



A Green Deal for Sustainable Resources



WRF is an independent non-profit international organization that serves as a platform connecting and fostering knowledge exchange on resources management amongst business leaders, policy-makers, NGOs, scientists and the public.

This report was produced by Emanuele Di Francesco, Mathias Schlupe and Fabian Ottiger based upon inputs from workshop organisers, speakers and participants. The report has not been reviewed by the speakers.

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1 Introduction Letter

Dear Reader,

After two years of waiting due to the global pandemic and the missed opportunity to host WRF2020 in Ghana as originally planned, it is a great pleasure to introduce the Meeting Report of the World Resources Forum 2021 – A Green Deal for Sustainable Resources.

On October 12th–14th, we welcomed over 950 international participants for a three-day hybrid event, with activities taking place in Ghana, Switzerland and online. As the first WRF conference on African soil, WRF2021 has enabled to put the perspectives, challenges, and solutions of African people at the core of a global, multi-stakeholder dialogue for the sustainable management of natural resources.

While the world is undertaking large-scale transitions to low-carbon economies, we must ensure that increased demand for mineral and metal resources does not translate into an excessive burden on nature and a barrier for social cohesion and international cooperation. Today more than ever, we see how the type of resources our economies rely on, how we use them and who owns them profoundly shape the international political, economic and social order.

Our ability to urgently implement transformative policy and practical solutions will be decisive for our path towards the achievement of human prosperity within planetary boundaries. We strongly demand these solutions not only to be sustainable, but also equitable and conducive towards a fair distribution of value, benefitting the Global South and the most vulnerable regions and communities around the world.

Led by our mission, we are proud to have been able to convey such a large and diverse audience of stakeholders, encompassing policy-makers, scientists, businesses, UN organisations, financial actors and civil society, with over 50% coming from the Global South. We hope that this report will allow everyone to benefit from the inputs of our speakers and wider community.

For this successful edition, many words of gratitude are in order. First, to our country Co-Hosts, the Ghanaian Ministry of Environment, Science, Technology and Innovation and the Swiss Federal Office for the Environment. Second, to our conference partners who have supported the realization of in-person events: GIZ in Ghana, and ETH-RAT and Empa in Switzerland. Third, to all the 200+ speakers and 40+ partner organisations that have enriched the debate and provided inputs for cutting-edge discussions. Finally, to all the participants, for making the event such a lively moment of encounter, sharing and reflection.

WRF2021 has also been the first WRF conference to take place in a hybrid format, delivering new value propositions to our community while lowering our environmental footprint. We will now take time to reflect on the learnings and will be back for the next WRF Conference in 2023.

Thank you for your continuous support – I hope to see you all next time!



With best regards,

Bruno Oberle

President of the World Resources Forum Association

2 WRF2021 in a snapshot

Date: 12–14 October

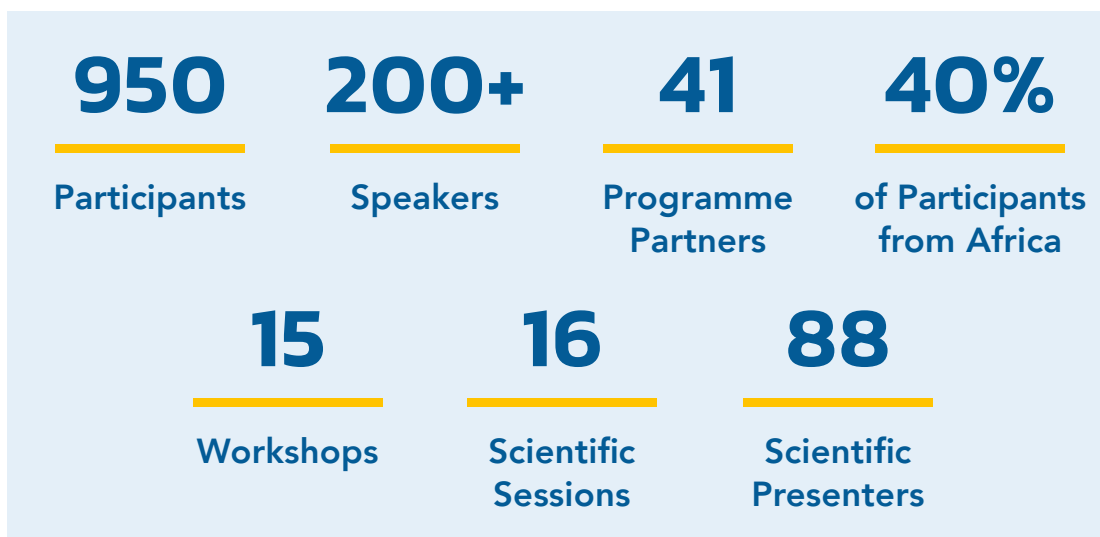
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Locations: Accra (Ghana), Zurich (Switzerland), Online

