoming the first national partner of the Global Plastic Action Partnership initiated by the World Economic Forum. Since its formal launch in 2019, NPAP has been convening Indonesia's leading stakeholders and influencers, who wield the necessary influence to drive public-private actions to shape a new plastics economy at the national and local levels.

Putting the NPAP Systems-Change Scenario into Action

However, a one-size-fits-all solution does not exist and neither are there quick-fixes to this issue, especially given the unique geographic archetypes, social aspects and economic contexts of Indonesia. On 22 April 2020, Indonesia's NPAP launched the Multi-Stakeholder Action Plan and recommended that a System Change Scenario (SCS) should be applied, replacing the business-as-usual scenario. The SCS highlighted five key transition actions toward the New Plastic Economy, which would be able to close the loop and potentially contribute significantly to sustainable development. The five key intervention actions include, (1) reduce or substitute avoidable plastic usage to prevent the consumption of more than one million tons of plastics per year by switching to reuse and new delivery models; (2) redesign plastic products and packaging with reuse or recycling context; (3) double the plastic waste collection to more than 80% by 2025 by boosting state-funded and informal or private-sector collection systems; (4) double the current recycling capacity by 2025; and (5) build or expand controlled waste disposal facilities to safely manage non-recyclable plastic waste.

The transition from the linear to the circular model may face barriers in policy, technological innovation, finance and systemic behavior change. All these should be anticipated so that more ambitious and collaborative responses can be taken in turn. The NPAP encouraged more fresh innovative solutions on material packaging and showed how effective

policies, together with industry initiatives, can accelerate the transition of all packaging within Indonesia to become 100% recyclable, reusable or compostable, while increasing the public's use of recycled plastics.

Strong-willed and Committed towards the National Target: NPAP Platform to Translate Political and Corporate Commitment into Concrete Action

The government should be in the driver's seat in achieving this ambitious goal, while other committed members should follow by affirming the resolution to work together in tackling the challenges. To implement the NPAP Action Plan, NPAP has built a broad community of more than 70 members. There are five task forces (i.e. Financing, Policy, Innovation, Behavior Change and Metrics) made up of key leaders from the government, private sector and civil society. Each task force is responsible for specific parts of the mission, notably to unlock financing, boost innovation, harmonize metrics, change behavior and provide viable policy options. Task forces meet regularly to exchange best practices and practical knowledge, coordinate their respective actions towards reducing plastic pollution and provide resources to drive impact in Indonesia.

The role of the NPAP Secretariat is essential in supporting and facilitating effective cross-task force collaboration and coordination. These interactions sets the NPAP up for suc-

cess. Implementing such structures require a lot of hard work behind the scenes. Those include building trusting relationships with members, understanding their needs and interests, regularly sharing information, and making long-lasting connections among members. At the individual level, everyone has different areas of influence, as consumers, citizens, leaders and economic agents, to contribute positively and be part of the solution instead of the pollution.

Successful collaboration requires regular, sustained communication, information sharing, and partnership

The ocean plastic pollution problem is a result of human activities; ocean plastic pollution affects communities, businesses, and ecosystems in both high-income, middle and low-income geographies. Political, economic, cultural, and behavioral dimensions, among others, bring different perspectives to perceived causes and solutions to tackle the issue. Therefore, we need to ensure convergence and collaboration between government and industry leaders to overcome paralysis caused by differing visions. After all, different actors act within their own powers to effect change.

Leaders should aspire to a shared near-zero leakage vision and commit to ambitious, concrete steps towards achieving this critical objective. Leaders and every individual should

commit to this long-term vision to protect the environment for their children, grandchildren, and future generations; simply, it would mean fulfilling their responsibility as a good citizen.

The spirit of coordinated multi-stakeholder effort and the commitment from the government, industry and civil society should be strengthened to unlock the opportunity and capital to implement the desired changes successfully. We can go far by moving together with a sense of urgency and unfaltering commitment.

1. https://en.wikipedia.org/wiki/Coral_Triangle
2. <https://science.sciencemag.org/content/347/6223/768>
3. https://globalplasticaction.org/wp-content/uploads/NPAP-Indonesia-Multistakeholder-Action-Plan_April-2020.pdf



“Although largely unknown to the public, HELCOM is an intergovernmental organization, comprising of the countries from around the Baltic Sea. Regional cooperation is the cornerstone to effective protection and sustainable use of the ocean.”

—Lilian Busse

Image Source: On the ferry boat between Smiltynė and Klaipėda in Lithuania, from the Curonian Isthmus. Image by Nicolas J.A. Buchoud, all rights reserved ©.



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Germany

On plastics in the environment

Gunnar Hartmann (GH): One of your main research areas as a biologist, working at the German Environment Agency, is plastics in the environment. How do plastics end up in the oceans?

Lilian Busse (LB): Plastics can get through different pathways into the environment, and it usually ends up in the oceans. One of the main pathways is the insufficient waste and wastewater management practices but there are many other sources like tire abrasion, films from agriculture or plastic particles from cosmetics or cleaning materials. The plastics in rivers, streams and lakes reach the ocean. In addition, more and more plastic material enters the environment through littering. At sea, shipping, fisheries, aquaculture and offshore installations are sources of litter. Once plastic is in the environment, they can cause great damage to both ecosystems and living organisms.

Marine litter is a global problem. Therefore, it is addressed in the Sustainable Development Goals (SDGs) 14 of the United Nations (UN): conserve and sustainable use of the oceans, seas and marine resources for sustainable development. In 2017, the UN held a High-Level Conference to support the implementation of SDG 14. In that conference, all matters regarding the oceans was discussed and marine litter was one of the top issues. I was able to attend the conference and led a panel discussion with different stakeholders on how to reduce marine litter. This is key because we can only address the issue of marine litter when we all work together: industry, regulatory agencies, science organizations, decisions-makers, NGOs, and all of us – the consumers. That is also the reason why marine litter has intersections with other SDGs (e.g. SDG 12: Ensure sustainable consumption and production patterns).

There was a follow up SDG Conference on oceans planned for 2021 but it was postponed due to the pandemic. When we hold this conference, either in 2022 or 2023, we will see how far we have come to reduce marine litter.

GH: Timothy Morton, a philosopher, refers to such a phenomenon of all the plastic in the sea as hyperobjects. That is, plastics are produced every year and chunks break down into particles that enter other objects, including animals. Although plastics are everywhere, one can never point to all the plastics in the world and say, “There it is.” What should be done about it?

LB: Yes! Agreed! There are two sides to it. First, the oceans are interconnected and, therefore, we cannot pinpoint where the plastics debris came from specifically. Secondly, macroplastics will turn into microplastics, which are almost invisible to human eye but are found everywhere, including the Arctic, Antarctic, and in the Deep Sea.

But scientists and agencies are working on methods on how to measure plastics (both macro- and microplastics) in the environment and in organisms. We are in the process of developing and improving methods in how to measure plastics in the environment (e.g. on beaches) and how to measure these particles in the laboratories. One key element is that we need to harmonize the methods so that we can compare the measurements. Additionally, more research is needed on how plastics affect marine organisms as well as humans, if they end up there.

However, in addition to developing these methods, it is crucial to continue to raise awareness for the topic on plastics in the environment and to communicate good approaches actively. Littering, one of the sources of marine litter, can and needs to be reduced. Intelligent product design also helps to reduce plastics in the environment.

There is no doubt that as a society we will use plastics in the future. But we need to change how we look at plastics. We need to give plastics a value and use plastic products more carefully and sustainably. As your current issue of

INTERSECTING explores, plastics need to be part of a circular economy. We have to be aware though, that once pollutants are in the circle, they are then recirculated – that's not good. The EU strategy aims to transform the way plastic products are designed, produced, used and recycled in the EU. Although we still have some gaps in knowledge, measures for reducing the use of plastics and avoiding the entry of plastic into the ocean can and must be taken now. These measures cannot only be taken by countries alone. They must be addressed on a regional and transnational level. Plastics do not know any borders! One regional organization that has developed measures for reducing marine litter is HELCOM, the Baltic Marine Environment Protection Commission, also known as the Helsinki Commission.

GH: So, you are currently the Chair of HELCOM. What does HELCOM initiate?

LB: Although largely unknown to the public, HELCOM is an intergovernmental organization, comprising of the countries from around the Baltic Sea. The organization has a long and successful history of cooperating to maintain the health of the oceans. The Helsinki Convention was originally signed in 1974 by all the coastal countries along the Baltic Sea. It seeks to protect the Baltic Sea from all sources of pollution from land, air and sea as well as to preserve biological diversity and promote sustainable use of marine resources.

GH: And what, in particular, is HELCOM doing to reduce plastics in the Baltic Sea?

LB: HELCOM has recently adopted the updated The Baltic Sea Action plan, or BSAP. The BSAP is HELCOM's strategic program for a healthy Baltic Sea. It contains about 200 actions addressing the various pressures, including marine litter, facing the Baltic Sea and its biodiversity. HELCOM has specific goals for the next decade. It will reduce marine litter on the beaches by at least 30% by 2025 and 50% by 2030. The measures on how to achieve these and other goals are addressed in HELCOM's Marine Litter Action Plan.

GH: So, regional governance is the key but what are the means?

LB: HELCOM is a symbol of successful regional cooperation and governance of marine protection. This approach is deeply rooted in science and in dialogue with stakeholders. Cooperating to solve the problems facing the ocean requires action across borders. Lines drawn on maps, separating one country from another, mean nothing when faced with global problems. Regional cooperation is the cornerstone to effective protection and sustainable use of the ocean.

All contracting parties of HELCOM are working together to help reduce marine litter in the Baltic Sea. After all, there is only one Baltic Sea. Besides looking at the Baltic Sea itself, we also need to work together with other stakeholders, like different industries, in order to get to the root of the plastics issue. By intersecting into other areas, such as the circular economy of plastics, we would have to begin far away from the Baltic Sea itself.

“Estimates show that by 2050, three entire planets’ worth of natural resources would be needed to sustain our current lifestyles. The EU aims to end the current ‘take-make-dispose’ model with its upcoming Sustainable Products Initiative (SPI), an initiative of the EU Circular Economy Action Plan (2022).”

–Ioana POPESCU



Image Source: An SDGs mural near the Leopold Sedar-Senghor bridge, along the Anatole France embankments in Paris, featuring 4 years of the Agenda 2030 in October 2019. Image by Nicolas J.A. Buchoud, all rights reserved ©.



Ioana POPESCU
Environmental Coalition on
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Sustainable products initiative: the EU cornerstone for sustainable products?

Shifting to sustainable production and consumption patterns is a key environmental challenge for the decades ahead. The figures speak for themselves. In 2020, despite the COVID-19 pandemic putting the global economy on pause for months on end, Earth Overshoot Day – the day on which humanity’s resource consumption for the year exceeds Earth’s capacity to regenerate – was reached on 22 August, almost a month faster than in the previous few years.¹ Estimates show that by 2050, three entire planets’ worth of natural resources would be needed to sustain our current lifestyles.² The European Union aims to end the current ‘take-make-dispose’ model with its upcoming Sustainable Products Initiative (SPI), a flagship initiative of the EU Circular Economy Action Plan planned for adoption in early 2022.³

The EU has been working on product policy for more than 20 years, developing tools and sector-specific legislation to drive innovation towards products with lower environmental impacts. Based on a review of the highly successful Ecodesign Directive, the SPI will seek to raise the bar on products to make them sustainable by design and gradually remove the worst performers from the market. The EU Commissioner for Environment, Virginijus Sinkevičius, wants the SPI to be an “ambitious tool that makes a difference”, kicking off a race to the top for products on the European market, while having a positive knock-on effect globally.

Defining ‘sustainable’

Sustainable products are those that enable us to dramatically cut our material footprint and promote well-being within the Earth’s carrying capacity. They should act as enablers for sustainable consumption patterns and allow for a regenerative economy. A comprehensive approach is essential, in particular addressing sourcing, design, production, multiple use and reuse cycles as well as end-of-life recycling.

