



2020-21 Sustainable Development Transformation Forum

Building Back Better and Greener
- Sustainable, Low-Carbon Industrialisation

22-26 February 2021

8 pm (Seoul) 2 pm (Addis Ababa) 8 am (Buenos Aires)

 https://unosd.un.org/events/2020-21_SDTF



Report of the 2020-21 Sustainable Development Transformation Forum

United Nations Office for Sustainable Development (UNOSD)
Incheon, Republic of Korea
Division for Sustainable Development (DSD)
UN Department of Economic and Social Affairs (UN-DESA)
*In partnership with
the Asia-Europe Foundation (ASEF)*

Prepared by D. O'Connor, Consultant
In collaboration with C. Foy, Consultant
United Nations Office for Sustainable Development

Table of Contents¹

Day 1:

"Building Back Better and Greener"

Day 2:

"Transformative Partnerships for Financing and Investing in Sustainable Infrastructure: Energy and Transport"

Day 3:

"Industrial, Technology and Labour Force Development Policies for Sustainable Industrial Development"

Day 4:

"Building Local Sustainable, Low-Carbon Agro-Processing and Construction Materials Industries"

Day 5:

"Moving to Zero-Waste, Circular Economies"

Annex 1: Agenda

Annex 2: 2020-21 Incheon Communiqué

¹ Concept note, agenda, speakers' biographies, recorded presentations and the Incheon Communiqué can be found at the following website: https://unosd.un.org/events/2020-21_SDTF

Key Messages emerging from the Sustainable Development Transformation Forum

Background

The SDTF 202-21 took place in the midst of the COVID-19 pandemic. This shaped the format and to a lesser degree the content of the Forum.

Regarding format, this SDTF was held virtually. Given that the audience was meant to come from essentially all time zones, the timing of the sessions made them particularly convenient for certain regions and countries and less convenient for others. The format – in particular the videoconferencing software platform used – also rendered interaction between speakers and participants limited, as the latter were required to submit questions or comments in writing.

Regarding content, the pandemic and the steep economic downturn it precipitated globally explains the choice of theme: “Building Back Better and Greener”. The sub-theme indicates that the perspective taken is a long-term not short-term one. “Sustainable low-carbon industrialization” in the developing world is a protracted process, though the urgency of tackling climate change does call for an acceleration of that process. The theme speaks to the fact that many governments – within their fiscal means – have sought to keep economic activities afloat and support individuals’ and households’ incomes in the face of severe curtailment of demand for many goods and services and for the workers who supply them. (At the same time, demand for specific goods and services needed to respond to the pandemic and its fallout – e.g., personal protective equipment for health workers; videoconferencing software and services, e-commerce -- has snowballed.) This has meant a significant increase in public spending, both current and capital spending, as well as government transfers.

"Building Back Better and Greener"

Part 1: Introductory Remarks

The COVID-19 pandemic and economic slump have been overlaid on the climate change crisis, and have also accentuated -- and risk deepening -- pre-existing inequalities in many societies.

This means that the response to the economic fallout, both short- and long-term, ought to be designed in a way that advances various societal priorities – including rapid and broad economic recovery as well as mitigating climate change and where relevant inequalities.

Low- and lower-middle income countries are in various stages of the structural transformation of their economies towards more productive activities and sectors – including through industrialization – and must endeavour to do so while progressively decarbonizing their economies and building resilience to climate change.

As the UN Assistant Secretary-General for Economic Development, Mr. Elliot Harris, noted, all countries will face the challenge of how best “to diversify away from fossil fuels and fossil-fuel-intensive industries and processes towards the new low-carbon industries and activities that will experience rapid growth in the course of decarbonisation and into the future.” He continued by noting that, as development continues in low-income countries, there will be higher demands on the construction and materials industries which will need to incorporate cleaner, low-carbon technologies and processes.

The Head of the UN Office for Sustainable Development, Mr. Chun Kyoo Park, added that the planet cannot afford “a whole new cohort of countries embarking on carbon-intensive industrial development. Such a path is inevitably a dead end, with worsening climate change as a consequence.”

Ambassador Toru Morikawa, Executive Director of the Asia Europe Foundation (ASEF), noted that the COVID-19 pandemic, while it disrupted progress towards the SDGs, opened up an “an opportunity to advance the transition to a greener, low-carbon future.”

Part 2: Overview of the Challenges and Opportunities in Building Back Better and Greener

The moderator, Mr. Colm Foy, offered some introductory observations. He referred to three, seemingly unconnected, events that had occurred in the previous week – the launch of *How to Avoid a Climate Disaster*, by Bill Gates; the multi-billion-dollar pledge of aid for vaccines in developing countries by the G7; and the Mars space missions. All were relevant to the SDTF, he noted: the first because it drew attention to the urgency of the current situation as the

world community tries to get on top of climate change, the second because it demonstrated how finance could be mobilised by the wealthier countries in an emergency, and the last because it showed what could happen to a planet that had once (probably) supported some form of life.

The co-convenor, Dr. David O'Connor, then set the scene for the 2020/2021 SDTF. He explained that the pandemic has largely halted or even reversed progress towards many SDGs – with poverty and hunger on the rise once more in many countries. Moreover, it has highlighted the inequalities between and within countries – from unequal access to quality health care to the “digital divide”. Governments need to give urgent attention to redressing these inequalities.

At the same time that governments deal with the immediate crisis of the pandemic and its economic fallout, less developed countries must get back on a sustainable growth track, which for many means sustainable industrialisation. This will occur in the context of a world economy undergoing major structural change as all countries work to de-carbonize their economies. This will unleash a process of “creative destruction”, rendering certain industries, technologies and products obsolete but giving rise to multiple new opportunities. Late industrializers should wherever possible aim to capitalize on those opportunities based on their endowments and capabilities and guided by forward-looking government policies.

Seizing such opportunities calls for intentional government efforts to build the industries of the future, encourage investments and support technology development and adaptation. Over the long term, being able to compete in new, more technology-intensive industries will require investments in human capital, to create a sufficiently skilled, creative and adaptable workforce.

For low- and middle-income countries, policies and investments aimed at sustainable industrialisation are also integral to achieving the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). Multistakeholder partnerships can support public policies and private investments, combining assets, skills and other resources distributed across multiple discrete stakeholders. The challenge is to identify the partnership

relationships that are needed, while also recognising that there may be – and certainly will be – partnerships that are not supportive of sustainable development and may even be anathema to it.

Sustainable industrialization in Africa

Fatima Denton, Director of the United Nations University (UNU) Institute for Natural Resources in Africa, noted that African countries currently dependent of fossil-fuel exports will be obliged to restructure their economies and think again about their growth strategies. The steep decline in oil and gas prices during the pandemic has added urgency to the need for diversification.

There is reason for optimism. Green industrialisation is not entirely new in Africa and several countries are already consciously fostering green growth. Ethiopia, for example, has created “green” industrial parks, and there are other countries in Africa taking similar steps. One advantage that many African countries enjoy is their late industrialization, which allows them to leapfrog to take advantage of the latest available technologies in tailor-made greenfield investments rather than having to retrofit existing industries. One challenge African industries face is competition from imported second-hand “technologies” or goods which compete with nascent local industries – clothing and automobiles being two striking examples.

The challenges for sustainable development in Africa are many. As elsewhere, there will be winners and losers and how the latter are handled could be key to avoiding disruption on the road to sustainable industrialisation. As African economies grow and develop, middle-class consumer demand will grow, and the question arises whether the consumption of the new African middle class will be as energy and resource intensive as the consumption of some high-income OECD countries. Consumption in principle should be able to leapfrog as well, but only if the prices of sustainable products become competitive with those of their ‘pollution-intensive’ close substitutes.

Climate change mitigation will not be enough, and thus far the major responsibility for mitigation lies with the high-emitter countries and regions. For African economies and

societies, climate change adaptation will be just as important in the near to medium term, as Africa's heavy reliance on agriculture leaves economies highly vulnerable to climate change.

Transforming governance to support sustainable industrialization

Louis Meuleman, founder of "Public Strategy for Sustainable Development" and vice-chair of the UN Committee of Experts on Public Administration (CEPA), began his remarks by calling attention to the vulnerability of low-income and developing countries because of their dependence on economically advanced economies for their markets. In the context of the rise of economic nationalism, it is essential to understand the structures of governance and how they can help or hinder pursuit of sustainable industrial development.

The so-called "invisible hand" of the market is not the right tool to bring about sustainable development or industrialisation. Instead, the institutions of the state need to be rewired to adapt to provide supportive institutions and policies for implementing sustainable industrialisation and advancing towards the SDGs. Economies cannot be expected to rewire themselves for "green growth".

A prime example of public policy and investment support is the European Green Deal that sets out not only targets but pathways. The Green Deal is comprehensive, containing advice, regulation and integration across all economic sectors, calling for partnerships involving private actors as well as the public sector. While the Green Deal may not be ideal, it is a model that can be copied and revised to suit local circumstances.

Initiatives like the Green Deal still need strategies of implementation, which is where the concepts of governance come in. "Policy" is what you should do, "Governance" is how you do it, and currently governance structures are not responding as they should. In effect, implementing a cross-sectoral, integrated agenda is rendered difficult by the siloed way in which government entities work. While some have suggested to "break down the silos", this would be counterproductive. For, "silos" contain a wealth of specialized experience and knowledge that benefits from interactions within the silo. What is needed is to encourage the silos to interact – to "dance" as Meuleman puts it. In this way, specialized expertise is

preserved but the benefits of cross-sectoral, cross-ministerial collaboration are also reaped. There is, thus, an urgent need to change mind sets and innovate in governance in line with UN DESA's eleven principles of effective governance.²

Private sector engagement in support of sustainable agricultural development

Corporate agriculture has had a storied history vis-à-vis sustainability. Historically, many of its practices have been in conflict with certain environmental aspects of sustainability – including heavy fertilizer and chemical use and associated nutrient and toxic substance pollution and human exposure, large-scale water extraction, contribution to greenhouse gas emissions, both directly and through deforestation, and threats to genetic diversity posed by monocropping. As societies, consumers and governments have come to demand more sustainable practices, the environmental record of the agriculture sector has gradually improved. Agricultural producers and suppliers have also had to adapt to the impacts, both current and expected, of climate change on agricultural production.