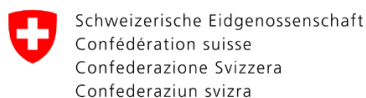
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3 Conference Tracks:

- Primary Resources: fair resource extraction for a prosperous future
- Secondary Resources: from waste to resources for development
- Circular Economy: designing systems for circular resources



Co-Hosts



Swiss Federal Office for the Environment (FOEN)



MINISTRY OF ENVIRONMENT, SCIENCE, TECHNOLOGY AND INNOVATION

Ministry of Environment, Science, Technology and Innovation of the Republic of Ghana

Partners

Deutsche Gesellschaft für Internationale Zusammenarbeit | European Commission | United Nations Environment Programme | SEED | African Circular Economy Alliance | African Circular Economy Network | Ghana National Plastic Action Partnership | Green Industry Platform | International Resource Panel | One Planet Network | World Bank Group | Global Opportunities for Sustainable Development Goals | Responsible Mining Foundation | Switch To Green | Empa | SRI | Environmental Protection Agency Ghana | UNU-INRA United Nations University Institute for Natural Resources in Africa | Ghana National Cleaner Production Centre | WWF | University of Ghana | ISO | UNICEF | ETH NADEL | Swiss Trading and Shipping Association | Holland Circular hotspot | SteP | IUCN | International Council on Mining and Metals | Swiss Better Gold Association | RE-SOURCING | Mountain Research Institute | ENEMCO | ETH Rat

3 Key takeaways from WRF2021



Policy

1. **Governments can and should play a supportive and enabling role for the industry transformation towards responsible mining**, through national regulations and global agreements which create a global playing field, and continuous monitoring and evaluation to enable transparency and accountability.
2. **A responsible and inclusive governance of mineral resources must encompass broad and effective stakeholder engagement**, particularly women, indigenous and tribal people and local communities.
3. **Useful tools, frameworks and regulations for the recovery of secondary resources need to evolve to better support a transition to the circular economy**, as in the case of the Basel Convention and Extended Producer Responsibility (EPR) schemes. The potential for a global EPR scheme should be further discussed in an international arena.
4. **OECD-centric circular economy concepts have so far not put enough attention on the effects of domestic policies on third countries**. A systemic understanding of the effects and interdependencies of domestic circular economy policies on low-income countries is required. Increased knowledge on the topic should be reflected in national and regional policy design.
5. **The social dimension of the circular economy transition needs to be better built into circular economy policies**. This calls, amongst others, for the design and adoption of new circular economy indicators and a stronger relationship between circular economy targets and impact targets.



Industry

1. **The extractive sector must move towards responsible mining**, pursuing a fair distribution of value, human health and environmental protection. Responsible mining practices must encompass economic development and social issues, including aspects related to the health and safety of mining workers and communities living nearby mining sites.
2. **The upscale of secondary markets and circular economy is vital to provide the resources necessary for a sustainable transition**, guaranteeing resource security and reducing demand for virgin raw materials. Through improved product design, extended asset life, reuse, remanufacturing and recycling, there is a huge potential to deliver tangible commercial and environmental gains, which largely remain untapped today.
3. **SMEs, with their wealth of innovative solutions, will play a key role in the transformation of global supply chains towards circularity**. As such, they should be provided with all the tools, resources and capacity necessary to scale their operations in local and global supply chains.



Finance

- 1. Financial and trading actors have a central role to play in fostering sustainability in mineral value chains**, through increased transparency and cross-chain collaboration. For green finance to act as a powerful driver towards sustainability, existing frameworks and initiatives need to be better coordinated and integrated. Monitoring and reporting practices of sustainability credentials need to go over the challenges of operationalization, harmonization and credibility.
- 2. The true socio-economic costs incurred in the extraction of mineral resources should be reflected in commodity prices.** Financial and trading actors should include the risk of the unsustainable use of natural resources, causing climate change, biodiversity loss and pollution into their financial decisions.
- 3. Digital technologies have the potential to improve access to data and to track sustainability performance**, enabling higher levels of trust, transparency and traceability in commodity trading and finance.