‘Sustainability’ means that short-lived, single-use, unfixable and toxic products become a thing of the past. Therefore, recyclability labeling on products should in no way be seen as demonstrating a company’s commitment to sustainability but merely an indication of how to best dispose of a product. In fact, guaranteeing recyclability is the very least companies should be doing.

Making investments count

Letting go of the 'take-make-dispose' model requires considerable investments in reverse logistics (i.e. operations linked to reuse of products and materials) and related infrastructure as well as new alternative and circular business models based on sharing, product as a service or leasing systems. In short, truly sustainable alternative business models are needed. Finally, when it comes to protecting natural resources, sufficiency remains the most valuable strategy irrespective of how circular a business may be. We should not demand new products without a clearly defined need.

Consumption is an integral part of the debate. No matter how sustainable the products are, they will still impact our natural capital if they are produced in ever-growing quantities. This is why making sustainable products the norm cannot be dissociated from having an appropriate monitoring system in place to ensure our material and consumption footprint is actually reduced. As a matter of fact, the EU is set to update its Circular Economy Monitoring Framework and develop further indicators on resource use, including consumption and material footprints, in light of the introduction of the SPI. Such indicators can be useful to show the environmental benefits of any new measures enacted on production, potentially laying the ground for further and more upstream regulatory action to tackle impacts of unsustainable production and consumption.

Towards a comprehensive policy framework

A well-functioning policy framework for sustainable products should have the circular economy hierarchy at its core. It needs to enable measures relating to sufficiency and prevention; for example, banning the destruction of unsold goods or setting material footprint targets.^{4,5} Incentives need to be created to encourage businesses to adopt circular models and more localized production.

Greenwashing and unsustainable commercial practices need to be addressed. Vulnerable populations, including workers, need to be protected from exposure to hazardous chemicals. The EU's SPI will be a key milestone to sustainable resource use but is not the endgame. Dedicated sector-specific legislation, including complementary social considerations on product requirements, will be instrumental. The SPI could be an excellent kick-starter for a more responsible approach to resource use. It should be closely followed by an entire range of policy measures to ensure well-being within planetary boundaries. The EU is about to lay the first stone to make sustainable products the norm but there is a long way to go.

1. <https://www.overshootday.org/newsroom/past-earth-overshoot-days/>
2. <https://www.un.org/sustainabledevelopment/sustainable-consumption-production/>
3. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN>
4. <https://eeb.org/library/prohibiting-the-destruction-of-unsold-goods/>
5. https://www.asktheeu.org/de/request/7726/response/26062/attach/71/NGOs%20CEAP%20Annex.pdf?cookie_passthrough=1



“Policy makers need to understand how the transition process will affect individuals, sectors and regions, and act to achieve an equitable transition process.”

–Julie RIJPENS and James HERMANSON

Image Source: Wikimedia Commons. May 25, 2017. Fast Food tray with a greasy burger, crinkle cut fries, and soda. Photo Credit: Christopher Flowers.
[https://commons.wikimedia.org/wiki/File:Fast_Food_for_Lunch_\(Unsplash\).jpg](https://commons.wikimedia.org/wiki/File:Fast_Food_for_Lunch_(Unsplash).jpg)



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Social economy facilitates a circular transition

The ongoing COVID-19 recovery process presents an opportunity to promote a green and inclusive transition, including through the circular economy. While the positive environmental impacts of the circular economy are clear, its social benefits remain relatively unexplored. The policy brief Making the Most of the Social Economy's Contribution to the Circular Economy¹ illustrates how the social economy helps to accelerate the development of the circular economy while amplifying its social benefits for people and places.

The OECD has studied the transition to a circular economy for a number of years and from several angles in order to provide guidance to policy makers. OECD research has demonstrated the fundamental role that cities and regions play in encouraging the transition from a linear to a circular economy.² Likewise, additional OECD studies aim to identify and quantify the environmental and economic impacts of policies to support the circular shift. For example, these OECD studies evaluate the labour market implications of the transition and highlight that it is likely to create jobs in certain sectors and regions but threaten adverse consequences in others, such as those engaged in production of primary materials, construction and plastics.^{3,4} Policy makers need to understand how the transition process will affect individuals, sectors and regions, and act to achieve an equitable transition process. The social economy is one partner among others in harnessing the full potential of the circular economy while driving an inclusive and durable transition for individuals, businesses and communities.

Social economy organizations include associations, co-operatives, mutual organizations, foundations and social enterprises. Driven by values of solidarity, participation and democracy, social economy organizations have played pioneering roles in the circular economy for decades. By prioritizing social impact over maximization of return on capital, these organizations are able to reinvest some profits in their social or environmental mission and develop activities that benefit society, even if it may appear less profitable from a

capital investor's perspective. The social economy is already integrated into circular value chains and has helped to develop and mainstream innovative circular business models in a range of sectors, such as electronics and textile recycling, reusable consumer goods, and repair and remanufacturing activities. Many of these are vital to the plastics industry.

By engaging in circular value chains, social economy organizations can reinforce social inclusion for individuals, particularly among vulnerable groups. Social economy organizations are well placed to integrate workers into the circular economy thanks to their extensive experience providing retraining, skills certification and work experience. There are numerous examples of work integration social enterprises (WISEs) that operate in the circular economy by collecting would-be waste that can be repaired and refurbished while providing work and training opportunities to marginalized and previously excluded groups. These organizations can also help drive uptake, awareness and acceptance of circular economy through improving the affordability of circular goods and services for low-income households.

Beyond driving job creation and training opportunities, social economy organizations have demonstrated the capacity to improve working conditions along value chains, which can help to amplify the positive impact of new jobs created within the circular economy. This is especially important considering that the working conditions in the global recycling industry, particularly in the case of plastics, is often poor. For in-

stance, the Colombian cooperative Association of Recyclers of Bogotá, which brings together 17 local cooperatives and represents 1,800 waste pickers, brought cases before the court to defend waste picking as a profession. The court's pronouncements significantly helped the negotiation of an inclusive waste management policy and the introduction of a new remuneration scheme to compensate waste pickers for their services.⁵

The shift towards a circular economy requires not only novel production practices but new consumption patterns as well. Individuals as workers, consumers and entrepreneurs need information to make informed choices to contribute to greater circularity. The embeddedness and deep integration of social economy organizations into their communities enable them to raise awareness on sustainable practices as well as on the costs of current production and consumption patterns. The opportunity for citizens to get involved in the social economy, as volunteers for example, such as the cooperative La Louve in Paris, also contributes to further community engagement.

Becoming embedded locally equips social economy organizations to work with diverse actors to develop dynamic circular value chains that positively affect the territories while contributing to local employment and economic development. For example, the Dutch cooperative IntelligentFood plays a specific role of connecting local actors and facilitating that collaboration, creating durable value chains to utilize

residual food waste, initially as resource inputs to, finally, as marketable products. This model leverages proximity and collaboration – both key functions of social economy organizations – to encourage the development of local circular value chains.

Scaling is an important way for organizations to increase their positive social and environmental impact. They would diversify their activities, increase in size or expand into new areas. However, scaling also poses challenges by creating new levels of complexity and raising the risk of mission drift. Social economy organizations have developed innovative scaling strategies that enable them to expand and amplify their impact while staying true to their original mission. These strategies leverage collaborative approaches to create cross-territory or cross-sector groups of social economy organizations, such as Group Terre in Belgium. Other social economy organizations remain local while actively encouraging others to replicate their business model in other areas – an approach known as the ‘strawberry field’ strategy.

These qualities make the social economy a strong partner for communities and policy makers in the adoption of circular activities. Policy makers can accelerate the development of the social economy active in the circular economy by supporting these organizations, particularly in this period of COVID-19 recovery. This can be accomplished by raising awareness, stimulating demand and encouraging innovation. Policy makers can support strategic partnerships and novel

forms of collaboration among public actors, social economy organizations and traditional businesses to develop circular supply chains, spur business development, build circular capacity and improve access to finance. Finally, policy makers can enhance the knowledge base by gathering robust data on social economy organizations active in the circular economy to measure their full economic value as well as their social and environmental contributions.

1. OECD/European Commission. (2022, forthcoming). Making the Most of the Social Economy's Contribution to the Circular Economy.
2. OECD. (2020). The Circular Economy in Cities and Regions: Synthesis Report. OECD Urban Studies. doi: <https://doi.org/10.1787/10ac6ae4-en>
3. Chateau, J., & Mavroeidi, E. (2020). The jobs potential of a transition towards a resource efficient and circular economy. In OECD Environment Working Papers. OECD Publishing, Paris. doi: <https://dx.doi.org/10.1787/28e768df-en>
4. Laubinger, F., Lanzi, E., & Chateau, J. (2020). Labour market consequences of a transition to a circular economy: A review paper. In OECD Environment Working Papers. OECD Publishing, Paris. doi: <https://dx.doi.org/10.1787/e57a300a-en>
5. ILO. (2019). Waste pickers' cooperatives and social and solidarity economy organizations. Cooperatives and the world of work no. 12.

An aerial photograph of Kitakyushu, Japan, featuring the city, the water, and the red suspension bridge. The image shows a mix of urban development, industrial areas, and green spaces. The red suspension bridge is a prominent feature, spanning a wide body of water. The city is densely packed with buildings, and the water is a deep blue. The sky is clear and blue.

“The Kitakyushu Eco-Town, established in 1997, is a business park clustering different recycling industries and is Japan’s first and largest of its kind. Since it was launched, a number of recycling laws have been implemented in Japan.”
–Emiko MURAKAMI

Image Source: May 2, 2013. Kitakyushu, Japan. Photo Credit: https://commons.wikimedia.org/wiki/File:Wakato_Bridge_KitaKyushu_Japan_01.jpg



Emiko MURAKAMI
Environmental Bureau
City of Kitakyushu
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INSIGHT/EXAMPLE: Kitakyushu—from industrial wasteland to Japan's first eco-town

Martin KOCHHAN (MK): The City of Kitakyushu has put a lot of effort into advancing the circular economy in the last years. Why is the transition to a circular economy important for Kitakyushu and how do its residents profit from it?

Emiko MURAKAMI (EM): Kitakyushu was one of the heavy industry centres powering Japan's 'economic miracle'. The city grew quickly during that period but was at the same time increasingly confronted with the flip side of its economic success: environmental pollution. Steel mills, coal factories and chemical plants dotted the city, pumping untreated wastewater directly into Dokai Bay, and soot and chemicals into the sky. The city overcame these environmental problems through a collaborative effort by the industry, government, academia and private sector. This collaboration was initiated by a citizens' movement and has led to reinventing itself as a green city.

Later, when economic growth stagnated due to decreased steel output from an oil shock – this situation was called 'tet-subie' – a new pillar was needed to support the revitalization of the city. The green industry, which supports the circular economy, was rooted as a new pillar of Kitakyushu's economy. Part of this effort is Kitakyushu's Eco-Town project¹ which comprises of numerous recycling companies, research institutes as well as a development zone for renewable energy. For instance, there are firms recycling mobile phones, PET bottles, home appliances, paper and cans. There are also companies which refurbish products, such as computers, and give them a second life. Before the COVID-19 pandemic, Kitakyushu was a major center for industrial tourism, with more than 100,000 visitors per year. A total of more than 90 facilities and new jobs for about 1,000 people with an investment of about 86 billion yen have been established so far.

MK: On a per capita basis, Japan is the second largest consumer of single-use plastic in the world. Which initiatives does Kitakyushu take to reduce the plastic footprint of the city and its residents?