Ms. Natasha Santos, Vice-President of Global Stakeholders Strategy and Affairs for Bayer Crop Sciences, spoke of the perspective of her company on the implementation of sustainable practices in agriculture. Bayer, with 100,000 employees and investments of 5.5 billion Euros in research and development, is dedicated to finding ways of “Feeding the world, without starving the planet”.

As she described it, her company is deeply involved in crop research and on the lookout for sustainable varieties that have the kinds of characteristics that farmers are looking for, one especially important one being profitability. Instead of simply applying chemicals to increase yields, Bayer trains farmers in sustainable, value-added practices in partnership with local agri-businesses and the public authorities. In this way, sustainability goals become identified with financial objectives – both for the farmers and for agri-business, including Bayer.

² The UN DESA's eleven principles of effective governance are: under **Effectiveness**: 1) Competence; 2) Sound policymaking; 3) Collaboration; under **Accountability** 4) Integrity 5) Transparency; 6) Independent oversight under **Inclusiveness**: 7) Leaving no one behind; 8) Non-discrimination; 9) Participation; 10) Subsidiarity; and Intergenerational equity. For more information, see https://publicadministration.un.org/Portals/1/Images/CEPA/Principles_of_effective_governance_english.pdf

"Transformative Partnerships for Financing and Investing in Sustainable Infrastructure: Energy and Transport"

The moderator for day 2, Dr. David O'Connor, provided a brief introduction to the topic of partnerships to support sustainable infrastructure development, notably in energy and transport.

Building transformative partnerships for the SDGs

Partnerships, as explained by Dr. David Horan, are a highly flexible vehicle for bringing together key stakeholders to tackle specific sustainable development challenges.

Dr. Horan used the example of Ireland's economic take-off (the Celtic Tiger story) of the mid-1990s to 2007/2008 to illustrate the contribution of a variety of partnerships. Among the key partnerships, broadly construed, were the social contract between the trade unions and the public authorities which moderated labour cost increases; the role of the Irish diaspora, which is some 70 million strong, as a source of investment, know-how and skills; the European Union as a source of development funding and expertise; communities which welcomed new economic activities and the workers who came with them.

The absence of key partnerships can retard progress, so a process is needed to identify strategic partnerships and to encourage their creation where they are missing. A portfolio of partners is needed to support attainment of the multiple SDGs. An inventory of existing partnerships and identification of key missing partnerships would be valuable in constructing a balanced SDG-targeted partnership portfolio in each country.³ Dr. Horan enumerated three priorities for creating partnerships to support the 2030 Agenda:

- Create a Partnership Registry;
- Build a shared vision for brokering missing partnerships; and

³ UN DESA has recently developed a guidebook to help develop successful multi-stakeholder partnerships to deliver the Sustainable Development Goals at country level, which could be found at: https://sustainabledevelopment.un.org/content/documents/2698SDG_Partnership_Guidebook_1.01_web.pdf

- Invest in a partnership infrastructure on the local, regional, national and international level.

Filling the SDG financing gap: building platforms to facilitate partnering between institutional investors and multilateral financial institutions (MFIs)

Substantially increased investments must be mobilised if the SDGs are to be achieved globally, but the financing gap has significantly increased with the COVID-19 pandemic. As explained by Dr. Håvard Halland, Senior Economist, OECD Development Centre, if financing for the SDGs is to move from the current \$Billions to the needed \$Trillions, the large pools of private capital will need to be mobilized, notably those controlled by institutional investors. This could be achieved through strategic partnerships between such investors and multilateral financial institutions (MFIs), which can serve as conduits for financing of strategic investment funds, green banks and other downstream actors committed to sustainable investing in developing countries. For such partnerships to work, MFIs need to strengthen their capacity to add value for these investors by assisting them in assessing risk in new sectors and geographies, and helping relieve bottlenecks to investing in more risky regions and sectors. Jointly capitalised investment funds are needed where institutional investors not only provide capital together with MFIs but also have a major stake in governance, within well-defined mandates.

Results-based financing: the case of agricultural innovation

Ms. Parasto Hamed, Field Coordinator, AgResults - "Pay for Results", described a partnership that has brought farmers, manufacturers and value-chain actors together to foster innovation. AgResults is a \$152 million multi-donor initiative that uses pay-for-results prize competitions to encourage private operators to invest in high-impact agricultural innovations that contribute to reducing food insecurity, improve household nutrition and health, and increase livestock productivity. The initiative conceives of its mission as identifying new technologies, encouraging the private sector to overcome market barriers, facilitating wide adoption and scaling, and creating sustainable markets as the final result. The initiative is active in a dozen countries throughout sub-Saharan Africa and Asia.

One prize competition Ms. Hamed described was for developing hermetic grain-storage bags in Kenya. Hermetic storage preserves grain crops – and possibly others – from insect damage

post-harvest. Until the introduction of hermetically sealed bags that were easy to use, there seemed to be no option but to use chemicals, even though many farmers blamed them for family illnesses. The relative novelty of the hermetic bags meant that the companies producing them had to tour the countryside introducing the bags to farmers and persuading them to substitute them for chemical treatment, which involved a risk for farmers.

Producers in the bag manufacturing industry were expected to reach a distribution and implementation goal (21,000 tonnes) that would entitle them to claim a very substantial monetary prize. This encouraged them to seek clients/customers in the countryside, to run educative workshops and to locate distributors along the value chain. The outcome was a large increase in the use of the bags, with a concomitant reduction in insect damage. In addition, prices were smoothed, since grain farmers were no longer forced to sell their harvests at the same time. In turn, farmers' quality of life was enhanced through higher and more reliable revenues from grain sales.

In summary, AgResults' prize competition model uses monetary incentives to enable competitors to overcome initial financial and logistical challenges impeding sustainable market growth. The private sector is incentivised to establish mutually beneficial partnerships along the value chain which increase access, trust, and the delivery of technological solutions to smallholder farmers.

Results-based financing can and does take other forms, for example, social impact bonds, whose pay-out to investors is contingent on achieving certain performance benchmarks. Collectively, such results-based financing remains a small portion of total financing, with most financing proffered on the basis of a combination of *ex ante* due diligence and collateral.

Managing infrastructure assets

Large-scale infrastructure investment relies on a combination of public and private investment, often financed by bank lending or by bond issuance. Green bonds represent a small but fast-growing portion of the bond market. Much of the cost of infrastructure, however, is in the operation and maintenance of installed capacity.

Mr. Daniel Platz, Economic Affairs Officer, Financing for Development Office, United Nations Department of Economic and Social Affairs (UN DESA) made a presentation of the United Nations Handbook for Infrastructure Asset Management for Sustainable Development. Partnerships – notably public-private partnerships – can be one important means not only of financing upfront infrastructure investment but also ensuring effective infrastructure management. Only 15-30% of the cost of an infrastructure asset is its acquisition or construction, with the remainder accounted for by the cost of maintenance and running expenses. Thus, underinvestment in asset management can be costly, compromising growth potential in some developing countries.

Harking back to the partnerships inventory proposed by Dr. Horan, Mr. Platz stressed the need to establish through a consultative process an inventory of infrastructure assets, answering the “six ‘Whats’ of asset management”: what and where is the asset? what is it worth? what is its condition; what is its remaining service life? what service does it require? and what should be fixed first – setting priorities. After the assessment, the process moves to establishing an action plan with specific actionable steps.

"Industrial, Technology and Labour Force Development Policies for Sustainable Industrial Development"

The moderator for day 3, Dr. David O'Connor, introduced the policy challenges involved in jump starting a process of sustained – and sustainable – industrial development in low-income countries (as per SDG 9). A range of policies – including those pertaining to trade, labour market, infrastructure, education and training, and technology – have a bearing on the prospects for successful industrialization. Attracting foreign investors may be possible in certain sectors, depending on comparative advantage and given a conducive investment climate, but building strong domestically owned industries is a more challenging proposition, which depends on strengthening domestic technological innovation and adaptation capabilities.

Building scientific and technological capabilities for industrial development

Dr. Ambuj Sagar, founding Head of the School of Public Policy, Indian Institute of Technology (IIT) Delhi, first addressed the question of the major constraints to industrial take-off, especially when it must entail low-carbon, sustainable industrial development?

Historically, there has not been a large cohort of countries which have successfully created a strong and broad industrial base, but the process is ongoing. Following Europe and Japan, the Asian Tigers were the outstanding example in the post-WWII period. Most recently, China has joined the ranks of successful, broad-based industrializers, with India also moving in that direction.

While the idea of sustainable industrial development is desirable, it is complicated by the need to draw on science and technology which is fast evolving. Thus, creating a strong scientific and technological base is crucial, including through investing in education, that is, human capital.

Of course, until now, no country has been particularly successful in low-carbon industrial development, but some are advancing more rapidly than others, thanks largely to strong signals from government policies. Today's late industrializers have the possibility, in principle, to benefit from adoption of the latest and "greenest" technologies being developed, assuming relatively free flows of goods, services and capital. To absorb and adapt such technologies, however, will depend on domestic technological capabilities. Such capabilities are also needed for domestic innovation.