4 Speakers' Visions



“Humanity faces an urgent choice: break down or break through. In order to break through, we need an efficient and responsible approach to natural resources management, built around shared value creation, respect for planetary boundaries, responsible supply chains, empowered consumers, engaged communities, and accountable governments.”

Inger Andersen

“We believe that in the years ahead the circular economy will be an economic model able to save the future of humankind.”

Oliver Boachie



“Responsible mining can be done and is already happening. With regulatory ecosystems, investor requirements, activism and courageous leadership, we can move towards an industry that prevents harm, limits risk and builds trust.”

Helene Piaget



Speakers' Visions



“We need a policy triangle: circular economy policy, trade policy and development cooperation policy. The three of them need to work together to have a fully sustainable and equitable circular economy transition.”

Marianne Kettunen

“Climate change provides an umbrella under which the mineral resources sector should come together and act on a shared ambition to be part of the global solution.”

Izabella Teixeira



“The clean energy transition provides a unique opportunity for Africa to accelerate its industrialization and development path. To fully benefit from the transition, however, African countries need to increase the value they add to global value chains, in addition to being the place for extraction of critical raw materials.”

Kojo Busia

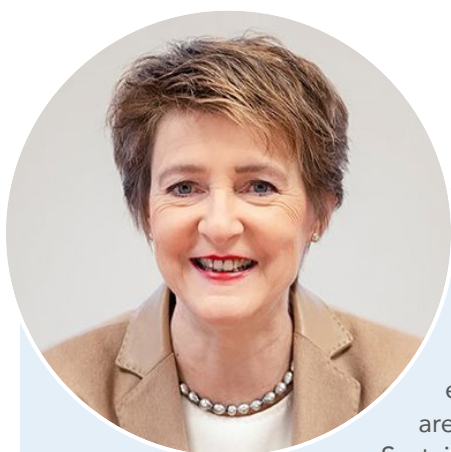


5 Ministerial Opening

The Co-Hosts of WRF2021

WRF2021 was officially opened by high-level Ministerial Speeches by **Simonetta Sommaruga**, Swiss Federal Councillor, and **Dr. Kwaku Afriyie**, Minister of Environment, Science, Technology and Innovation of the Republic of Ghana.

The economies of both **Ghana** and **Switzerland** are strongly bound to resource governance issues, although in very different parts of the value chain. At the beginning of the value chain, Ghana is endowed with important natural resources and minerals, and a significant portion of the economy relies on extractive activities. Later in the value chain, Switzerland is a global player in the trade of natural resources, especially in gold and precious metals, serving its international trade centres and national industries. In both their speeches, Ms. Sommaruga and Dr. Afriyie stressed the importance of an ongoing partnership among the two countries for finding collaborative and innovative solutions throughout the value chains of natural resources.



“The world faces a crisis of climate change, biodiversity loss and pollution. The extraction of raw materials plays a key role in this context. On the one side, resource extraction has strong and partly irreversible environmental impacts. On the other side, raw materials are essential to implement the Paris agreement and the Sustainable Development Goals.

This global picture reveals the urgent need to strengthen the global governance of resources. Aware of this, Switzerland has been very active towards the adoption of a resolution on mineral resource governance at the last UN Environment Assembly, putting this issue at the top of the global environmental agenda. All countries depend on the sustainable management of resources, whether they extract, trade or consume resources. All countries share responsibility at the next UN Environment assembly in February 2022. It will be essential to set up an intergovernmental Working Group on resource governance, so that member states can discuss priorities and develop the rules needed. The World Resources Forum provides an excellent platform in preparation for the UN Environment Assembly, bringing all stakeholders together to discuss innovative solutions.”

Ms. Simonetta Sommaruga
Swiss Federal Councillor

Ministerial Opening



“Rapid population growth and climate change have combined with irresponsible exploitation, production and consumption to mount intense pressure on the world’s natural resources. As a result, precious resources are rapidly diminishing, with devastating impacts around the world, particularly on the poor who rely on these resources to generate most of their incomes and to maintain their livelihoods.