EM: Kitakyushu is taking several actions to reduce the volume of disposable plastics. First of all, Japan announced, during the G20 meeting in Osaka in 2019, that it would start charging for plastic bags from 2020. Since July 2020, shops now charge customers at least ¥3 per plastic bag. The city also organizes beach clean-ups and town beautification campaigns. We

hope to increase awareness for the harmful consequences of single-use plastic and inform our city's residents of the means they can contribute. Furthermore, the use of personal drinking bottles, cups and reusable bags is being promoted. We want to highlight concrete measures which each and every one can adopt in their daily routine. Besides that, we ensure the plastic waste collected is separated and treated correctly. For instance, the Eco-Town has a PET bottle recycling facility. Finally, we hold seminars and workshops for our residents to demonstrate how to recycle properly. We also organize regular visits to the Eco-Town and other recycling facilities for school students and residents.

MK: The Kitakyushu Eco-Town, established in 1997, is a business park clustering different recycling industries and is Japan's first and largest of its kind. After more than 20 years of operation, what measurable impact does this Eco-Town have on the circular economy transition in Kitakyushu?

EM: Since the city launched the Kitakyushu Eco-Town Project in 1997, a number of recycling laws have been implemented in Japan. These recycling laws currently cover food containers and packaging, organic waste, home appliances, motor vehicles and construction materials. In addition, voluntary recalls of personal computers and other equipment have been carried out under the responsibility of the manufacturers, following a reform of the wide area certification system.

MK: Kitakyushu is working on the reduction of marine plastic waste together with local governments from other Asian countries, such as Thailand and Cambodia. What kind of knowledge can be transferred from Kitakyushu to partner cities and what can Kitakyushu learn from them?

EM: Kitakyushu collaborates with cities in Thailand and Cambodia to raise public awareness and promote the separation of plastics collected from other types of waste. In addition, Kitakyushu will support them with environmental knowledge built up over the years. We also help local authorities to assess the feasibility of converting marine plastics into oil at designated plants.

MK: The transition to a circular economy is a collective effort of local, national and international actors. To which extent are the hands of Kitakyushu tied because some regulations and laws cannot be passed on a local level, and how does the city deal with this situation?

EM: First of all, we set up a demonstration project before we introduce new regulations and full-scale operation. Through this process, we study the cooperation of stakeholders in sorting and collection, and the potential of recycling projects, collection and regulation. The data obtained is used and discussed in order to implement the project.

1. <https://www.kitaq-ecotown.com/docs/ecotown-pamphlet-en-2019.pdf>

“Local governments often lack data about waste, concerning the types and quantities of plastics. They do not have the knowledge and resources to provide the infrastructure for the informal sector’s operations. International development cooperation should enable them to overcome challenges facing circular plastics management.”

–Burcu TUNCER



Image Source: Wikimedia Commons. October 15, 2017. An unemployed man collects plastic from household refuse bins to onsell to plastic recyclers. Photo Credit: Vanderspuyr: https://commons.wikimedia.org/wiki/File:Plastic_recycler.jpg



Burcu TUNCER
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INSIGHT/EXAMPLE: Local authorities as driver for circularity in plastics packaging value chain

City governments typically perceive that their role is at the end of the plastics packaging value chain, linked to municipal waste management schemes. Indeed, the tasks of collection, sorting, processing, recycling, and disposal of plastics fall under their constituency. However, putting a focus only on these actions drives a linear economy perspective. The transition to a circular economy approach calls for plastic material to be seen as resource rather than waste. In that sense, city and local authorities that want to exercise an effective role in the circular plastics value chain need to start transitioning from waste to resource management.

What opportunities do local governments have for circular management of plastics?

The opportunities for resource management of plastics can be well demonstrated through the Circular City Actions

Framework that provides local authorities with five complementary strategies they can practice to facilitate the shift away from the take-make-waste model. The upstream strategies are preventative and preferable to downstream strategies in circular plastics management.

What challenges do local governments face to implement circular management of plastics?

For local authorities to be able to implement these upstream and downstream strategies, the following challenges need to be overcome:

- Lack of data: Local governments often lack data about waste, concerning the types and quantities of plastics, which is essential for coming up with any action plan.
- Shortfall in alternatives: In the case of banning single-use plastics or the requirement to source alternative packaging material, the local authorities face shortages in the supply of suitable alternatives. Collaboration with innovation hubs and incentivization of industries are required to make alternative materials widely available in the market.
- Limited capacity: To encourage the right alternatives in the market, technical evaluation, such as life cycle assessments, must be carried out. For this, local authorities must be equipped with backstopping and technical assistance services.

- **Management of hazardous content:** Plastics often contain a complex blend of chemical substances. In regions and cities where plastic waste is collected and processed by the informal sector, handling of the hazardous content is challenging. Often, the authorities do not have the knowledge and resources to provide the infrastructure for the informal sector's operations.

- **Scale of engagement and coordination:** For the implementation of upstream measures, local authorities need to carry out intense engagement and negotiation with producing and importing companies that are often multinational conglomerates. Local governments are too small to tackle these capacity-intensive stakeholder engagement processes. Therefore, which national governments' support is needed.

All in all, international development cooperation working with city networks can enable local authorities to overcome challenges facing circular plastics management, by providing technical assistance and peer-to-peer support platforms.

Rethink: Redesign the system
Structurally support circular systems, re-think how value chains are organized and phase out linear incentives¹

Regenerate: Harmonize with nature
Ensure all infrastructure and production-consumption systems positively contribute to local resource and nutrient cycles and respect ecosystems' regeneration rates²

Reuse: Use longer
Extend the use of existing resources, products and infrastructure³

Reduce: Do better with less
Design infrastructures, processes and products to reduce material & energy consumption and waste generation during production, use and end of life⁴

Recover: Close the loop
Enable the recovery of materials at their end of life and facilitate their reintroduction in production processes⁵

1. Example actions and policies for circular management of plastics packaging:

- Support development of shorter plastics value chains
- Avoid lock-in for generation of plastic packaging waste and encourage use of alternative materials
- Support introduction of plastic material content reduction goals into the Extended Producer Responsibility (EPR) schemes
- Ban or tax single use plastics packaging
- Include eco-design criteria in public procurement tenders (e.g. public offices and school catering services)

2. Example actions and policies for circular management of plastics packaging:

- Incentivize low-impact and renewable materials for packaging and adjust waste management systems to process biomaterials
- Provide water supply that is safe to drink or used for food preparation

3. Example actions and policies for circular management of plastics packaging:

- Support reuse schemes for plastics packaging
- Design and regulate for extended use of plastics packaging if it is not possible to avoid its use

4. Example actions and policies for circular management of plastics packaging:

- Regulate and incentivize cleaner production of plastics packaging (i.e. with less waste, energy and material inputs)
- Support industrial symbiosis solutions (i.e. closed-loop cycling of industrial plastic waste)
- Support information campaigns and eco-labelling schemes for single use and high-impact plastics

5. Example actions and policies for circular management of plastics packaging:

- Establish plastic waste data monitoring systems
- Set plastics recycling targets
- Support introduction of design for disassembly, design for modularity targets into the EPR schemes
- Collect plastic material separate from residual waste (i.e. mixed municipal waste)
- Introduce door-to-door, bring-point collection and other systems that sort at destination
- Support formalization of informal plastic packaging waste picker and collector communities
- Establish information centres for collectors, pickers, separators and recyclers

A close-up photograph of a person's eye. The eyelid is covered in a thick layer of fine, iridescent plastic glitter. A makeup brush with dark bristles is visible on the right side of the frame, applying more glitter to the eye. The skin around the eye is a warm, light brown tone.

responsibility

Image Source: Wikimedia Commons. November 28, 2005. Plastic glitter on a girl's eyelids. Photo Credit: Flickr user eperales. https://commons.wikimedia.org/wiki/File:Applying_glitter_to_her_eyelids.jpg

industries responsibility cooperation

3.1. Monomer recycling towards a sustainable circular economy of plastics?

Carsten EICHERT, Stephan SCHOLL, Mandy PASCHETAG
RITTEC Umwelttechnik GmbH and Technical University of
Braunschweig, Germany

3.2. Making plastics part of the solution

Jazlyn LEE
World Wide Fund For Nature (WWF), Malaysia

3.3. On circularity and international cooperation

Markus LÜCKE
Deutsche Gesellschaft für Internationale Zusammenarbeit
(GIZ), Germany

3.4. Implementing extended producer responsibility for waste management in Nigeria

Agharese Lucia ONAGHISE
Food & Beverage Recycling Alliance (FBRA), Nigeria

3.5. Creating sustainable packaging management in the MENA region

Wassim CHAABANE, Agnes BÜNEMANN
cyclos GmbH, North Africa / Germany

3.6. On Vietnam's waste management strategy

Nam Hoang NGUYEN
Ministry of Natural Resources and Environment, Vietnam

3.7. Towards a new generation of extended producer responsibility in Germany

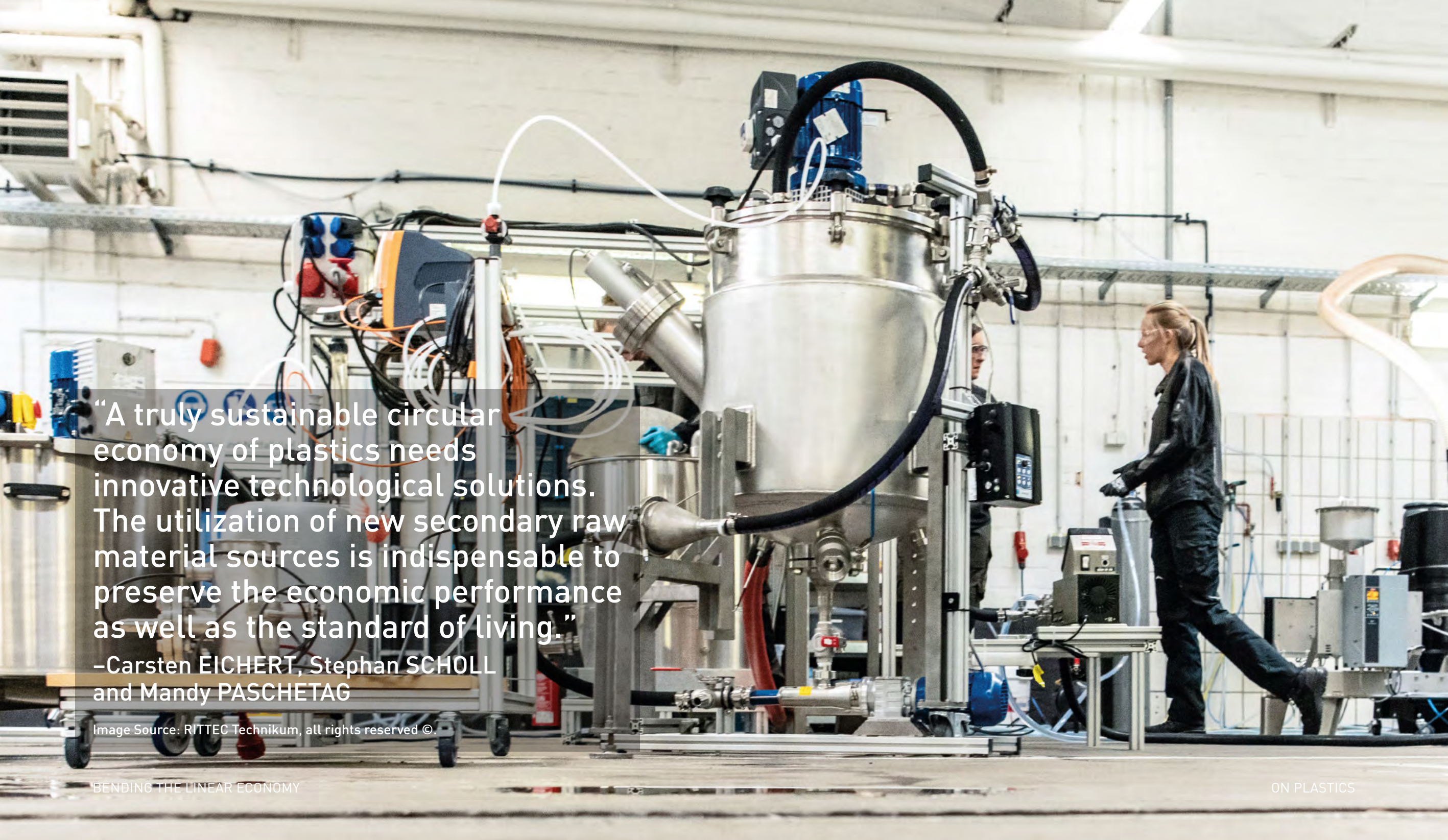
Ursula DENISON

PRO EUROPE, Belgium; Grüner Punkt – Duales System Deutschland GmbH, Germany

3.8. Insight/example: Costa Rica's Circular Economy Success Stories

Kathia Aguilar MARTÍN, Marco Chinchilla SALAZAR and Cynthia Córdoba SERRANO, Ministry of Energy and Environment, Costa Rica

industries responsibility cooperation

A large, stainless steel industrial mixing tank is the central focus, equipped with various pipes, valves, and a blue motor on top. It sits on a metal frame. In the background, a person in a dark lab coat and safety glasses is walking towards the right. The setting appears to be a laboratory or a specialized industrial facility with concrete floors and white walls.