Wise, forward-looking choice of technology is crucial in sectors – notably energy and transport – where capital stock is long-lived, there are strong network effects, and thus those choices get "locked-in" for decades – with the risk of premature obsolescence, or stranded assets. Countries with sizeable fossil-fuel endowments face this risk acutely, especially oil- and gas-exporting countries, since the world oil and gas markets will be significantly impacted in coming decades as countries move to decarbonize their economies.

Promoting domestic innovation for low-carbon, sustainable industrial development

Mr. Edward Mungai, CEO, Kenya Climate Innovation Center (KCIC), spoke of how KCIC is working to support start-up companies aiming to commercialize low-carbon innovations. One problem faced is an unsupportive policy environment – e.g., one which would encourage development of biogas to the point where it can compete with propane gas. Another is the financing architecture, where there are few if any private investors willing to risk investing in early-stage innovation – e.g., proof-of-concept, prototype production – and the public sector has not filled the gap. Blended public-private risk capital may be one option to support such start-ups. Limited knowledge of how to protect intellectual property can be a third barrier to attracting start-up investment. Finally, testing and standardization are important services needed by industries seeking to establish a reputation for quality and to access export markets, yet standards and testing services are often weak in low-income countries.

There is a theory that there is a natural progression to a stage where a promising innovation will find access to venture capital, but that is not true. Even impact investors need to “broaden the pipeline”, so that we can finance the value chain early on, from education to innovation to proof-of-concept to commercialization. This calls for a mix of public finance, risk capital, and social capital funding.

As Bill Gates argues in his recent book, *How to Avoid a Climate Disaster*, most sustainable products still command a ‘green premium’, meaning that they are more expensive than their ‘brown’ competitor products⁴. Of course, the prices of the ‘brown’ products normally fail to include their full costs, including the external costs to the environment (for example by contributing to climate change). Fiscal policies can change relative prices, e.g., by taxing pollution, or subsidizing ‘green’ products, but few countries employ these on a scale which would make a material difference. The hard fact is that, in a low-income country where many people lack access to any electricity, making fossil-fuel-generated electricity more expensive would be politically self-defeating, and governments lack the fiscal space to provide adequate subsidies to ‘green’ energy. So, progress happens only slowly if at all towards cleaner energy.

⁴ Gates gives this example of a Green Premium: “The average retail price for a gallon of jet fuel in the United States over the past few years has been around \$2.22, while advanced biofuels for jets cost around \$5.35 per gallon. The Green Premium is the difference between the two, which is \$3.13, or an increase of more than 140 percent.” (<https://www.gatesnotes.com/Energy/Introducing-the-Green-Premiums>)

Still, the problem of climate change is worsening not ameliorating, so countries will be confronted with hard choices. The expectation is that the developed world will accelerate innovation and deployment of low-carbon technologies, driving down their prices rapidly to the point where they become an attractive option for low-income countries. This is happening already with solar power and wind power, but needs to happen more widely to enable sustainable, low-carbon industrialization in low-income developing countries.

Trade agreements and sustainable industrial development

There is a vast literature and a long controversy regarding the impact of trade and trade liberalization on the environment and sustainable development. As with much in economics, it is largely inconclusive. One important effect is to enlarge demand greatly beyond domestic market demand, allowing for scaling up of production. To the degree that production activity pollutes, one would expect adverse environmental impacts. On the other hand, freer trade should allow greater access to imports of the latest technologies, which generally are less polluting than older technologies. There are other possible effects which cannot be explored here.

In terms of human living standards, to the extent that trade expansion stimulates economic growth, and to the extent that income increases are relatively equally distributed, trade liberalization should have positive social and economic impacts.

Mr. Andrew Mold, Chief, Regional Integration and the African Continental Free Trade Area (AfCFTA) Cluster, Sub-Regional Office for Eastern Africa, UN Economic Commission for Africa (UNECA), described the economic importance of the new AfCFTA for African countries. This new agreement needs to be understood against the backdrop of Africa's historical experience of trade integration into the global economy and value chains. The patterns of trade which have emerged partly as a result of colonialism and enduring post-colonial cultural and economic ties are far from environmentally sustainable. For example, "French" beans from Kenya are sold in supermarkets in Djibouti via France. The extent of such indirect transshipment of goods is large, involving large volumes of needless carbon emissions from burning of jet fuel. In terms of economic and social benefits of trade, preferential trade agreements involving African countries – like the African Growth and Opportunity Act (AGOA)

– have created some jobs in countries like Kenya, but the domestic clothing industry faces stiff competition from the flood of cheap imported second-hand clothing. Similarly, while automobile manufacturers (e.g., VW’s South African operation) have considered expanding production to other parts of the continent, the incentive to do so is undermined by stiff competition from imported used vehicles, which are also more polluting. These examples show a lop-sided integration into global value chains.

It is expected that AfCFTA will shift these trade patterns, resulting in a much higher proportion of intra-industry trade in African countries’ imports and exports – that is, both importing and exporting automobiles and parts, both importing and exporting textiles and clothing. Also, growth of regional markets for manufactures should diversify African countries’ trade away from the continued heavy reliance on primary commodity exports. Growth of regional markets and facilitation of regional trade should also improve food security, as localized droughts or crop failures can be compensated more easily by emergency imports from neighbouring countries.

Flying geese, or riding the tiger: a realistic scenario?

When the newly emerging economies of East Asia – the so-called Asian tigers – enjoyed their industrial take-off in the 1960s and 1970s, they were following in the footsteps of Japan, and Japanese commentators described the pattern as one of flying geese, with Korea and Taiwan but also Hong Kong and Singapore and to a lesser extent Malaysia and Thailand, charting an industrial development path behind Japan. Rising labour and other costs in leaders of the formation led to the sloughing off of more labour-intensive processes to lower-cost locations.

Ms. Helen Hai, UNIDO Global Ambassador for Sustainable Industrialisation, alluded to this experience and suggested that, today, China can be substituted for Japan and rising labour and other costs in China are forcing Chinese enterprises to relocate labour-intensive processes in much the same way as Japanese, then Korean and Taiwanese companies, once did. She argued that forward-looking, pro-active African governments can take advantage of the opportunities this presents to attract Chinese manufacturing industry, create jobs and build up a domestic manufacturing base.

She drew upon her personal experiences setting up businesses in African countries. Starting with investing in a shoe factory and then advising the Ethiopian government on setting up its first industrial park, followed by several others, she has since advised other African governments and helped to create similar industrial parks in, for example, Senegal.

In her view, the industrialisation process has begun in Africa. Seeing the example of China has encouraged African entrepreneurs and the public authorities to see industrialisation as a sustainable goal for development and growth. Ethiopia has been in the vanguard of the movement, partly because of advice in 2011 from the World Bank's then Chief Economist, Justin Yifu Lin, who recommended the "demonstration" approach of establishing working examples of what could be achieved, with the objective of encouraging entrepreneurship, creating mass employment and reducing poverty.

Challenges remain, but solutions exist. For example, government guarantees to foreign investors of duty-free imports of parts and materials – often proffered as a package of inducements to attract foreign investors -- can be thwarted by the actions of zealous customs and border control officers. Strong directives from the central government accompanied by effective enforcement can minimize such problems, but that depends also on providing adequate compensation to customs officials to reduce the incentive for corruption.

Automation poses a challenge to employment creation in many manufacturing industries, so it remains to be seen how much scope there is for using abundant and cheap labour as an inducement to foreign manufacturing investment in African countries. It is possible, as Ms. Hai argues, that there is currently a window of opportunity, before automation renders many more manufacturing jobs redundant, but that window may be very narrow indeed.

"Building Local Sustainable, Low-Carbon Agro-Processing and Construction Materials Industries"

The moderator, Dr. David O'Connor, introduced the fourth day's topic, which was a deeper dive into a few industrial sectors of promise in low-income countries, in Africa in particular. Agro-processing builds upon and adds value to the agricultural sectors which make up the largest share of the economies of almost all African countries. Construction materials will in

turn be a sector of rapid growth as African economies grow, urbanize and give rise to growing urban middle-classes. Having some of the most carbon-intensive industries, construction materials industry development in Africa has the potential to leapfrog as low-carbon process alternatives are developed and deployed in developed countries.

Towards a sustainable, low-carbon construction materials sector in Africa

Mr. Antonio Carrillo, Head of Climate and Energy/Sustainable Development, LafargeHolcim, the largest global manufacturer of cement, aggregates, ready-mix concrete, and asphalt products, explained his company's strategy and policies to move towards net zero emissions and waste, as well as its efforts – with CDC Group – to provide affordable housing and other structures in Africa.

LafargeHolcim employs over 70,000 people in 75 countries. Globally, concrete is the most widely used material after water, but still 1.6 billion people are inadequately housed. How can those people be provided decent housing in an environmentally sustainable manner, and how can the huge building structure and infrastructure demands of the coming decades also be met while moving towards net zero emissions? The challenge is that a significant portion of the industry's carbon footprint comes not from the type of energy used to heat cement kilns but from the actual chemical process technology known as sintering. Moving towards net zero by 2050 thus means re-engineering the cement-making process and/or finding good zero-carbon substitutes.

LafargeHolcim is using a portfolio of approaches to shrink its carbon footprint, including carbon capture, green alternative materials, newer technology, use of renewable energy, maximising the efficiency of existing fuels, and recycling/reusing waste. New products include "EcoPact" green concrete enabling carbon-neutral construction and Susteno, a new "circular" cement with at least 20% recycled material.

One of the first steps in reducing CO₂ emissions was to substitute other energy sources for coal and oil – notably biomass -- to provide heat for the cement-making process. Also, the composition of cement (e.g., lower clinker content) evolved to meet environmental

regulations in Switzerland. The physical properties of low clinker cement appear to compare favorably with those of plain cement, depending on the process used⁵.