“A truly sustainable circular economy of plastics needs innovative technological solutions. The utilization of new secondary raw material sources is indispensable to preserve the economic performance as well as the standard of living.”

–Carsten EICHERT, Stephan SCHOLL
and Mandy PASCHETAG

Image Source: RITTEC Technikum, all rights reserved ©



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Monomer recycling towards a sustainable circular economy of plastics?

A truly sustainable circular economy of plastics needs innovative technological solutions. Monomer recycling for PET plastic waste, like the revolPET technology, represents a viable alternative to established technologies like mechanical recycling and pyrolytic processes. The increase in prosperity in almost all countries, especially those with a thriving tourism industry, seem inevitably faced with a growing waste problem. Local and regional efforts are often overwhelmed and thus, waste is (partially) released into the environment in an uncontrolled manner. Plastic waste in particular represents a real threat to the environment. Avoidance or at least a reduction of littering especially in emerging and developing countries can be most efficiently achieved through a circular economy system that offers a fair share of the value creation for its local contributors.

Challenges in the circular economy

Unlike other regions around the globe, nearly every European country has an established waste collection and sorting infrastructure. In addition to this infrastructure, recycling measures ensure the return of plastic waste and its recovery, to a large extent. However, a major challenge in the end-of-life section of the plastics value chain is the realization of high-quality plastic waste recycling maximising its potential as a raw material in the resource cycle. Mixed materials are

commonly downcycled and end up in a qualitative downward spiral where they finally end up in incineration plants or landfills and thus, result in the loss of resources.

Mixed plastic packaging with a PET layer accounts for a high proportion of plastic waste. The establishment of new recycling methodologies as well as the development of innovative technologies for those mixed materials is therefore necessary. However, this is associated with different challenges. First, the recovery of specific value components from waste; second, the economic efficiency of the established or developed technologies; and, finally, the minimization of the environmental impacts associated with closing the loop.

The first challenge can be resolved by positive value creation for currently non-valuable wastes like coloured bottles or multi-layered packaging. Profitability is often linked to high recovery quotas of valuable constituents in technically robust recycling processes as well as through assurance of a sufficient feedstock. This set-up provides secondary resources which serve as drop-in substitutes of primary raw material. All this drastically reduces the necessity to use fossil resources and leads to the reduction of environmental impact. To ultimately show an overall environmental benefit, the recycling technology requires a lower additional raw material and energy demand than virgin production. Necessary materials must be recirculated within or into the process and used auxiliaries must not pose a high risk to humans or the environment.

Innovative monomer recycling: The revolPET technology

The newly developed revolPET technology¹ sets a positive example for tackling the different global challenges in recycling PET waste. In the revolPET technology, PET is depolymerized into its monomers, terephthalic acid (TA) and ethylene glycol (EG). Within the process, other potentially valuable components as well as impurities are separated from the desired monomers. The additional valuable components are often other plastic materials, like polyolefins found as components in high graded PET packaging. These so-called multi-layer packaging or foils are not recyclable with state-of-the-art technologies and thus, end up in incineration plants or landfills, dropping out of the circular economy. Valuable components like polyolefins from multi-layers are separated through the revolPET process and can be fed into other appropriate recycling routes. The PET monomers produced satisfy virgin material quality standards which can be used to produce new PET packaging.

The revolPET technology keeps the complexity within the process as low as possible. This technology is based on a solid-solid reaction in an extruder that uses alkaline hydrolysis to selectively depolymerize PET polymers to its monomers TA and EG. The technology reaches a yield of PET monomers based on the PET content in the waste stream of up to 97%. The high yield as well as the continuous operating mode with a reaction time of less than 1 minute are key success factors to economically and environmentally

cope with recycling challenges. The direct utilization of the reaction heat released during depolymerization for internal pre-heating of the feed contributes significantly to the energy efficiency of the revolPET process.

Sustainability

Huge amounts of raw materials and resources are globally consumed annually by the private and industrial sectors. A coverage of the resource demands by either natural or especially fossil sources is becoming increasingly difficult. Therefore, the utilization of new secondary raw material sources is indispensable to maintain economic performance as well as standards of living.

The revolPET technology contributes significantly to closing the gaps in the resource cycle by providing virgin-quality recycled PET monomers. The development of this process is continuously accompanied by ongoing assessments and analyses with regards to economic efficiency and environmental impact. Already at the current stage of development, the economic perspective shows that economical operation is possible without restrictions. Furthermore, since the early phase of process and development and design, the minimization of environmental impact was the focus and is now a determining success factor, besides the economic aspects.

The environmental impact caused by the revolPET technology compared to that of a fossil production route of the monomers is clearly lower. The production process emits 40% less greenhouse gases than conventional processes and the impact on the fossil depletion is even 60% lower as the TA monomer production via the fossil route. These benefits as well as photochemical ozone creation can already be achieved at the current, early technology development stage and this will be improved due to scale-up effects, until technological and commercial readiness is achieved.

The transfer of technology to global plastic waste hot spots, like Southeast Asia or Western Africa, requires robust technology. It should be implementable with the least possible alignment to existing local infrastructures. For sustainable integration into existing end-of-life structures, the involvement of local initiatives (e.g. cooperatives) is mandatory. The establishment and expansion of further value-adding steps in the end-of-life section of the plastics value chain creates jobs and thus, secures a fair share of the value creation for local stakeholders. Moreover, it is indispensable to push for knowledge transfer as well as for the training of local specialists.

Future role and potential social impact

To meet the challenges of a fully closed circular economy from both the local and global perspective, various complementary technologies are required. As a monomer recycling technology for PET plastic waste, the revolPET technology represents a trend-setting alternative to established technologies of mechanical recycling as well as pyrolytic processes. The revolPET technology ensures the preservation of non-renewable resources by recurrent recycling of PET to its monomers with up to 60% reduction in environmental impact as compared to the fossil route associated with the supplied unit of monomer. Due to the robust technical implementation and low complexity, the integration of the revolPET recycling technology in different regions of the world can be realized quickly and with comparatively low investment.

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“Plastics will dominate the growth in use of petrochemicals as feedstock in plastics production through 2050 under business-as-usual practices. The largest segment of demand growth for plastic production is predominantly single-use plastic.”

–Jazlyn LEE

Image Source: Wikimedia Commons. August 6, 2017. Rest from a plastics processing machine at a recycling centre. Photo Credit: Ermell. https://commons.wikimedia.org/wiki/File:Kunststoff_Plastik_Rest_Abfall_1446-PSD.jpg



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Making plastics part of the solution

Plastics make our lives easy and keep us safe. However, they may also pose a threat to our planet and prosperity. This was particularly felt with the circumstances surrounding the ongoing and escalating COVID-19 pandemic, notably the movement restrictions and safety concerns, which skyrocketed take-outs and deliveries and, among others, caused a spike in packaging waste generation. This begs the urgency to have a holistic waste management approach that is able to take on the huge load of waste generated.

While plastic pollution is a global problem, a 2017 report¹ by Ocean Conservancy and McKinsey Center for Business and Environment showed that around 60% of marine plastic debris enters the ocean from just five countries in Asia. A more recent series of studies² conducted by the World Bank in 2021 across three countries, namely Malaysia, Thailand and the Philippines, indicate that there is a total

of over 5 million tons of plastic consumed each year. From this, only 18 – 28% of key plastic resins are recycled, leading to nearly \$6 billion of the material value lost annually.

Overall, plastic supply chains have a considerable carbon footprint, from the extraction of fossil fuels to the disposal of plastic products. According to a report from CIEL,³ the plastic sector alone would consume up to 19% of the world's remaining carbon budget to limit global mean temperature rise to below 1.5°C by 2040, under a business-as-usual growth model.

As the transportation and power industries are transitioning away from fossil fuels towards renewable energy, there is still a growing demand for petrochemicals and oil from the plastic production industry. BP's 2020 Energy Outlook⁴ forecasts that although the overall global oil demand will slow down, plastics will dominate the growth in use of petrochemicals as feedstock in plastics production through 2050, under business-as-usual practices. The largest segment of demand growth for plastic production is predominantly single-use plastics. However, plastic demand and management are likely to see continuous evolution, as the world begins to transition from a linear plastic system to a circular one.

Currently, the world's plastic problem lies in poor designs of packaging that limit recycling, and inefficient collection and processing of plastic products at the end of their life. This places responsibility and great costs on consumers,

governments and others at the end of the supply chain, rather than on the producers. If we look carefully at the packaging of products we use daily, we will see a worrying number of different materials and layers of packaging, all purely driven by marketing decisions.

In Southeast Asia (SEA), waste management has always been the responsibility of the public and government, and the system has proven to be highly inefficient. A revision of the existing system is crucial to demand greater responsibility from producers through an Extended Producer Responsibility (EPR) scheme which holds producers accountable for end-of-life products. The scheme requires governments to enact EPR guidelines and regulations that mandate producers to ensure a clean and healthy environment, beginning with product conceptualization and product design, all the way to the production, distribution, post-consumption and collection phases. All in all, producers would take greater responsibility throughout the entire lifecycle of their products and packaging.

Under the EPR scheme, the responsibility of the manufacturer goes beyond waste treatment and recycling. The EPR scheme addresses four key issues, such as waste avoidance, prevention and minimization of material use; waste collection and sorting; material recovery, recycling and reuse; and proper treatment and disposal of wastes with minimal environmental and social impact. Even though the outlook of plastic waste management seems grim, there

is a growing momentum for solutions within all sectors. Commitments to a circular economy are gaining traction and there is a growing appetite for change. Policymakers are enacting stringent regulations and policies to address plastic pollution.

In SEA countries, some of the more progressive enterprises are proactively incorporating circularity into their products and packaging, by switching to recyclable and recycled materials as well as adapting a reuse model. Voluntary Producer Responsibility Organizations (PROs) and corporate alliances have been formed by several consumer brands to drive the establishment of the EPR scheme.

In recent years, a considerable amount of financial institutions' (FIs) and investors' actions related to plastics and the circular economy indicate a growing interest in the issue of plastics pollution. This is set to change the business outlook. Financial risks and opportunities arising from plastic action and inaction can be substantial, especially with the potential increase in operational and compliance costs due to the imposition of green taxes, bans and trade restrictions by governments on national and regional level. FIs are now closely assessing plastics-related risks and supporting companies to effectively communicate and disclose plastic impacts in their Environment, Social and Governance related reporting.

As the Breaking the Plastic Wave⁵ report highlights, the plastics problem is so large that simply expanding waste collection, landfill, incineration and recycling capacities lend false hope. The most significant step would be to combine these downstream measures with an absolute reduction of plastic in the system. The time to act is now.

Jazlyn Lee is a SEA regional coordinator for the EPR project⁶ that is part of WWF's No Plastic In Nature by 2030 Initiative. She drives engagement with businesses and governments in targeted countries in Southeast Asia to build a collective action and systemic approach to address plastic pollution. Jazlyn holds a Master's Degree in Economics from University of Malaya.