Specifically with regard to low- to moderate-cost housing in Africa, Mr. Carrillo explained the company's 14Trees Programme, which is a joint venture with the CDC Group (CDC = Commonwealth Development Corporation). He described in detail what the venture is doing to produce relatively affordable housing in Malawi (also in Kenya and Cote d'Ivoire), using Durabrics made with earth, sand and cement compressed in a mould in place of traditional clay-burned bricks, thus shrinking energy consumption and the carbon footprint. Extension of microfinancing helps households pay for a single bedroom house which costs under \$20,000 – still quite expensive in a country where per capita household income is around \$500.

In Malawi, the joint venture also employs 3D printing to make structures – a house of 36 m² can be “printed” in under 12 hours for \$9,500 and a school in 18 hours at a cost of \$25,000. In the case of the house, the technology is estimated to emit 70% less CO₂ than one built with conventional methods and materials.

By far the most important development to reduce the carbon footprint of the construction materials industry will be to introduce new processes for making cement and concrete and zero-emissions cement/concrete substitutes. As Africa can be expected to enjoy some of the fastest growth in building and housing construction over the coming decades, the construction sector in Africa should aim to “get in on the ground floor”, so to speak, with these new low- to zero-emission construction technologies and materials. Joint ventures with world industry leaders may be one way to acquire state-of-the-art technology, even as African countries build up domestic R&D capabilities.

Metallic minerals and their processing – moving towards sustainability?

Besides bulk materials for construction, there is also a growing demand for various non-ferrous metals, including precious metals, to support the transition to a sustainable low-

⁵Cf. Jiang *et al.* (2020):

<https://www.sciencedirect.com/science/article/abs/pii/S0950061819331368#:~:text=The%20low%20clinker%20cement%20containing,than%20that%20of%20plain%20cement.>

carbon economy. Their expanded extraction and processing must also take place in the context of global decarbonization.

Mr. Nicolas Maennling, Principal Advisor - Regional Cooperation for the Sustainable Management of Mineral Resources in the Andean Region, GIZ, spoke of the challenges facing metals mining and processing – notably copper and lithium, which together with graphite and various rare earths are used heavily in new technologies, from cell phones to batteries to wind turbines.

In the case of copper and lithium, extraction can be damaging for the environment and there can be resistance to scaling it up, especially when disasters occur and tailings escape. GIZ is working with governments and other stakeholders in the Andean region to promote responsible mining through policies and strategies, stakeholder engagement, technology transfer and innovation.

The GIZ project provides support to governments to react to cleaner and more productive trends. Mining has traditionally lagged in the adoption of new technologies, but the pressures of COVID-19 has accelerated labour-saving technology adoption, which in turn has engendered local community fears of job loss and changes in skills needs. Internationally, consumer and investor groups are exerting pressure to reduce carbon footprints. In Chile, these concerns are being addressed through growing use of renewable energy to power mining operations, with the country rich in wind and solar energy. Locally, the primary environmental concern from mining tends to be water quality.

The GIZ project is helping Andean public authorities to understand the linkages between mining and other parts of the economy and community, so that impacts – positive and negative – can be managed. Much focus has been on upstream activities – i.e., extraction, but it is also important to appreciate downstream linkages – e.g., transport and water infrastructure which can serve both mining operations and neighbouring communities.

What are the prospects for downstream processing and value addition to locally mined minerals? The prospects and approach are different from one Andean country to another. In

the case of lithium, for example, Bolivia takes a public-sector-led approach, Argentina a private-sector-led one. At the moment, Argentina is producing some lithium-based products (e.g., batteries), while Bolivia has hardly begun. There may be limits to localization of downstream processing, however, to the extent that the main producers of the end products (cell phones, automobiles, etc.) are abroad and the production of key components like batteries needs to be closely coordinated with end product design and production. Moreover, the high value-to-weight ratio of lithium and copper means that long-distance transport of the materials is not uneconomical – as it is for example with cement.

Agriculture and agro-processing: what prospect for sustainability?

Agriculture covers a diverse range of activities from smallholder farming and livestock raising to industrial-scale production of cash crops of various kinds. Thus, a range of technologies and production methods can be found, with corporate agribusiness particularly known for mechanization and heavy reliance on monocropping, improved crop varieties (including genetically modified ones), irrigation, and chemical aids to boost productivity. So, moving towards sustainable agriculture may have quite different signification depending on the starting point.

Mr. Santiago Alba-Corral, Director, Climate-Resilient Food Systems, International Development Research Centre, Ottawa, Canada, described his work to support sustainable smallholder production in Africa, where 45% of jobs continue to be in agriculture, 86% of whom are women. As food production is responsible for roughly half of Africa's greenhouse gas emissions, changing agricultural production methods will be crucial to eventually achieving carbon neutrality.

Cash crops (coffee and cocoa, for example) are being impacted seriously by climate change, as well as food crops. In Africa, climate change has heavily hit coffee producers through changing rain patterns and changing temperatures, but also through proliferation of disease and pests. So, the focus of IDRC's work is to find means of increasing resilience and mitigating the effects of climate change, for example, through research into better adapted varieties.

In the case of cocoa producers in Côte d'Ivoire, IDRC has been facilitating farmers' access to climate information, to enable them to make informed decisions about how to respond to climate change.

One element of the decision set for both coffee and cocoa farmers may need to be diversifying away from these crops to others which they can grow profitably under changed climatic conditions.

Mr. Clemens Grünbühel, Senior Research Fellow, Stockholm Environment Institute, described the work being done in Laos to support a national Green and Sustainable Agriculture Framework (GSAF) strategy. Laos is a least developed country, which has until recently been largely untouched by modern agricultural methods.

A centrally planned economy in transition towards greater reliance on markets, the government of Laos was accustomed to setting and successively raising production targets for agricultural crops. The analysis undertaken in preparing GSA questioned this preoccupation with quantity over quality, especially considering that the country has large-scale agricultural producers for neighbours, notably Thailand and Viet Nam in the case of rice.

So, the new agricultural policy establishes good agricultural practice (GAP) promoted by FAO as the unified national standard, and the government is currently exploring a more sustainable production system using practices and systems for aiming at producing organic output. Elements include sustainable weed and pest control, natural nutrient inputs, and improved post-harvest storage infrastructure.

The national Green Growth Strategy includes as one important element "post-harvest storage and processing facilities" against a background of processing outside the country: corn exports from Laos come back to the country as feed. The government is also committed to infrastructure development that will be beneficial for post-harvest storage, distribution and marketing, even if agriculture is not specifically the target.

The GSAF includes a number of policy actions, viz.: maintain biodiversity (e.g., of rice varieties); develop niche markets and unique products (e.g., specialty coffees and teas); upskill farmers and supporting industries – e.g., to qualify and register geo-indexed products with international certification bodies; attract private sector investment through partnerships. Relatedly, investments are encouraged to develop: ‘green’ agricultural innovation; ‘green’ extension services – e.g., moving away from production growth mindset to resource conservation one, and building on indigenous knowledge; ‘green’ markets and value chains.

The GSAF must now move from paper to field, so to speak. The government has a blueprint for building a sustainable, value-adding agricultural and agro-processing sector. There is still a long way to go, but future implementation seems favourable, based not just on a body of national legislation and regulations but on regional and international developments – changing consumer preferences in global markets, the SDGs, the need to accelerate climate action.

"Moving to Zero-Waste, Circular Economies"

The moderator for day 5, Mr. Colm Foy, posed a number of questions to panellists in the final focused session of the week, inviting them to comment:

- Is the circular economy just a fad or a more durable shift in production systems;
- how realistic is the objective of “zero waste”;
- is there movement towards the circular economy anywhere in the world and, if so, how much of this process is transferable, especially to developing economies?

Republic of Korea: a circular economy pioneer?

Prof. Seung-Whee Rhee, Kyonggi University, Republic of Korea, presented a detailed report on how the Republic of Korea is dealing with the problem of waste and driving towards a circular economy.

He pointed out that Korea spends over USD532 billion annually on imports, of which 52% is for raw materials and 40% for energy. At the same time, the country has seen the amount of waste produced rise from some 340,000 tons per day in 2007 to almost 450,000 tons/day by

2018, an annual rate of increase of 2.32%. This worrisome situation engendered a response from the country's lawmakers.

The country's approach to the circular economy has seven elements:

- 1) Design for the future
- 2) Incorporate digital technology to track and optimise resource use
- 3) Preserve and extend what is already underway: maintain, repair and upgrade
- 4) Prioritise regenerative resources, such as renewable energy
- 5) Use waste as a resource by recovering usable elements
- 6) Rethink the traditional business model to incorporate value addition through the 3Rs – reduce, reuse, recycle
- 7) Collaborate to create joint value through partnerships along the supply chain and within organisations.

Prof. Rhee linked these elements to progress on six of the SDGs. These are SDG 7 (affordable clean energy that could come from waste-generated biogas), SDG 8 (decent work and economic growth generated by new “green jobs and increased resource effectiveness from new business models), SDG 9 (industry, innovation and infrastructure that would be created by adopting circular manufacturing), SDG 11 (sustainable cities and communities by reducing materials consumption and extending the life of existing structures), SDG 12 (responsible consumption and production) and SDG 13 (climate action by reducing greenhouse gas emissions).

Accordingly, the Korean Government has introduced a series of legislative measures, constantly revised and amended to take account of changing circumstances and enhanced knowledge since the 1986 Waste Control Act. All of the legislation seeks to conserve resources, encourage recycling and reduce waste. The most recent action is the 2017 Framework Act on Resource Circulation, which specifically recognises the importance of the circular economy.

The 2017 Act is aligned with the 3Rs.