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3. <https://www.ciel.org/plasticandclimate/>
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6. https://wwf.panda.org/discover/knowledge_hub/all_publications/?356332/Extended-Producer-Responsibility-Project

A woman wearing a green hijab and a white face mask is sitting amidst large sacks of waste, sorting through them. The background is filled with more sacks and debris, suggesting a recycling or waste management facility. The text is overlaid on the left side of the image.

“A major challenge of strategic decision-making is in determining the monetary value of the environment and its natural resources. This again requires clear political commitments that need to be translated into legal and administrative actions.”

–Markus LÜCKE

Image Source: The Incubation Network.
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sites where these products contaminate ground water and the environment. Our current production and consumption patterns adversely affect our climate through CO₂ and methane emissions, as well as our maritime and terrestrial environment through litter, especially microplastic. In a more circular world, the negative climate impact of our production and consumption patterns would be significantly lower.

On circularity and international cooperation

Konstantinos KARAMPOURNIOTIS (KK): A circular economy fundamentally alters our approach to production and consumption. In which areas do you expect positive ramifications when the world shifts towards more circularity?

Markus LÜCKE (ML): Our current mode of industrial production is linear and based on the exploitation, or rather overexploitation, of natural and fossil resources. In our economy, products are designed to be bought, used and discarded. Design aspects such as longevity, reparability or modularity are neglected. This leads to the rapid transformation of products to waste, accompanied by the loss of precious resources.

Waste might end up in incineration plants where fossil resources are used to produce energy. However, more often than not they end up at landfills, or worst, in open dump-

KK: GIZ works together with political decision makers around the globe. How can these policy makers accelerate the transition to a circular economy?

ML: Sustainable economic growth is on the top of the political agenda in many countries. Yet, public investment into the protection of the environment and conservation of natural resources is often seen as detrimental to this desired long-term goal. That's why we see the latter topics often only at end of the same agenda.

Today action is often reduced to technical end-of-pipe interventions, rather than focusing on preventive measures. Economic, social and environmental benefits are also often not considered in the respective cost-benefit analyses for necessary investments. Externalities and adverse impacts on public goods are not valued in terms of macro-economic costs.

A major challenge of strategic decision-making is in determining the monetary value of the environment and its natural resources. In other words, how should we calculate the economic value of a clean or of a polluted marine and coastal environment to ecosystem services, such as a sustainable fishing industry? The long-term macro- and micro economic costs caused by non-action may serve as a helpful basis for wise political and strategic decision-making.

Considering measurable and quantified economic, social and environmental objectives in planning processes allow for the development of a more comprehensive political vision, one that goes beyond the purely technical aspects of waste management. This again requires clear political commitments that need to be translated into legal and administrative actions, which further enable private or public enterprises to develop and implement innovative and economic solutions.

The absence of adequate regulatory and legal frameworks still hamper the development of “green” sectors in many countries worldwide. Providing appropriate market incentives rather than subsidizing mismanagement could reduce the problem of capital misallocation. It may create business opportunities and promote sustainable economic development and growth. Respective governmental action must not be limited to technical end-of-pipe interventions. It should focus on sustainable and preventive measures, acknowledging its economic and social dimensions.

KK: Globally, private enterprises account for the lion’s share in economic activity. What is their role in the transition to a circular economy?

ML: Innovations for environmental protection, climate change mitigation and resource efficiency provide considerable opportunities for green growth. Progressive environmental policies may be viewed as a driver of innovation, qualification and ‘green transformation’, while simultaneously offering competitive opportunities and considerable potential for reducing environmental pressures. Furthermore, the promotion of a conducive environment for the use of innovative and integrated environmental and efficiency technologies, the setup of activities to prepare the market and the development of conditions for sustainable development may be established as they make an important contribution to the protection of the environment and resources. The role of private enterprises is to develop necessary technical innovations and circular concepts that fulfill legal environmental standards determined by political decision-making processes.

KK: The ‘Export Initiative for Green Technologies’, a program financed by Germany’s Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection and implemented by GlZ, acts as an umbrella coordinating several circular economy projects. How do these projects support the circular economy transition in GlZ partner countries?

ML: The global project supports the Export Initiative for Green Technologies, financed by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). It aims to improve the enabling environment, develop markets for the introduction and long-term application of innovative and integrated environmental and climate change mitigation technologies, as well as develop innovative green infrastructure in selected partner countries. In so doing, it also contributes to the achievement of the UN's Sustainable Development Goals (SDGs).

To this end, the project carries out measures designed to share environmental knowledge, raise environmental awareness and build capacities. It provides specific technical advice to public and private sector actors, according to their needs, and is piloting the use of modern environmental technologies to underpin technology transfer.

This will pave the way for the development of competitive and sustainable environmental infrastructure in the partner countries, while also contributing to environmental protection and climate change mitigation, to resource efficiency and to overall development in line with the Sustainable Development Goals of the 2030 Agenda (i.e. SDG implementation) and a 'green transformation'.



**“The waste sector has to be self-sustaining to become a catalyst for a new culture of responsible handling of post-consumer packaging wastes, especially plastics.”
–Agharese Lucia ONAGHISE**

Image Source: A stakeholders forum held for the 10th anniversary of the National Environmental Standards and Environmental Enforcement Agency on the topic 'Environmental governance, a key to achieving Green Economy' held at Nikon Hotel in the federal capital of Abuja in Dec. 2017. Image source publicly available at <https://wastesmart.org/2017/12/stakeholders-forum-11-nesrea/>
Note: We apologize for the low image quality.



Agharese Lucia ONAGHISE
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Implementing extended producer responsibility for waste management in Nigeria

Globally, the last decade has spawned an onset of consciousness and awareness for environmental preservation and efficient resource utilization, especially in a world where there is an increasing capacity in waste regeneration. This is due to a reform in culture, from a take-use-dispose to a circular economy; through mechanisms to close the loop. There is an urgent need for an efficient waste management system that takes an integrated approach by applying the appropriate waste principles and required technological advancements to transform the waste sector into a green economy that contributes to a nation's economic, social and environmental bottom-line.

In Nigeria, the evolution of municipal solid waste generation has created an opportunity for exploitation of these resources to create a new market. With the emergence of this new

market, it is fair to note that waste is material in transit; therefore, it is a valuable raw material for several industries and can be utilized for productive uses in Nigeria. In a country with a population of 210 million, there is a growing annual municipal waste generation, of which less than 20% is collected through a formal system. Establishing a national uniform collection system will go a long way in enhancing waste management operations, particularly if this service is integrated to include the underserved and unstructured communities.

In 2015, a World Bank study identified Lagos as one of the most populous coastal cities in Africa with an estimated population of over 24 million residents generating about 4.59 million tons of Municipal Solid Waste (MSW), with the potential for waste volumes to double by 2030. About 90% of the waste generated in Lagos consists of recyclable materials. However, only an estimated 13% of the waste is recycled under current waste management practices. A recent study in Lagos(2020) states that 23% of the 16,500 tons of municipal solid waste generated daily accrues to about 6 million tons annually. Out of that, plastics make up 23%, yielding a daily estimated of 3,800 tons. Currently, only 10% of this amount is recycled with the rest ending up in landfills, on the streets, in waterways and, eventually, in the ocean causing environmental degradation. This analysis also gives an indication to the untapped resources that the waste sector provides and its potential to contribute immensely to the economy.

Implementing an industry-led Extended Producer Responsibility (EPR) for the packaging sector in Nigeria would have its unique challenges as with any other climes conversely. Yet, the situation is slowly evolving with a potential to boost creativity, innovation, create job opportunities and also build a self-sustaining economy. One significant consideration is that both the formal and informal waste value chains are critical for effective EPR implementation. For producers or manufacturers to effectively take responsibility for the lifecycle of their packaging, there needs to be an enabling environment to thrive in, and this needs to be driven by government policy. The waste sector has to be self-sustaining to become a catalyst for a new culture of responsible handling of post-consumer packaging wastes, especially plastics. This will create economic, social and environmental benefits for all stakeholders while promoting a sustainable environment.

Establishing sustainable programs such as buy-back schemes to incentivize recycling would place a value on recyclables and thereby encourage more people to get involved in the scheme. Additionally, providing community collection centers would bridge the gap identified in logistics by bringing the recycling services closer to the doorstep of individuals, make the service more accessible and improve source segregation at the point of generation. There is an urgent need to invest in these schemes by scaling up and developing recycling infrastructure to enhance the EPR implementation. The massive shift towards implementing an efficient waste management system, including recycling, in recent years has

created a drive for the adoption of sustainable waste management practices. This is being influenced by policy targets, government regulations, political will, global commitments and civil society. The waste management value chain is relevant to the success of shifting from a linear to a circular economy due to the specific role it plays in enhancing the operations and effectively closing the loop. The collaborative effort of all players in the value chain is required to transit seamlessly from a linear to a circular economy. The waste management value chain has various players, both formal and informal, who activate recycling at the point of generation (i.e. by consumers, after purchase and use of products). Waste pickers, mainly considered part of the informal sector, account for over 60% of the post-consumer collection as they harvest these materials from difference sources, mostly dumpsites. They work with collectors to aggregate and pre-process material for recycling. To effectively close the loop and enhance the waste operations, some challenges such as logistics, lack of infrastructure and technology gaps need to be addressed.

The vision for a circular economy in Nigeria can only be achieved by adopting an integrated approach and leveraging on committed, collaborative efforts of all stakeholders. Each stakeholder in the value chain has a role in strengthening the Green Economy. An effective waste management system remains a key tool for tracking development advancement of a nation.

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About FBRA: Food and Beverage Recycling Alliance is the Industry Coalition of the Food and Beverage Industry set up as a Producer Responsibility Organization to implement the EPR Policy. The focus is to ensure post-consumer packaging waste get recycled with the aim of achieving a circular economy.

A man with a beard and a black cap is working in a recycling facility. He is wearing a bright yellow high-visibility shirt and green gloves. He is holding a grey plastic tray filled with aluminum cans. The background shows industrial machinery and a conveyor belt. On the right, there is a machine with a digital display showing '84' and labels for 'FINAL RINSE TEMP' and 'DISHWA'. A sign on the machine reads 'Globelet' and 'DSA BUSINESS SERVICES'.

“MENA countries starting to establish EPR as an instrument to transition to a circular economy model. EPR schemes needs to be socially acceptable, implementable in a feasible way, and economically and ecologically sound.”

–Wassim CHAABANE

Image Source: May 8, 2019. Globelet Reusable Sydney, Australia. Image provided by Living Prospects. Photo Credit: <https://unsplash.com/photos/gXnq5U-2DN8>



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Creating sustainable packaging management in the MENA region

Population growth, lack of planning, lack of proper disposal, limited collection service and material recovery, use of inappropriate technology and inadequate financing are, among others, the main obstacles facing solid waste management (SWM) in the Middle East and North Africa (MENA) region, causing several environmental, social and economic issues. Packaging is only sporadically collected separately, and by no means does this occur at the national level or in the vicinity of households. In many cases, there is only a single collec-

tion system for all household waste, which is provided locally along public roads and spaces within the municipalities. Therefore, mixed waste ends up in landfills with packaging being the visually dominant type of waste.

More often than not, only the informal sector participates in the separation of collected packaging. Recyclable material from households is directly gathered from containers on the street or diverted from landfills or dumpsites to be sold to aggregating companies. A large part of this informally collected waste, especially plastics, is exported to other countries where recycling is available.

Several countries in the region have realized that the way they manage their solid waste does not satisfy the objectives of sustainable development. Despite various attempts by multiple stakeholders in the region, SWM is still inadequate since the main obstacles are not properly addressed. Currently, the region observes low levels of recyclables recovered (e.g. Egypt 10%, Morocco 8%, Algeria 7%, Tunisia 5%, Jordan 7%).¹ To eventually overcome the current situation, many countries have decided to transition to more integrated approaches, rolling out sustainable waste management systems that are adapted to country-specific circumstances and share responsibility among all the actors.

One of the key concepts for this is the Extended Producer Responsibility (EPR). As defined by the OECD (2016), EPR is an environmental policy approach in which a producer's

responsibility for a product is extended to the post-consumer stage of a product's life cycle.² Translated to practice this means that EPR involves producers taking responsibility not only for designing products, but also collecting end-of-life products, and for sorting them before their final treatment.

Several countries in the MENA region have started to implement EPR for plastic packaging.

Tunisia established its own packaging recovery system, the ECO-LEF, more than 20 years ago. It consists of the collection of packaging waste under agreements with the national waste management agency and the recycling of certain types of plastic waste under agreements to fulfil monthly quotas of these materials. However, the collected quantities by the system have decreased considerably since 2009 (i.e. 15,000 tons), reaching only 3,400 tons in 2018. Several reasons caused this drastic decrease, including a change in the economic situation, competition between ECO-LEF and private collectors working in within the system as well as growing activities of informal collectors. In order to optimize the system, it is currently being revised to focus on a more sustainable organization and financing mechanism, while considering the whole packaging value chain.

In 2017, Jordan's government-initiated discussions to introduce EPR for packaging. Anchoring the introduction in the overarching waste legislation in 2020, EPR instructions are currently being drafted and are planned to be published

soon. In addition to that, the elaboration of pilot projects in some areas is still underway, aiming to reinforce the separate collection and material recovery at the source.

Likewise, discussions about the development of a recovery system for packaging materials in Morocco started 10 years ago. Since then, several studies have been conducted to analyse the current situation and outline a suitable EPR system for the country. Currently, the Moroccan government is discussing the possibility of developing a national deposit refund system for PET bottles which should integrate all actors in the value chain, including the informal sector.

Algeria published the Executive Decree No. 04-199 of July 19, 2004, which laid down the procedures for the creation, organization, operation and financing of the public system of packaging 'Eco-Jem'. After years of operation, the system needs to be updated. Therefore, the national waste agency established a project to create an operational EPR scheme for packaging waste under an upcoming executive decree. It will amend the current regulations with respect to the EPR model as well as set up institutional and operational producer responsibility organizations (PROs).

Egypt also decided to tackle the packaging waste issue. There have been several discussions to develop an institutional setup for an EPR scheme for packaging waste under the draft waste framework law. It details the roles and responsibilities of both the public and private stakeholders,

the required local infrastructure a corresponding roadmap of implementing the EPR scheme in a pilot area as well as an expansion plan at the national level.

To conclude, MENA countries are getting increasingly interested in establishing EPR as an instrument to transition to a circular economy model related to packaging as well as other materials. There is a growing number of projects and initiatives in the region, such as in Saudi Arabia, Lebanon and the United Arab Emirates.

The common starting point for introducing EPR in these countries is enabling an inclusive discussion among all stakeholders with a focus on conceptualizing a suitable localized scheme for each country, considering its specific context. Communication and cooperation among all actors are imperative for its success. Furthermore, the informal sector needs to be formally involved in the system. Finally, all EPR schemes need to be socially acceptable, implementable in a feasible way, and economically and ecologically sound. Only if all these parts are considered can MENA countries successfully overcome their inadequate waste management challenge, which is at present a burden to the region.

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“In Vietnam, municipal solid waste increased from 11.6 million tons in 2016 to 13 million tons in 2019. This number could increase by 15.9 million tons in 2030 and by 21.96 million tons in 2050. 70% of the waste is currently disposed in landfills.”

–Nam Hoang NGUYEN

Image source: May 10, 2018. On the National strategy on integrated solid waste management, VGP News. Photo Credit: <http://baochinhphu.vn/Tin-noi-bat/Chien-luoc-quoc-gia-ve-quan-ly-tong-hop-chat-thai-ran/336103.vgp>

Note: We apologize for the low image quality.



Nam Hoang NGUYEN
Ministry of Natural Resources
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On Vietnam's waste management strategy

Martin KOCHHAN (MK): One of the key pillars of Vietnam's socio-economic development strategy for the period 2021-2030 is the transition to a circular economy. Why is moving away from a linear economy so important for the country?

Nam Hoang NGUYEN (NHN): After 10 years of implementing the Socio-economic Development Strategy (SEDS) 2011-2020, Vietnam has recorded numerous economic and social achievements. However, the country is also facing substantial challenges namely natural resource depletion and increasing waste, which adversely affect socio-economic development. In terms of natural resources, after a long time of being a significant coal exporter in the Asia-Pacific region, Vietnam started to import coal in 2001 and became a net importer of coal since 2015. In addition, the country increasingly imports crude oil, metals and raw materials for its textiles, leather and shoe industry.

In terms of waste, the municipal solid waste increased from 11.6 million tons in 2016 to 13 million tons in 2019.¹ Moreover, this number could increase by 15.9 million tons in 2030 and by 21.96 million tons in 2050.² Most importantly, 70% of the waste is currently disposed in landfills. This cost Vietnam a large amount of land used as well as pollution. Air pollution alone cost 5.18% of Vietnam's gross domestic product (GDP) in 2013.³ Water pollution is causing damages worth up to 3.5% of the country's GDP.⁴ Soil degradation and other the impacts of climate change cannot be understated. Although Vietnam is ranked 68th in the world in terms of land area and 15th in terms of population size, it ranks 4th in the world for plastic waste production, with 1.83 million tons discharged into the ocean every year.⁵ Therefore, moving away from a linear economy is extremely important for Vietnam.

MK: During the COP26 in Glasgow, Vietnam pledged to become carbon neutral by 2050. How can the transition to a circular economy help achieve this target?

NHN: The majority of Vietnam's GHG emission comes from the energy sector (61.6%) while agriculture as well as industrial processes and product account for 18.6% and 14.3% respectively.⁶ The transition to a circular economy is expected to reduce the emission of these sectors without having to reduce the production output. Without a circular economy, there may be no way to achieve the target set at COP26 together with rapid economic development.

MK: Currently, the majority of Vietnam's municipal solid waste (MSW) still ends up in landfills. With mounting ecological problems and dwindling landfilling capacity, what is Vietnam's strategy going forward with regards to MSW?

NHN: The Law on Environmental Protection 2020 (LEP 2020), which will be enforced from January 2022, establishes several strategies to solve this issue. First, Article 142 strongly promotes the application of redesign, recycling and resource circulation, and identifies the responsibilities of different stakeholders. Second, waste segregation at source is set to be implemented no later than 31/12/2024 (Article 75). This will help cut the costs of recycling and waste-to-energy. Consequently, the amount of waste to landfill will be reduced. Third, Extended Producer Responsibility (EPR) will gradually be applied, starting from January 2023 (Article 54 and 55).

MK: The issue of single-use plastic waste is becoming increasingly pressing in Vietnam. How is the country addressing this development? Are there any specific legal measures in place or are you planning any?

NHN: Yes, there are growing movements to reduce single-use plastics in Vietnam, from a ban on single-use plastics or the application of economic instruments (e.g. tax, fee) on single-use plastics, to the development of alternatives to replace single-use plastics (e.g. grass straws, paper

straws, disposable bags) and public awareness campaigns. For example, in 2018, the Ministry of Natural Resources and Environment (MONRE) initiated the 'Against plastic waste' movement in all government offices and state-owned companies through the Official Dispatch 5539/BTNMT-TCMT. It first began by stopping the use of plastic water bottles in offices, conferences and seminars.⁷ This movement has been adopted by several cities (e.g. Hanoi, Ho Chi Minh City) and communities.

In addition, the Draft Decree, which is the legislative guidance for the implementation of LEP 2020, set to stop the production and import of non-biodegradable plastic bags with dimensions smaller than 50cmx50cm and a film thickness of less than 50 µm (Article 72) by 2026 as well as all kinds of single-use plastic products and non-biodegradable plastic packaging for domestic purposes by January 2031 (Article 72).

MK: Vietnam's Ministry of Natural Resources and Environment is in the process of setting up the 'Viet Nam Circular Economy Hub'⁸ together with UNDP, with financial support from European countries. How can international cooperation assist Vietnam in facilitating the uptake of circularity?

NHN: The Viet Nam Circular Economy is the very first public-private platform to promote the transition toward a circular economy in Vietnam. It is expected to enhance dia-

logue among stakeholders, including the government, and to increase the chances for cooperation in practical projects. International cooperation can facilitate the uptake of circularity in many ways. First is the international experiences and knowledge exchange to consolidate the legal framework and policies. Currently, Vietnam's national action plan on circular economy is being drafted and policymakers are open to discussion and consultation. Second, international cooperation can promote practical projects to improve the circularity, such as re-organizing the value chain to reduce waste; measuring, reporting and publicizing information about products and the risk of self-recycling and reusing products; and technology transfer and improvement (e.g. recycling technologies).

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A photograph showing the lower legs and feet of several runners on a paved road. The ground is covered with a large number of discarded plastic cups, mostly yellow and clear, which are scattered across the asphalt. The runners are wearing various athletic shoes and socks. The scene is brightly lit, suggesting a sunny day.

“The last two decades have shown that sustainable use of plastics will not happen by itself but requires a clear regulatory framework for producers. The big challenge with plastics is not how they are used, but how they are designed to be recycled once they have become waste.”
–Ursula DENISON

Image Source: Wikimedia Commons. September 15, 2011. Disposed plastic cups at the Berlin Marathon. Photo Credit: Dirk Ingo Franke. https://commons.wikimedia.org/wiki/File:Berlin_marathon_freizeitlaeuer_wittenbergplatz_25.09.2011_12-18-25.jpg



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Towards a new generation of extended producer responsibility in Germany

In February 2021, manufacturers of plastic packaging in Germany reported supply problems. Obtaining supplies of raw material, notably plastic, proved being a real challenge. While in Europe the economy is stagnating or even shrinking due to the COVID-19 pandemic, China is already recording strong economic growth again, leading to a growing appetite for raw materials. Manufacturers of plastics, who often no longer produce in Europe but, for example, in the Persian Gulf, often prefer to supply China than Europe. The result for Europe: a shortage of raw materials and dramatic increase in price.

The pandemic is changing perspectives and shifting priorities both in our private lives as well as in businesses, but it is not only for the worst. The EU's planned "green" reconstruction of the post-COVID economy (i.e. the Green

Deal) presents us the added possibility of solving one of the most pressing challenges of our time: the sustainable use of plastics. The last two decades have shown that this shift will not happen by itself; it requires a clear regulatory framework for producers to act on. We need more ambition in the implementation of Extended Producer Responsibility, or what is called EPR 2.0. With the right political decisions, we would not only tackle the plastic challenge - often discussed in view of dramatic environmental and waste problems - but also harness the vast potential of plastic as an economically, socially and environmentally beneficial material.

It is perhaps useful to take a closer look at the situation in Germany. While it is the pioneer in implementing EPR for packaging, Germany leads in the consumption of plastic in all of Europe. End-of-life mismanagement is often blamed for the plastics problem. The ban on plastic bags, the penalty tax for non-recycled plastic waste and products made from ocean plastics are all these initiatives that have recently received a lot of public attention and approval. Yet, none of them truly addresses the source of the problem. The challenge with plastics is not how they are used but how they are designed to be recycled once they have become waste. As a material, plastics are now indispensable. For instance, refrigerators and cell phones only function with high-quality plastics; the automotive industry relies on plastics for lightweight construction to save weight and thus fuel.

Nevertheless, the largest area of application for plastics in Europe is still packaging. Plastic packaging ensures hygiene and longer shelf life, for example for food and cosmetics. However, we still have a long way to go before adequately closing the gaps in the materials loop. Today, far too many used plastics are either incinerated or exported to third countries for use in low-grade recycling applications. As a result, Germany loses valuable raw materials and value-add processes, which in turn discourages investment into the necessary recycling infrastructure.