Under “reduce”, it places restrictions on single-use goods – such as beverage containers and plastic bags – and overpackaging. The Act introduces a waste-charge system on “biocide” containers, disposable nappies, and cigarettes. It also introduces a volume-based fee system for waste disposal by households.

Under “reuse” the Act introduces a beverage container deposit system.

Under “recycle”, the 2017 legislation decrees recycling of metal, glass and paper products, as well as of used domestic appliances, such as washing machines, and end-of life large objects, such as vehicles. To underpin this national effort, the government offers support for recycling facilities including sorting and storage. It also encourages recycling of forest products to reduce dependence on raw and semi-processed wood products.

Household waste recycling is handled by local government and producer organisations to liberate as much material as possible for reintroduction into the production cycle. Using advanced information and communication technologies, the system is able to identify which households are disposing of which kind of waste and in what quantity via electronically operated collection bins. Based on the records thus obtained, a charge is levied based on the volume of different types of waste disposed of by the household.

Food waste is recycled to animal feed, compost and/or biogas extractions. Other solid waste, including plastics and large domestic appliances, is sent to specialised recycling centres that separate reusable elements from the material and reintroduce them into the industrial cycle.

While the system is primarily focused on household waste, there is growing attention by industry to reducing its waste streams, as the costs of treating industrial waste are coming down while the cost of not dealing with it is rising.

Another piece of the waste puzzle not covered by the 3Rs is substitution away from existing products – e.g., moving from petrochemical-based plastics towards biodegradable plastics for a range of applications. The Republic of Korea has active research into bioplastics development.

Global progress towards adoption of circular economy approaches

David McGinty of the World Resources Institute, who is also Global Director of the Platform for Accelerating the Circular Economy (PACE), argued that circular economy is a mindset and a toolkit – not an end in itself – as part of the drive towards a just, inclusive and sustainable global economy. He suggested that the movement towards a circular economy continues to build, including in the G20 countries. The approach figures in some countries' enhanced Nationally Determined Contributions (NDCs) to climate action in the lead-up to COP-26. The concept has become an important policy item in Latin America, and there has been an uptick in national and regional policy approaches in other parts of the world.

On the corporate side, there has also been significant movement in favour of the circular economy both on the individual company level and the industry level.

A few economic arguments for moving towards a circular economy are:

- Better use of limited resources, generating savings to firms and benefits for the environment;
- A \$4.5 trillion business opportunity, without taking into account the savings of not producing “stuff” and having to dispose of or treat waste;
- The circular economy could create 6 million new jobs by 2030; including decent jobs for very poor currently working in the informal recycling sector.

The challenges are many. We have to recognise that no country with a high level of human development currently has a small ecological footprint. In that sense, the concept of a “developed” country is erroneous: there is no sustainably “developed country”! The current challenge is how to get to the point where industrial processes are both sustainable and equitable.

A recent PACE report⁶ rates countries based on their proximity to a circular economy, which is very different from ranking them according to GDP or other traditional metrics. This helps

⁶ <https://www.circle-economy.com/resources/circularity-gap-report-2021>

in defining the direction in which countries are going. We need to move to a more in-depth exploration of the entry points for transformation leading to the implementation of the SDGs identified in the 2019 Global Sustainable Development Report. PACE's "Circular Economy Action Agenda" sets out global priorities for action on the circular economy with the aim of creating momentum towards sustainable development. Among the priorities:

- Design standards for a common area of action;
- Establish global trade "green lanes", viable global value chains and propose moving the circular economy out of the domestic to the international agenda;
- Examine pricing incentives and subsidies and how they can be used as levers;
- Undertake research on decent work within the circular economy and recommend policy and action;
- Define metrics for measuring the circular economy on its own or integrated into existing frameworks.

The hope is that PACE's analyses will demonstrate the extent of consensus across a wide range of key actors, moving the idea of the circular economy out of theory into practical application, adapting the approach to individual country circumstances⁷.

Dealing with single-use plastics: challenges and opportunities

Ms. Grażyna Pulawska, Senior Project Manager, Asia-Europe Foundation (ASEF), argues that, with the concept of circular economy, we have a new and unique opportunity to take a holistic approach to industrial development: designing, shaping producing, consuming, everything with the closed circle in mind. We can see what is happening at the different stages of life of the product and adjust accordingly to conserve resources and reduce waste.

ASEF has carried out a year-long research project covering all its member countries as part of a general effort to look into mapping progress on sustainable consumption and production (SDG 12). The results show that countries are having difficulty grappling with this issue, not because the concept is difficult, but because it is so vast and so broad that there are too many

⁷ See this detailed discussion of Finland's roadmap towards a circular economy: <https://knowledge-hub.circle-lab.com/article/6736?n=Finnish-road-map-to-a-circular-economy-2016-2025>

elements, including diverse stakeholders, that need to be taken into consideration at the same time. Mapping levers and entry points is, thus, very challenging.

The ASEF research project chose to hone in on one challenging topic within this broad landscape: single-use plastics.

Most of the countries studied have policies related to responsible production and consumption and they recognise the importance of the concept. What does this mean in practice, however?

Most discussions seem to turn around the concept and need of recycling and waste management, but not so much about reducing the original volume of materials consumed. There is much less attention to innovation that leads to redesigned products and processes that would be less wasteful in the final analysis. This might be because recycling is the easy part, even legislatively. While laws about obligatory recycling of products are relatively easy to frame, the same is not true of legislation and rules to oblige innovators and designers to think of products that can be manufactured in a circular way.

Concentrating on price and ignoring life-cycle costs has meant that often products are made without regard to recyclability – e.g., using plastic components that cannot be recycled, or batteries that can only be recycled with further technological innovation. There is a similar problem with solar panels that need to be recycled at the end of their useful lives; it is so far not so easy to do but there will soon be very large quantities of these to recycle, and we need to prepare for that.

Innovations to deal with the problem of single-use plastics waste are insufficient to deal with the problem. There are three reasons for this: initiatives tend to be small, they are usually underfunded, and the problem requires substantial research and development investment and access to facilities such as laboratories and specialised equipment.

When innovations are identified as being feasible and necessary, they need to be scaled up. Most of the projects identified in the ASEF study lend themselves to scaling, provided that the

innovation is adapted to local circumstances – what works for the Republic of Korea may not necessarily work for the Lao People’s Democratic Republic, for example. The innovations concerned are not always “products” of a physical nature; they can also be ideas. The hospitality industry can scale up ideas like home gardens and water recycling.

The clearest and most obvious solution to the problem of waste is not to create it in the first place. This is where the pivotal importance of reduction clearly applies – not everywhere is like Korea and Singapore, where waste removal systems are sophisticated and efficient. Even in such systems, recycling and reuse is not easy; on the contrary, it can be very complicated for the consumer who disposes of the waste, for the operatives who have to sort through it, and for the plants that dispose of it.

In summary, the barriers to recycling single-use plastic waste are:

- Insufficient regulations and standards
- Absence of price incentives to lower plastics use
- Shortage of funding for non-plastic options
- Insufficient recycling infrastructure
- Insufficient awareness, interest or commitment to plastics recycling
- Limited co-ordination throughout the plastics life cycle.

Building a circular economy from the ground up

Ms. Jennifer Fraser, Synergy Foundation (Canada), described a case study of implementing the circular economy at the local level on Vancouver Island, British Columbia, Canada. Synergy Foundation is a non-profit organisation founded in 2013 dedicated to sharing ideas, sparking innovation and activating change towards a more sustainable and resilient economy of the future. There are three major initiatives – the Vancouver Island Green Business Collective, the Food Eco District (urban agriculture) and Project Zero, which is intended to educate on the subject of the circular economy.

Project Zero launched in 2019 aims to make a positive environmental impact, lower carbon emissions, promote innovation towards sustainability, offer entrepreneurial opportunities

and create jobs. The most successful initiative so far has been the “Business Incubator Programme”, which is an 8-month, free programme for ventures that qualify. It teaches entrepreneurs how to develop their business plans and pitches, operations fundamentals and business skills, and how to build connections and grow their businesses within a circular economy. There have been 15 graduates so far. Project Zero also operates a business accelerator that helps entrepreneurs grow their businesses. It has helped First Nations develop recycling programmes, and worked with private companies to turn what was waste into an added revenue source.

Ms. Fraser outlined the differences between a linear economy model and a circular economy model. There is an emphasis on reducing virgin material inputs. An example of an incubator graduation/success is the “nulla”- coffee-cup system, where participating coffee houses all use the same cups, allowing customers to return them to any one of the participating outlets. Such programmes promote community awareness, reduce waste and support municipal government attempts to control waste. For example, if 20% of single-use coffee cups were eliminated from Victoria’s downtown core, it would save 1.5 million cups annually.

Moving in the same direction are other initiatives that allow reuse of household items through “zero-waste” stores, the first one of which opened in 2018 in Victoria.

While the linear economy model promotes mass consumption, especially in North America, the circular economy does the exact opposite, promoting responsible consumption, in line with SDG 12. Examples of repair and reuse include shoes, clothes, household appliances, IT equipment. Under Project Zero, Synergy has supported “Basecamp Repairs”, an initiative to repair camping equipment, especially tents, so that they can return to service instead of being discarded. Such an initiative adds value to in-service items and reduces the cost of maintaining them, especially when we consider that living on an island means we often have to send goods off-island to be fixed.

Key concepts employed by Synergy’s circular economy efforts:

Redistribute – instead of disposing of things no longer needed, they are given to a “library” that can offer tools, or bicycles, or even vehicles on a loan-for-use basis that includes a small fee.

Recondition – the penultimate step before recycling, includes upgrading and value-addition. For example, “Ergo” solutions offer services and products including a collection service for restaurants of used cooking oil that allows them to transform the oil into biodiesel and alternatives to oil-based products. “ChopValue”, another of the Project Zero companies, collects used chopsticks from restaurants and transforms them into useful household products and decorative items. It has reclaimed and transformed over 32 million chopsticks.