Far too rarely does used plastic packaging become new packaging. But why is that?

Technically, high quality plastic recycling is possible – there is no question about that. Often, plastic obtained from recycling can hardly be distinguished in terms of quality from new plastic produced from crude oil. In some cases, it even meets the strict requirements for food and cosmetics packaging. In addition, greenhouse gas emissions from the use of recycled plastic are only about half that of virgin plastic. Recycled plastic is a raw material that can – and should – be used effectively, especially in a country with scarce raw materials, like Germany.

Still, many companies shy away from using recycled plastic because crude oil is priced so low. Moreover, the comparatively small production capacities of recyclers may mean that recycled plastic is sometimes more expensive than

new plastic. This creates a classic vicious circle: if recycled plastics are not competitive, they will not be used; in turn, if they are not used, they cannot become competitive. This is not how the circular economy will work and this is not how the plastics crisis can be solved.

However, there are market developments. The current situation shows that not only are new plastics suddenly in short supply recyclates (i.e. plastics recycled from waste) are too. With virgin plastics supply in a limbo, manufacturers of car parts or products for gardening, construction and even packaging may switch to alternatives. Given that for years the recyclate market has been underfinanced, the appropriate quality and quantity are not available to fill the gap. The lackadaisical attitude toward plastics recycling of the last 20 years is now taking its toll. Although recyclate is a source of raw materials that could reduce the dependency on non-European suppliers and create significant number of jobs in the EU and Germany, this matter has not received the attention it deserves.

Now, what needs to be done?

- Introduce a binding quota for the use of recycled plastic to drive up demand and set a clear framework to develop markets and standardized qualities for post-consumer recycled plastics;
- Reinvigorate the principle of Extended Producer Responsibility. If an industry knows that usage of virgin plastics

in products or packaging means a commitment to use a corresponding share of secondary plastics, it will regain a sense of stewardship regarding its own circularity strategies;

- Provide clear incentives for recyclable packaging by improving the input stream so as to benefit the output quality of plastics; and
- Encourage investments and R&D in this segment to make Germany and Europe less dependent on the import of virgin plastics. This will benefit the environment and contribute to economic stability.

The fact that the market can be stabilized and boosted through the adoption of these strategies is observable since the recent transposition of the EU Single-Use Plastics Directive into German law. The law states that by 2025, PET beverage bottles must contain at least 25% recycled content. Although many manufacturers have already set themselves higher targets and PET bottles are often already made partly from recyclates, producers need not wait until 2025 to get on board. The positive effects of this shift are already becoming apparent as PET recyclers are investing massively in existing and new plants, thus, creating more employment, among other benefits.

Given that recycling technology has been tried and tested for many years, a major beverage producer, one of the global top 4, has announced that it will go well beyond the EU's minimum requirements. As early as 2022, it will use 100% recycled PET in all bottles in Germany, Austria, and Switzerland. In this way, greater environmental benefits are created. Simultaneously, it works together with the market dynamics, not against it. It is obvious that competitors will follow suit, not least because consumers anticipate these solutions.

Closing the loop on plastics is not just a question of environmental protection. It is a matter of determining the parameters to set up Germany and Europe as globally competitive business locations: the intelligent use of scarce resources, the sustainable creation and safeguarding of jobs with a secure future and independence from raw material imports from regions that are in part geopolitically unstable. There is broad agreement on these points. However, far too little progress has been made in recent years. The temporary boom in plastics as raw material plastic and its recyclate will not suffice as interest will wane with the next drop in oil prices.

It is time to change. With the consistent use of recycled plastics, Germany can finally live up to its former role as a pioneer in EPR and innovation driver and create new jobs in the circular economy.

A photograph of a child's table and chairs made from recycled plastic, featuring a speckled pattern of colorful plastic fragments. On the table are two wooden toy trees of different sizes and several colorful pencils. A white paper with some drawings is also on the table. The background shows a wooden floor and a white wall.

“At the beginning, the two founders only had the most basic knowledge on plastic recycling and absolutely no experience in the plastics industry. Nowadays, they have a dedicated workshop in Curridabat, San Jose, with a maximum production capacity over four tons a month with their full sheet press system, and in 2020 they became technical consultants in Costas Circulares with UNDP.”

–Ministry of Energy and Environment Costa Rica

Image Source: October 15, 2019. Children's furniture designed by Ecobirdy with recycled plastic toys. Ecobirdy has developed a method for recycling mixed plastics, which are usually considered too difficult to recycle. Photo Credit: Joris Vanbriel.
https://commons.wikimedia.org/wiki/File:EcoBirdy_Set_All_Bright.png



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INSIGHT/EXAMPLE: Costa Rica's Circular Economy Success Stories

The circular economy represents a viable option for a sustainable economic recovery in Costa Rica. It is good for the community, creates jobs and reduces the environmental impact of economic activities. Costa Rica's circular economy efforts, outlined below, show that the transition to a circular economy may become a profitable and scalable economic activity that offers great opportunities especially to vulnerable sectors. The case studies presented form part of a selection of relevant experiences shared at the '1st Virtual Forum for Quality, Circular Economy and Bioeconomy: Challenges and Opportunities', organized in November 2020 by the Executive Secretariat of the National Council for Quality (CONAC).

Balanced Energy is a group of engineers, led by the Costa Rican entrepreneur German Jimenez, in search of a balance between energy and the environment and try to find alternative sources to fuel that reduce, in some way, the environmental impact of our daily lives. The team's project to transform plastic wastes into alternative fuels was the winner of Unilever's Solá contest. This regional competition searched for the best ideas to, among others, manage productive resources and develop populations at risk, attracting 300 enterprises. With this initiative, they achieved the reduction of plastic pollution in the environment, the reduction of imports of fossil fuels, the reduction of sulphur pollution in the environment and the opening of job opportunities for people

who recover waste plastics. Their winning team's product is polydiesel, a fuel that is equivalent to vehicle diesel and has already been tested in motor vehicles with excellent results.

MundoRep converts more than 300 tons of plastic waste into new raw materials and reusable products every month. This not only prevents almost 4,000 tons of plastic waste a year from ending up in rivers and oceans, it also promotes a new way of producing that could generate great opportunities for economic reactivation in harmony with the environment. MundoRep generates 40 jobs at its plant located in Heredia and approximately 500 indirect jobs through some 50 collection centres nationwide that are part of its supply chain. They specialize in the transformation, production and commercialization of high value-add recycled plastic resins made from waste. By using discarded plastic as raw material and converting it back into final products, the import of virgin resin, which is a derivative of petroleum used in the manufacture of plastic, is reduced. Ultimately, this reduces the carbon footprint. The company kicked-off in 2021 with the launch of an innovative product called 'Nuevo Mundo', a line of garbage bags made of 100% post-consumer recycled materials, which is in itself also 100% recyclable.

Plastic Process Engineering (Ingeniería de Procesos Plásticos, IPP) is a Costa Rican recycling company that converts plastic waste into highly durable, excellent quality and usable plastic products for industrial, construction, architecture and design applications. IPP's Plastic Wood is the result of trans-

forming recycled plastic into profiles, posts and boards that can also be recycled. With the pieces obtained, they build other products and focus on replacing wood and other materials. Its composition, with a high percentage of high and low density polyethylenes and polyrolines, gives the final product great structural resistance. The final products can be used in the same way as natural wood, mainly for outdoor use and saline environments, with numerous advantages. The collection process allows a real use of the thousands of tons of plastic waste that are generated in the country, that would otherwise invade streets, fields, rivers and seas with disastrous consequences. Through a network of collaborators and companies committed to proper management techniques, they recover and transform various types of plastic materials (e.g. HDPE, LDPE and PP, plastic bags, plastic lids, plastic gallons and cans, plastic vehicle bumpers, plastic tile and food containers).

The Recycle Studio (TRS) was founded by Olivia Grosvenor and Oliver Wakile, who, after a career break from the international NGO sector, stumbled across Precious Plastic, an open-source plastic recycling initiative with roots in The Netherlands. The two founders share knowledge on how to begin personal recycling workshops wherever a person may be in the world. At the beginning, they only had the most basic knowledge on plastic recycling and absolutely no experience in the plastics industry. They transformed their garage into a workspace to build the Precious Plastic's injection machine. The machine is capable of processing about two

kilograms of plastics a day. Nowadays, they have a dedicated workshop in Curridabat, San Jose, with a maximum production capacity over four tons a month with their full sheet press system. In early 2020, they had the opportunity to combine their experience within the plastic industry with their years within the development sector by becoming technical consultants in Costas Circulares, a two-year project implemented by the United Nations Development Programme (UNDP) and the Costa Rican Institute of Pacific Ports (INCOP) in Puntarenas, which aims to empower local groups with knowledge of upcycling. TRS' aim is to incorporate plastics collected from beach clean-ups as much as they can.

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outlook

Image Source: Toll barrier on the highway connecting Seoul to Incheon new town and logistics area in South Korea. The orderly lanes, multiple indications and signs including on the road, are also a symbol for regulated economic flows and yet, such linear systems offer little room for recycling and for circular models, notwithstanding interaction with the civil society (2021).

Image by Nicolas J.A. Buchoud, all rights reserved ©.



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and 12% incinerated, leaving almost 80% to accumulate in landfills or in nature, often in the oceans. Plastics mainly end up in the oceans through 1,000 rivers, with just 10 of them responsible for over 90% of the emissions, and 20 firms responsible for more than half of the world's plastic waste. This is not the unfortunate result of external circumstances. We are, individually and collectively, part of such crises, and hence, part of the possible solutions.

Bending the linear economy

Christoph PODEWILS (CP): Why did you choose to focus INTERSECTING on circular economy and, in particular, on plastics?

Nicolas J.A. BUCHOUD (NB): The first series of INTERSECTING was about questioning and raising sustainable responses to the COVID-19 crisis, a topic far larger than typical cities or infrastructure approaches. We have used hashtags to keep sight of multiple angles applied to a single issue. For instance, the issue of 'infrastructure' has been associated with the issues of 'distribution' and 'inclusion', referring to several articles and policy briefs we have produced in parallel to the INTERSECTING process.

Crises, be it the COVID-19 crisis or the plastics waste crisis (after seventy years of production of this synthetic material) are not natural events. Between 1950 and 2015, the world created 6.3 billion tons of plastic waste, with 9% recycled

CP: You mentioned that the plastics crisis is not a natural but a man-made phenomenon. How would you summarize the philosophy of INTERSECTING when applied to plastics and to the circular economy?

NB: COVID-19 and the plastics crisis are two powerful illustrations of the limitations of globalization beyond individual will.

Globalization is a man-made phenomenon. Together, we have cemented systems of interconnections and interdependencies and continue to expand on land, at sea, beneath the oceans and now in space. Plastics symbolically embody over seven decades of growth and development to the extent that and that now, large or small particles, and even chemical elements, are found everywhere, including in food chains. The magnitude of annual plastics production is so massive that we need to understand that the full extent of a crisis goes beyond short-term emergencies.

The plastics crisis requires an open, 360 degree approach to tackle market transformations, including producer and consumer responsibility, and public regulations to address the very environmental issues we have collectively created. Only then would we be able to understand the potential changes in polymer and monomer industries, from production to recycling, and get a better sense of the timeframe of the daring ambition to bend the linear economy.

There is yet another challenge. Illustrating the intersections within plastics is very challenging because the public eye is bombarded with pictures of unwanted and discarded plastic items, especially at sea and along seashores. Awareness campaigns are commonplace and we have all seen images of smoking mountains of trash, including plastics, with bulldozers and waste pickers scaling them. Social media is not short of sponsored events such as waste collection or pilot recycling projects, usually accompanied by banners, logos and smiley faces. However, more awareness does not necessarily translate to more enlightened action. For instance, Lifestyles of Health and Sustainability (LOHAS) promote jogging or fitness heavily even though sport sneakers rely heavily on complex mixes of plastics.