Recycle -- the final and most energy-intensive phase of the circular economy.

- “Anian” is a company beneficiary of Project Zero that makes clothing from recycled fibres – sweaters, suits, blankets and so on. It has resulted in substantial job creation and transparency along the supply chain.
- Construction waste takes up a huge amount of space in landfills. “Unbuilders” is a Vancouver-based company that dismantles, rather than demolishes, houses and recovers the building materials, equal to a 95% salvage rate, which avoids sending all that waste to the landfill. The process not only creates new jobs, it demonstrates what can be done. It is supported through provincial and federal tax credits.
- Flipside Plastics, another Project Zero company, will be addressing some of Victoria’s plastic-waste problem by redirecting it to reprocessing and using the resulting material to make new products. Currently, all of the island’s plastics waste is shipped off-island for processing, so this will make a change in several areas of environmental responsibility.

Ms. Fraser concluded with a few recommendations:

- Encourage “conscious consuming”
- Seek opportunities to reduce waste and optimise existing waste streams
- Find other learning opportunities and start the conversation in your community.

Concluding Session

Dr. David O’Connor presented the draft Incheon Communiqué, emphasising that the draft would be circulated to all the participants for their comments (see Annex 2 for final version). Mr. Colm Foy announced the distribution of the Forum Report in coming weeks and the later publication (in May/June) of the detailed proceedings of the Forum.

Mr. Léon Faber, Deputy Executive Director, ASEF, then offered his closing remarks. He stressed the importance of staying positive in the face of the current pandemic and economic crisis – seeing this crisis as an opportunity. Countries and companies are setting themselves targets for reducing carbon emissions and even becoming carbon-neutral in the not-too-distant future. However, it took us a long time to this point of commitment, especially when we realise that almost half a century ago, the Club of Rome warned us that we could not carry on as we were.

Mr. Farber observed that, while he is not an advocate of zero growth, zero waste is quite another story and we should not give up on that. The discussions on a circular economy were very encouraging in this regard and also enlightening for people who are not necessarily specialists. Investing in the 3Rs is certainly an avenue that we have to pursue if we expect them to become mainstream over time.

The session on the availability of finance demonstrated an important reality. We need to develop new partnerships to find ways of releasing the money to finance the SDGs where it is most needed. In that regard, the risk of growing inequalities needs to be considered and we need to find ways of channelling private capital in ways that will have the reduction of inequalities as an objective.

The mission of ASEF is to promote better mutual understanding between Asia and Europe through intellectual and people-to-people exchanges. It brings together government and civil society and issues like those we have been discussing at the Forum are very close to the organization's interests.

Mr. Jean D'Aragon, Senior Sustainable Development Expert, UNOSD, then offered his final remarks. He noted that this year's SDTF had a focus on Building Back Better and Greener — Sustainable, Low-Carbon Industrialisation. He noted that, despite the restraints and the hazards of the COVID-19 pandemic, UNOSD and ASEF have managed to produce a very successful event! Through the excellent presentations and panel discussions during the whole week, the Forum succeeded to bring to light ideas and experiences of low-carbon transition across the economy, with a strong emphasis on decarbonisation of the industrial sector,

particularly in least developed countries. What is interesting is that many of these ideas and experiences can also be implemented to help with a sustainable, green recovery from the COVID-19 pandemic.

As the Assistant Secretary-General for Economic Development and Chief Economist, Elliott Harris, emphasised during the first segment of the first session, the endeavour to support countries to “build back better and greener” means to ensure they are on a truly sustainable and inclusive development path to shared prosperity.

It was mentioned a few times, and particularly by Ms. Fatima Denton, Director of the UNU Institute for Natural Resources in Africa, that as developed countries green their industries at home, they are importing those industries’ products now made using polluting, energy-intensive technologies in developing countries. Such indirect emissions make “decoupling” of carbon emissions from output much less of a success story.

We all know that the informal sector is a major contributor to the economy and especially in times of crisis, where the informal sector is particularly innovative. In that sense, Ms. Denton put it well when she pleaded to “take the informal sector with us in this process of green and sustainable industrialisation.”

Throughout the week we also learned about innovations in housing, agriculture, and even innovative ways of promoting and supporting such innovations at the household, city, country and regional levels, and up to Official Development Assistance (ODA), Foreign Direct Investment (FDI), diaspora investment and other forms of investments from within (the countries) and from abroad.

And today, we have also heard about Moving To Zero Waste/Circular Economies, which some speakers had also touched upon during other sessions, particularly yesterday’s.

We need to continue our conversation.

This will occur through the next activity of the SDTF, which we would like to convene in person in Incheon City, when the situation allows.

As well, as some of you know, we are also already working on a publication where the presenters and speakers of this Sustainable Development Transformation Forum that took place in virtual format this week, will be invited to develop and share further their ideas in the form of articles to be integrated in the 2020-21 SDTF Publication.

We produced such a publication last year, which can be found on the UNOSD Website. The next one, based on this last week SDTF, will be on-line, on our Website again, in the next couple of months.

The Forum would not have been possible without the dedicated support and selfless dedication of the staff of the UNOSD and our stagiaires who helped us master the technology, keep in touch with the presenters and participants, and supplied us with a constant stream of information, and support.

On behalf of the United Nations Office for Sustainable Development, I would also like to thank our long-time partner in the Sustainable Development Transformation Forum, the Asia Europe Foundation.

Annex 1

Concept Note and Agenda

2020-21 Sustainable Development Transformation Forum

Building Back Better and Greener — Sustainable, Low-Carbon Industrialisation

22 - 26 February 2021

8:00pm (Republic of Korea), 12:00pm (Geneva), 6:00am (New York)

Background

Established in 2011, the United Nations Office for Sustainable Development (UNOSD) is part of the Division for Sustainable Development Goals (DSDG) of the United Nations Department of Economic and Social Affairs (UNDESA). UNOSD contributes to building, exchanging and facilitating the use of knowledge in support of sustainable development.

One of UNOSD's flagship activities to fulfil this goal is the annual Sustainable Development Transformation Forum (SDTF), which normally takes place at the end of October every year but, due to the novel coronavirus (COVID-19) pandemic, the 2020 SDTF had to be postponed to early 2021. In previous editions of the SDTF, the Forum tended to follow the thread of the previous and forthcoming sessions of the High-level Political Forum (HLPF), and examine their interlinkages, given the integrated nature of the 2030 Agenda. It moved away from this approach for the 2019 SDTF, when the Forum instead followed the structure of the Global Sustainable Development Report 2019 (GSDR 2019)¹ using its six identified entry points for transformation and four levers which, when combined effectively, can accelerate those transformations².

¹ In 2016, the UN Member States requested the Secretary General to appoint a group of independent scientists to prepare a Global Sustainable Development Report every four years, to inform deliberations at the High-Level Political Forum on implementation of the 2030 Agenda and on emerging sustainable development challenges. The first edition of this report was published in September 2019 under the title, "The Future is Now: Science for Achieving Sustainable Development".

² These six entry points are: Human well-being and capabilities; Sustainable and just economies; Food systems and nutrition patterns; Energy decarbonization and universal access; Urban and peri-urban development; Global environmental commons. The four levers are: Governance; Economy and finance; Individual and collective Behaviour; and Science and technology.

This edition of the SDTF will also be guided by the 2019 GSDR approach, particularly the four key levers of change to accelerate fundamental transformation towards sustainable development (Governance, Economy and Finance, Individual and Collective Action, and Science and Technology), while focusing on some of the unprecedented challenges the international community is facing due to the impact of the COVID-19 pandemic. The Forum will discuss experiences, lessons learned, good practices, strategies and measures that have been or could be implemented to build back better and greener, using the Sustainable Development Goals as a roadmap for all sectors of society at all levels to work towards a rapid and sustainable recovery from the COVID-19 pandemic and accelerate the delivery of the Global Goals during this Decade of Action³.

³ In September 2019, during the UN Secretary-General's SDG Summit, Heads of State agreed on a Political Declaration (A/RES/74/4) for the coming Decade of Action, following the UN Secretary-General's global call to all sectors of society to mobilize for a decade of action to deliver the SDGs by 2030. (Source: Decade of Action to deliver the Global Goals).

⁴ The IMF projects that, even with the US\$18 trillion that has already been spent to stimulate economies around the world, the global economy will lose US\$12 trillion, or more, by the end of 2021. (Source: Goalkeepers Report 2020).

⁵ Idem.

The COVID-19 pandemic has confronted the world with unprecedented challenges, exposing and exacerbating inequalities, weaknesses in health systems, governance challenges following on years of weakening delivery of public goods, lack of policy coherence and lack of coordination between national, regional and local governments, as well as public sector departments and agencies. Today, the pandemic continues to spread rapidly in parts of the world, even as vaccines begin to be distributed in a number of countries. The economic toll has been high, even in countries which have been so far spared the worst health impacts. Moreover, there is a serious risk that the rollout of vaccines in less developed countries will be delayed as the global supply is straining to meet demand even in the rich countries, which have signed contracts for large quantities of the vaccines so far approved in Europe and North America. If the pandemic continues to spread widely in those countries, their economies will struggle to recover and progress towards many SDGs will be set back by years⁴. While certain countries' governments have the fiscal space to provide income support to households and relief for businesses in distress, this is rarely true for the less developed countries, many of whom entered this COVID crisis already substantially in debt. The G20 countries have spent roughly 22 percent of their GDP for stimulus funding, while sub-Saharan African countries have spent on average just 3 percent of their much smaller GDPs⁵.

The UN and other international organisations are spearheading a collaborative multilateral effort to address the immediate health crisis by working to ensure that vaccines, diagnostics, and therapeutics are available and affordable to those in need in a timely manner, whatever the country. Still, the vaccine effort, under the auspices of COVAX, must contend with the supply shortages mentioned above.

Meanwhile, the UN and other multilateral institutions are also co-ordinating efforts to mobilise resources for countries, especially less developed ones, to build back better and greener – that is, to recover from the economic shock as quickly as possible and in doing so to direct investments to uses that will put them on a long-term sustainable and resilient development path – one consistent with achieving the SDGs as well as the Paris Agreement targets.

Forum Objectives and Content

The overarching objective of the 2020-21 SDTF is to achieve a better understanding of successes, lessons and specific mechanisms for initiating and fostering the transformations that are urgently needed to make our societies sustainable, resilient, prosperous, peaceful and inclusive in accordance with the ambitions of the 2030 Agenda for Sustainable Development. This edition's focus will be on building back better and greener through fostering sustainable, low-carbon industrialisation. It will identify efforts being made by governments and the opportunities they can exploit to use COVID-19 recovery plans and budgets to support a low-carbon transition across the economy, with a strong emphasis on decarbonisation of the energy, transport and industrial (including agro-industry) sectors.

Unlike the previous, three-day, in-person editions of the SDTF, which brought together a hundred or so participants from all over the world in Incheon City, South Korea, the 2020/2021 SDTF is taking a different approach. Given the travel and in-person meeting restrictions imposed by the Covid-19 pandemic, the Forum will take place through a series of two-hour online sessions over five days from 22 to 26 February 2021 (inclusive), 8:00pm to 10:00pm, Korea Standard Time.

Consequently, this edition will have a more limited scope, and a sharper focus, than in the past. This presents an opportunity to begin more in-depth exploration of the different "entry points" for transformation identified by the 2019 Global Sustainable Development Report. Thus, the 2020-21 SDTF will focus on the "sustainable and just economies" entry point, considering in depth how developing countries can seize the opportunities presented by COVID-19 and long-term decarbonisation to launch – or, in some cases, accelerate – sustainable, low-carbon industrialisation.

This remains a high priority for low-income developing countries, notably in Africa, a priority reflected in SDG 9. It also involves investing in sustainable infrastructure and supporting innovative technology development, adaptation and adoption to support dynamic economies and move along a 'green' industrial development path, one that creates quality, productive jobs for all workers of different skill levels (SDGs 5, 8, 9).

The 2020-21 SDTF will also discuss issues interconnected with each other on such a green industrial path. It will, for instance, consider that in various developing contexts, including in African economies, the modernization of agriculture and its whole value chain is an important part of industrial sector development, linking SDGs 2 and 9 among others. Discussions will also include how sustainable, low-carbon industrialisation can contribute to poverty alleviation and greater equality (SDGs 1, 10).

The five sessions will address different topics, as explained below.

While the exact titles and outlines of each session are yet to be finalized, the first part of the **opening plenary** will be *specifically* linked to the pandemic. This session, which will also include a half-hour opening ceremony, will relate to how COVID has or has not changed the world -- opened up (or not) possibilities for truly transformative shifts away from business as usual towards sustainable options. While the session will include reference to how countries, regions and institutions are dealing with issues related to health, hunger, poverty, employment and faltering economies, its main focus will be on outlining the challenges for integrating industrialisation – especially the rapid industrialisation demanded by some countries in Africa – into sustainable development strategies.

All five sessions will deal with specific challenges for sustainable development in individual areas of the economy. Selected themes are: (i) *Building Back Better and Greener*; (ii) *Transformative Partnerships for Financing and Investing in Sustainable Infrastructure: Energy and Transport*; (iii) *Industrial, Technology and Labour Force Development Policies for Sustainable Industrial Development*; (iv) *Building Local Sustainable, Low-Carbon Agro- and Construction Materials Processing Industries*; (v) *Moving To Zero-Waste, Circular Economies*. The final session will integrate the summing up and conclusion of the 2020/2021 SDTF in its final half hour ending with the closing ceremony. The four levers of the 2019 Global Sustainable Development Report that informed the previous SDTF – *Governance, Economy and Finance, Individual and Collective Action, and Science and Technology* – will also inform the discussion of sustainable, low-carbon industrialisation.

Governance has clearly been highly differentiated throughout regions and countries in approaches to dealing with the pandemic. Yet, the virus is exactly the kind of global challenge that can only be dealt with on a planetary basis, like the SDGs and climate change. Can we identify approaches to governance that most effectively abetted efforts to contain the pandemic? Do these same contain lessons for the global drive towards the SDGs and action on climate change?

The impact of the pandemic on the **economy and finances** of countries and institutions has been in many cases dramatic and negative. While some sectors, such as e-commerce and software for remote learning, telemedicine, and other applications have actually drawn benefits from the lockdowns put in place to slow the spread of the virus, in many other sectors, the impact has ranged from the negative to the catastrophic. Even with emergency government support in some countries, businesses and households have had to dig deeply into their resources to support themselves and many small businesses will not survive. Hunger has dramatically increased as have other negative impacts like homelessness. Both businesses and households have become more leveraged and, if economic recovery is prolonged due, for example, to failure to control the virus, there are clear

perils to the health of financial systems. These could be compounded by emerging financial risks associated with climate change.

The reaction to the pandemic has shown the strengths and the shortcomings of **collective and individual action**. While initial support for medical and scientific experts was generally strong, as time went on it waned in many countries and morphed into outright resistance in others. The development of vaccines and the need to trust science if the pandemic is to be tamed may have dampened such resistance. Reaching the SDGs and tackling climate change will require sustained and informed collective and individual action over years. How can we solicit and sustain such support? What have we learned from human behaviours throughout the current crisis? How can we channel individual and collective action effectively into implementation?

The role of **science and technology** is clearly critical in identifying the areas for action and developing solutions to challenges on the way to sustainable industrial development. Even the scientific sceptics tend often to be technology believers. The biggest challenge on this front is not scepticism but fairness and multilateral solidarity. In recent years a resurgence of economic nationalism has complicated efforts to promote international technology diffusion and transfer. This includes the risk that COVID-19 vaccine nationalism significantly delays access of poor countries. Much such technology diffusion and transfer happen through foreign direct investment (FDI), and this too has slowed significantly, in large measure as a result of the pandemic. How can we reinforce multilateral cooperation to ensure that the poorest and most vulnerable are not excluded from timely and affordable access to technologies needed to support sustainable development? The **final session** will also produce initial conclusions and recommendations, based upon the rapporteur's reports from each of the foregoing ones.

Outputs and Follow-up

The Forum will result in a communiqué —the *Incheon Communiqué*. In addition, a volume based upon the discussions, deliberations and conclusions of the Forum —the 2020-21 SDTF Publication— will be produced during weeks following the Forum. Both the *Incheon Communiqué* and the 2020-21 SDTF Publication will be published and posted on the UNOSD's Website.

UNOSD is also planning to organize a special 3-day face-to-face meeting in Incheon, Republic of Korea, where a selection of participants who have registered and actively taken part in the 2020-21 SDTF will be invited to share their learning and experience with peers from all over the world, when the situation allows.

Dates and time

The Forum will take place from **22 February 2021 – 26 February**, between **20:00-22:00**, Korean standard time (KST).

Theme

As indicated above, the theme of the 2020-21 Sustainable Development Transformation Forum will be *Building Back Better through Sustainable, Low-Carbon Industrialisation*.

Participants and Organisers

The 2020-21 SDTF is organized by the United Nations Office for Sustainable Development (UNOSD) of UN DESA, Division for Sustainable Development Goals (UN DESA-DSDG) in partnership with the Asia-Europe Foundation (ASEF).

The sessions will be led by the UNOSD team, namely, Mr. Jean D'Aragnon, Dr. David O'Connor and Mr. Colm Foy, co-conveners of the 2020-21 SDTF.

The Forum aims to bring together an international audience composed of a cross-section of decision makers from the public and private sectors, as well as technologists, economists and social science

researchers. It will have a particular focus on building back better and greener through sustainable, low-carbon industrialisation, exploring actions already in place and new opportunities for using COVID-19 recovery plans and budgets that are supportive of a low-carbon transition across the economy, with a strong emphasis on decarbonization of the industrial sector, particularly in least developed countries.

Language

The Forum will be conducted in English.