INTERSECTING uses three sets of tools: the articles and contributions from a wide variety of guest experts; the quotes that we, as editors, decide to use from their texts or from the Dialogues that preside over the production of

INTERSECTING; and the illustrations. The visual material requires specific editorial curation. Understanding the formation of our visual universe is critical as we argue that there is no valuable reasoning without questioning 'what we know about what we know'. This is especially true when it comes to plastics.

Due to the widespread and problematic presence of plastics everywhere, the appeal for immediate, ready-made, sometimes simplistic solutions is very strong. A handful of experimental vessels are currently scouting the seas to collect plastic waste. Start-ups are regularly branding new potentially game-changing technical products or services. Yet, the core of the problem remains: to bend linear economy as a whole. Circular economy is about multiple transformations at the same time, from the high complexity and interdependence of global value and supply chains to policies and experiments at the local level.

CP: To which extent does circular economy shape the current discourse on the transformation?

Markus LÜCKE (ML): I share Nicolas' point of view that the term circular economy is about transformations. It is a term widely used today. Its significance for sustainable economic growth, however, still needs to be sharpened. Some even suspect that the transition to more circularity would hamper economic growth, especially when it comes

to emerging and developing countries. But the opposite holds true. Regarding plastics, the circular economy's imperative is about intersecting and not purely an economic concept. The circular concept aims towards sustainable use and management of limited and precious resources by a balancing interactions between three dimensions: the economy, society, and the environment. After all, sustainable prosperity cannot be reached by any country while neglecting one of these dimensions.

CP: What makes the application of the INTERSECTING perspective in relation to plastics and the circular economy relevant for the context of international cooperation?

ML: The United Nation's sustainable development goals (SDG) are setting the current global agenda for international cooperation. This agenda itself is an expression of intersecting different disciplines, governance levels, and institutions. These goals may only be reached with a paradigm shift, and that is precisely what the circular economy stands for. Attempts to reduce adverse effects by improving linear production and consumption structures while applying traditional end-of-pipe solutions have their limitations. Economic models based on a high-quality products and services as well as responsible use or replacement of fossil resources by closing material cycles need to be applied.

Standards for durability, repairability and recyclability of products, mandatory recycled content, and the promotion of innovative recycling technologies may significantly contribute to these goals. Innovative business models such as product-service-systems and take-back schemes may replace the traditional make-take-dispose economy. These systems are designed to maintain responsibility over products and packaging and, hence, are a prerequisite for closing the material cycle. The good news is that many of the necessary instruments are already available and are waiting to be applied.

CP: Are there any unique challenges in the rapid proliferation of plastics in emerging economies, compared to the overall global scenario?

Shuva RAHA (SR): Emerging economies are rapidly embracing plastics as part of their industrialization and modernization trajectories, and are at a different stage of the relationship with plastics than their developed counterparts. For people in emerging economies, plastics are offering a fantastic new range of affordable, safe and versatile solutions for almost every day-to-day need: from hygienic food, water and medical packaging, to weatherproof, lightweight and durable housing materials and furniture, to longer-lasting clothes, shoes, toys and bags, and easy to clean and replace household and commercial items. Plastics are associated with

convenience and modernity, and their disposability is a desired outcome of the shift towards more Western, affluent, and consumerist lifestyles. Existing alternatives to plastics such as paper, cardboard, wood, glass, natural fibers, and metals are not only more expensive and difficult to handle and maintain, but also, often dismissed as 'old-fashioned'. Moreover, re-use and recycling tend to be perceived as stinginess, or an outcome of poverty, rather than efforts to conserve material and manage waste.

Consequently, few people are genuinely troubled by the growing mountains of plastic waste in and around both urban and rural centers, nor are many significantly swayed by policy- or civil society-led campaigns against plastic. So, exploring only technocratic solutions, policy-led governance interventions, and industry-centric value chains – linear or circular – will not yield meaningful results in these geographies unless we understand and address this aspirational aspect of plastics and the direct correlation with better living standards and more modern lifestyles.

CP: INTERSECTING is presented as a value proposal. How could that be concretely applied to solve the plastics issue?

NB: At the World Health Summit in Berlin in October 2021 about the socioeconomics of the pandemic and at the Nobel Week Dialogue on 'The future of cities' in Gothenburg, Sweden, in December 2021, I stressed that INTERSECTING

is a value proposal. We include an economic perspective along with environmental, social, institutional, ethical priorities, and we are looking at individual and collective factors of system change. Our model goes beyond interdisciplinary or transdisciplinary approaches. We are working with disciplines but we also try to understand, collectively, the interactions between different spheres of knowledge, multilateral agendas, and policy frameworks. We want to connect technical and technocratic processes with people's actions and with broader mindsets, and economic or social structures.

In 2018, the share of circularity in the economy was about 9.1% but it fell to 8.6% in 2020. Meanwhile, there is mounting evidence of direct linkages between circular economy and global warming scenarios. Solving the plastics equation is not about 'global' or 'local' action only – a model for sustainability through subsidiarity that has prevailed since the early 1990s. We would like to replace this with an approach that connects scales, systems and agendas.

ML: Externalities and adverse impacts on public goods, such as littering nature with plastic and thereby endangering ecosystems, need to be priced into macro-economic costs and should be borne by the polluter. Clear political commitments need to be translated into tangible international legal and administrative actions.

Critically, this applies to global supply and value chains, where social, ecological or economic impacts need to be traceable at any step of the chain and negative consequences must be acted upon.

CP: Are discussions about the social implications of a potential degrowth in the plastics industry, or any other linear industry, on the CESD's agenda? What lessons have the CESD elicited about jobs created, or potentially lost, in a circular economy?

Alexander CHARALAMBOUS (AC): The Circular Economy Solutions Dialogues (CESD) builds on existing insights, reports and assessments. Let me give you an example. Projections by a recent EU-funded research indicate overall positive employment effects of a circular economy transition in Africa, estimating a net increase in employment relative to the business-as-usual (BAU) scenario of around 2.7% in 2030.¹ This is equivalent to approximately 11 million additional jobs compared to the BAU scenario, with a potential to cut the unemployment rate by 12% or, in other words, from 94 to around 83 million. Building appropriate skill sets in the African workforce is identified by the same study as a prerequisite for these projections.

Such social considerations are well integrated into the CESD discussions, which are forward-looking and analyze

future risks and opportunities of circular solutions. Thus far, the CESD has acknowledged the importance of labor market processes and business trends that are largely grounded on the rise of innovative - usually technology-based and often disruptive - service- (vs. product-) business models for a circular economy transition. Importantly, CESD acknowledges the relatively limited global evidence regarding social impacts of circularity in developing economies.

CP: Is plastic still the elephant in the room? Are we still looking away when it comes to discussing about it?

Konstantinos KARAMPOURNIOTIS (KK): For more than 70 years, we have been verifying its existence and acknowledging its presence. Every single day - every single time we need something durable, safe, lightweight, clean, easy to use and produce and cheap, we look to plastic.

But is it really cheap? It should be, but we live far from a perfect world. We have unsustainable, or rather, not that sustainable plastics production and consumption systems, adversely impacting the environment and the climate during its life cycle. In that sense, plastic has received a lot of attention at least in the past decade, and that too for good reasons. Despite the negative impact as well as the substantial global effort that goes into producing alternatives and improving its life-cycle performance, the

production, trade and use of plastics continue to grow as we speak.

All things considered, the elephant has a seat at the table, even if it is not a good one. To put it in another way, it is becoming clearer that instead of pointing a finger at plastics, we should aim at devising strategies to improve its environmental and climate performance, and ensure that its life cycle is indeed a 'cycle'.

CP: How did the Circular Economy Solutions Dialogues (CESD) manage to capture the conversations surrounding the plastics crisis?

KK: Plastic, especially plastic pollution, has produced very strong images all around the world. During the Circular Economy Solutions Dialogues, the only thing left to do was to pick one, select a nice frame and put it on a shelf so that everybody could deliberate upon it.

Plastic is traded in a traditionally well-established, but largely linear value chain, despite global efforts otherwise. Rethinking the future of plastics is what the CESD tries to achieve by breaking down the elements that could accelerate plastics circularity, focusing among others on governance and regulations, innovation and technological solutions, and consumer needs and behaviors.

All things considered, the CESD offers a mix of messages, experiences and recommendations, capturing the plastics crisis and momentum, addressing the how's and what's of making the transition to better performing products that may or may not consist of plastics.

CP: During the CESD sessions, participants also debated the future of different plastic recycling technologies and a German company presented a chemical recycling method for PET bottles. Could such recycling processes lead the way out of the plastic crisis?

Martin KOCHHAN (MK): First, it is very good that companies are trying to combat the plastic crisis and at the same time see a business opportunity in a particular market niche. The method which has been presented seems to have fundamental advantages over conventional mechanical recycling processes. The problem with mechanical recycling procedures is that when PET bottles are shredded into pieces and melted into pellets, the quality also degrades. With this recycling method, bottles can only be recycled up to five times.

On the other hand, chemical recycling breaks down polymers into monomers which can then be used to create actual virgin plastic. The problem of degradation is eliminated. Further, the regulatory environment gives PET recycling another push. For instance, the EU set minimum

quotas for recycled plastics in new bottles. By 2025, PET bottles need to contain at least 25% recycled material and 30% by 2030.

Major beverage companies are jumping on the bandwagon and have set company-wide targets which are even more ambitious. They aim to use 50% to 100% of recycled plastic for new bottles. Big international consumer goods companies also plan to use up to 100% recycled PET bottles and use it for their polyester clothing.

CP: Recycling does not come first in the EU's waste hierarchy. Are there also downsides of giving a lot of attention to recycling technologies and targets?

MK: The main problem I see here is that talking too much about recycling legitimizes our throw-away, single-use culture. People might think that when something is 100% recyclable, that using more of it is unproblematic. We have seen similar rebound effects in other areas where environmental legislation had made progress, such as in energy efficiency.

Furthermore, we need to keep in mind that no material can be recycled endlessly. Just because a material could be recycled 100% in theory does not mean it is possible in practice. During the recycling process, we will always lose a fraction of the recycled material, be it metal, paper, or

plastic. Often, we do not recycle the material; rather, we downcycle it. For instance, paper and carton can be recycled for about five times and with each cycle the quality degrades. This casts some doubt on the proclamation of 100% recycling target for PET bottles by some multinationals. What these campaigns do not mention is that more than one recycled bottle is needed to create an entirely new bottle.

Hence, recycling can be only one answer to the plastic crisis. Prevention and re-use are far more important and powerful tools to get our plastics problem under control. And that is why they come before recycling in the EU's waste hierarchy.²

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outlook

Image Source: A view from street life in the center of Taichung in Taiwan, from the inside of a cab ('please fasten your seatbelt' is written on the dashboard). This route daily scenery also illustrates how difficult it can be to change models when driving business. Moving towards circular economy models also depends on multiple external factors that are not necessarily placed in a fixed, nice order (2008). Image by Nicolas J.A. Buchoud, all rights reserved ©.

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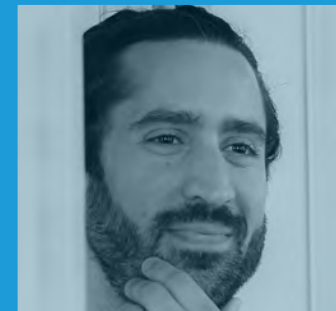
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“The traditional division of responsibilities in capitalist economies is obsolete. Many business leaders recognize the seriousness of the environmental and social problems generated by the current variant of capitalism but find themselves trapped in a systemic standoff. We must urgently recouple shareholders, stakeholders, and society.”

–Colm KELLY and Dennis J SNOWER, Capitalism Recoupled, IZA Institute of Labor Economics

Image Source: Plenary round table at the first edition of the Global Solutions Summit in Berlin, during the G20 Germany in 2017. Photo: Tobias Koch for the GSI.

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