Agenda

(more information can be found at: https://unosd.un.org/events/2021-21_SDTF)

Day One, Monday 22 February 2021

Time	Activities
20:00 – 20:30	Session 1: Opening of the Forum Moderator: Mr. Jean D’Aragon, Senior Sustainable Development Expert, UNOSD -Mr. Elliott C. Harris, Assistant Secretary-General for Economic Development and Chief Economist, UN Department of Economic and Social Affairs (UN DESA) -Mr. Chun Kyoo Park, Head of Office, UNOSD -Mr. Toru Morikawa, Executive Director, ASEF
20:30 – 22:00	Session 1... Theme: <i>Building Back Better and Greener –</i> Moderator, Colm Foy Expert witnesses: -Mr. David O’Connor, Coordinator of the 2020-21 SDTF -Ms. Fatima Denton, Director of the UNU Institute for Natural Resources in Africa -Mr. Louis Meuleman, Founder/Director, PublicStrategy for Sustainable Development (PS4SD), Brussels, Belgium -Ms Natasha Santos, Vice-President of Global Stakeholders Strategy and Affairs for Bayer Crop Sciences

Day Two, Tuesday 23 February 2021

20:00 – 22:00	Session 2 Theme: <i>Transformative Partnerships for Financing and Investing in Sustainable Infrastructure, Energy and Transport –</i> Moderator, David O’Connor Expert witnesses: -Håvard Halland, Senior Economist, OECD Development Centre, Co-author, <i>Mobilising institutional investor capital for climate-aligned development</i> -David Horan, Post-doctoral Researcher, School of Politics and International Relations, University College Dublin -Ms. Parasto Hamed, AgResults – “Pay-for-Results” -Mr. Daniel Platz, Economic Affairs Officer, Financing for Development Office, United Nations Department of Economic and Social Affairs (UN DESA) (video)
----------------------	--

Day Three, Wednesday 24 February 2021

20:00 – 22:00	Session 3 Theme: <i>Industrial, Technology and Labour Force Development Policies for Sustainable Industrial Development –</i> Moderator, David O’Connor Expert witnesses: -Mr. Ambuj Sagar, founding Head of the School of Public Policy, Indian Institute of Technology (IIT) Delhi, and member of the UN Secretary General's Independent Panel of Experts on Sustainable Development Mr. Edward Mungai, CEO, Kenya Climate Innovation Center (KCIC), Nairobi, Kenya
----------------------	---

-Mr. Andrew Mold, Chief, Regional Integration and the African Continental Free Trade Area (AfCFTA) Cluster, Sub-Regional Office for Eastern Africa, UN Economic Commission for Africa (UNECA)

-Ms Helen Hai, UNIDO Goodwill Ambassador for Sustainable Industrialisation, CEO of the Made in Africa Initiative

Day Four, Thursday 25 February 2021

20:00 – 22:00

Session 4

Theme: *Building Local Sustainable, Low-Carbon Agro-Processing and Construction Materials Industries* – Moderator, David O’Connor

Expert witnesses:

-Mr. Antonio Carrillo Doblado, Head, Climate and Energy programme, LafargeHolcim Ltd

-Mr. Nicolas Maennling, Principal Advisor - Regional Cooperation for the Sustainable Management of Mineral Resources in the Andean Region, GIZ

-Mr. Santiago Alba-Corral, Director, Climate-Resilient Food Systems, International Development Research Centre, Ottawa, Canada

-Mr. Clemens Grünbühel, Senior Research Fellow, Stockholm Environment Institute

Day Five, Friday 26 February 2021

20:00 – 21:30

Session 5

Themes: *Moving To Zero-Waste, Circular Economies* – Moderator, Colm Foy

Expert witnesses:

-Mr. Seung-Whee Rhee, Professor, Kyonggi University, Republic of Korea

-Mr. David McGinty, Global Director of the Platform for Accelerating the Circular Economy (PACE) World Resources institute (WRI)

-Ms. Grażyna Pulawska, Acting Director, Sustainable Development & Public Health Department, Asia-Europe Foundation (ASEF)

-Ms Jennifer Fraser, Synergy Foundation – a case study of implementing the circular economy at the local level

21:30 – 22:00

Discussion on the whole Forum; Summing up and Closing of the Forum

The Incheon Communiqué

-Mr. David O’Connor, Coordinator of the 2020-21 SDTF

Closing remarks:

-Mr. Léon Faber, Deputy Executive Director, ASEF

-Mr. Jean D’Aragon, Senior Sustainable Development Expert, UNOSD

Annex 2:

Incheon Communiqué (07/03/21)

Sustainable Development Transformation Forum, 2020-21

We, the participants in the 2020-21 Sustainable Development Transformation Forum co-organised by the United Nations Office for Sustainable Development in Incheon, Republic of Korea, with the Asia Europe Foundation (ASEF) and broadcast virtually world-wide, having met during the week of 22-26 February 2021 to reflect on the topic of “Building Back Better and Greener: Sustainable, Low-Carbon Industrialisation”, issue this Incheon Communiqué to share our policy-relevant conclusions with the international community, national governments and other stakeholders.

Crises can also offer opportunities. As countries invest in recovery and re-energizing their economies in a post-COVID-19 world, they have an opportunity to re-evaluate their pre-pandemic development trajectories. Global decarbonisation by 2050 will require all countries to wean themselves off fossil-fuel dependency. Reorientation is needed in developed and emerging economies but also in those newly embarking upon sustained industrial development.

Countries with large young populations need robust job creation, including promotion of relatively labour-intensive manufacturing. Late industrialisers may still capture investments from countries with fast-rising incomes – notably in Asia, including China – that are relocating labour-intensive industries away from their own shores. Governments seeking such investments need to be proactive. Experimentation can help. Ethiopia, for example, has set up industrial parks for both foreign and domestic investors that are easily replicable.

Jumpstarting industrial development is complex and difficult; adding *low-carbon* to the mix compounds the problem and no country has yet succeeded in decarbonising their industrial economies. Some progress has been made in developed countries, in part by sourcing carbon-intensive goods from emerging economies, and in developing countries.

The challenges are particularly great for the most carbon-intensive global industries, like steel and cement and concrete manufacture. Various routes to reducing the carbon intensity of cement have been successfully pursued by industry leaders in the past 30 years, and innovations are continuing. The challenge ahead will be to build millions of adequate, safe and affordable housing units for low-income households in the developing world, using materials made with low- or zero-carbon processes.

Sustainable, low-carbon industrialisation requires forward-looking and adaptive governance based on medium- and long-term planning. Governance models must emphasise more broad-based consultative mechanisms and less hierarchy, especially to build political consensus for hard decisions needed to move towards decarbonised economies and industries.

Substantially increased investments must be mobilised if the SDGs are to be achieved globally, but the financing gap has significantly increased with the COVID-19 pandemic.

Adequate investments cannot be mobilised without tapping the enormous pools of capital controlled by institutional investors. Multilateral financial institutions (MFIs) need to strengthen their capacity to add value for these investors by assisting them in assessing risk in new sectors and geographies, and helping relieve bottlenecks to investing in borderline regions and sectors. Jointly capitalised investment funds are needed where those investors not only provide capital with MFIs but also have a major stake in governance, within well-defined mandates.

Partnerships are a highly flexible vehicle for bringing together key stakeholders to tackle specific sustainable development challenges. They can mobilise varied types of resources and expertise, for example linking institutional investors with MFIs as conduits for financing of strategic investment funds, green banks and other downstream actors in developing countries. An inventory of existing partnerships and identification of key missing partnerships would be valuable in constructing a balanced SDG-targeted partnership portfolio in each country.⁸

Financing is not scarce globally, but it is not available where it is most needed to achieve the SDGs, nor is it well adapted to the needs of innovative, smaller-scale enterprises in developing countries. Public-private venture funds and other forms of blended finance can help to mobilise capital for innovative start-ups.

Government and international development partners have been experimenting with results-based financing. Such financing, which includes prizes-for-results initiatives, has been used to support agricultural innovations but the principle has broader applicability. Results-based financing is gaining traction in financial markets in the form of social impact bonds, which offer a return to investors only when pre-defined performance benchmarks are achieved.

Beyond financing, **strategic planning and policies will be crucial to fostering sustainable industrialisation,** based on realistic assessments of dynamic comparative advantage in relation to emerging opportunities, and avenues for value addition, including in the agricultural sector.

Focused policy support is needed where it is most likely to have multiplier effects and leverage private investment and innovation. This may be in pre-commercial R&D, government-supported incubators and industrial parks, and the provision of standards and testing laboratory services for local products to meet international quality and reliability standards. Critical infrastructure (transport, energy, storage) enables producers – both industry and farmers – to access markets and capitalise on innovation.

Sustainable industrial transformation will require a broad range of skills beyond the “obvious” ones. Skills in business, commerce and law are critical, as is IT training. Innovators

⁸ UN DESA has recently developed a guidebook to help develop successful multi-stakeholder partnerships to deliver the Sustainable Development Goals at country level, which could be found at: https://sustainabledevelopment.un.org/content/documents/2698SDG_Partnership_Guidebook_1.01_web.pdf

need to know their intellectual property rights are protected and that they can bring a product to market.

The African Continental Free Trade Agreement (AfCFTA) would shift the balance away from reliance on trade preferences in OECD markets towards greater intra-regional trade, which is likely to be more diversified, with a higher share of intra-industry trade.

The transformation of the world economy towards zero net carbon will be minerals-intensive, and countries endowed with those minerals stand to derive significant benefits. However, they need to work with extraction companies to minimise and mitigate environmental damage. Mining operations have been moving towards labour-saving technologies, accelerated by the COVID-19 pandemic, which raises employment and livelihood concerns. The revenues from mining need to be used to secure the future well-being of the dependent communities when mining ends.

Agriculture, a dominant sector in low-income countries, needs to be kept productive and to adapt to climate change, while identifying opportunities to add value for farming and agro-industries. Niche products utilising the international geographic identifier system to facilitate sale at a market premium, and establishing a reputation for “green agriculture” can help.

Globally, progress towards adoption of circular economy principles is accelerating, albeit from a small base. The concept is a means, a set of tools to help countries move towards inclusive and sustainable economies that offer a high quality of life. **Scaling circular methods in developing countries offers the prospect of increasing economic return to waste-recovery jobs** which currently offer many informal sector workers a ‘hand-to-mouth’ existence.

Circular economy efforts remain piecemeal and disconnected, instead of creating momentum across different stages in the production-consumption system. **Plastic waste management often focuses on collecting, recycling and reusing plastic waste, but much remains to be done to develop good new substitutes.** Continued fossil fuel subsidies in many countries complicate efforts to reduce reliance on petroleum and natural gas as feedstocks. Bioplastics are still under development but hold promise as substitutes (Korea is actively pursuing research in this area).

The deep and fascinating **presentations** made to the 2020/2021 Sustainable Development Transformation Forum **provided inspiration for policy makers and implementers to adopt evidence-based pathways towards low-carbon, green and adaptive industrialisation.** While many challenges are clearly visible and hurdles will need to be overcome, the Forum shed several rays of light on ways forward into a more sustainable and rational industrial future.