With its focus on the three thematic areas of primary resources, secondary resources and circular economy, WRF2021 presents a great opportunity to reflect on more sustainable ways of designing, producing, consuming and regenerating value from what would be otherwise discarded as unwanted waste. Circularity is a very promising innovation in resource management to reduce the pressure on the use of resources, preserve the health of the environment and create jobs.

Ghana and Switzerland have embarked on an exciting journey as partners to confront the challenges facing mankind in the areas of environment and natural resources management. Whether it is adaptation to climate change, control of plastic pollution, or the management of electronic waste, our two countries are working together to find shared solutions. WRF2021 is a shining example of this partnership and, as MESTI, we are very proud to represent Ghana in this journey.”

Dr. Kwaku Afriyie

Minister of Environment, Science, Technology and Innovation, Republic of Ghana



6

Online Plenary Panel Debates

Mineral Resource Governance for a Green Deal: the key role of international cooperation

<p>Topic stream: Primary Resources</p> <p>Format: Keynote and Online Panel Discussion</p> <p> Session Recording »</p>	 <p>Inger Andersen Executive Director at United Nations Environment Programme</p>
	 <p>Manuel Pulgar-Vidal Global Leader of Climate and Energy at WWF</p>
	 <p>Izabella Teixeira Co-Chair International Resource Panel</p>
	 <p>Kojo Busia Non-Executive Director AngloGold Ashanti</p>
	 <p>Masuma Farooki Consulting Director at MineHutte</p>

Discussion

With a growing global population, and the expected large-scale deployment of green and digital technologies, demand for minerals and metals will increase in the coming decades. In the short term, a substantial portion of this demand will be met through extractive activities. While extractive activities can be a potential engine for economic development, they are often accompanied by a variety of social, environmental and economic detriments. Despite ongoing efforts to create legal and regulatory frameworks, as well as formal and informal initiatives and instruments to improve governance of the extractive industry, fragmentation of these efforts make it difficult to achieve their desired impact in a holistic way. Given the diversity of the mineral governance landscapes and complexity of issues associated with the extractive industry, there is a need for a multi-national, multi-level and multi-sectoral dialogue and cooperation to find international agreement on systemic solutions, achieve fair and sustainable results and create effective cross-boundary mineral governance systems.

Takeaways

- Even renewable is not without a footprint. As countries accelerate their efforts to transition towards clean energy, they need to make sure that increased extraction rates do not augment stress placed on people and environment in mining locations.
- There are three major opportunities for the mining sector to drive the transition towards a green economy: 1) circularity, 2) digitalization, 3) green finance. Mining companies can be front runners in the uptake of circularity through improved product design, extended asset life, reuse, remanufacturing, recycling and the development of markets for secondary resources. As investors are increasingly looking at companies committed to sustainability, mining companies should take advantage of this climate of transparency and disclosure. Finally, digital technologies have the potential to improve access to data to track performance, improve trust and traceability.

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- Mineral resource governance plays a fundamental role to tackle the global environmental crises of biodiversity loss, climate change and pollution. The mineral resources sector should therefore be aligned into a new collective vision of the world through the strategies, policies and legal frameworks set by producers, investors and regulators.
- Governments need to get the foundations right on mineral resource governance through four interrelated aspects:
 - 1) a clear and well-implemented legal system with assigned rights,
 - 2) a comprehensive set of regulations for mineral resources,
 - 3) a shared and cross-sectoral vision, and
 - 4) a system able to protect defenders and promote public participation and accountability.
- The clean energy transition provides a unique opportunity for developing countries that extract a significant amount of (critical) raw materials, such as African and Latin American countries. These countries should be able to increase the value adding aspects of their value chains and try to localize some of the global value chains within their territories, relying on energy sources like hydropower and solar.
- Mineral resource governance should use the international momentum created by the climate umbrella, so that mineral resource governance decisions better fit climate change goals. We should find innovative ways to use international cooperation to address the key issue of benefit sharing – who gets to benefit from the extraction of mineral resources.

Recovering resources from post-consumer products: responsibilities and opportunities

<p>Topic stream: Secondary Resources</p> <p>Format: Online Panel Discussion</p> <p> Session Recording »</p>	<p> Anders Perrson Requirement Engineering Lead at IKEA</p> <p> Kristin Hughes Executive Director of Global Plastic Action Partnership</p> <p> Peter Andrews Director of Consumer Rights, Impact and Innovation at Consumers International</p> <p> Klaus Hieronymi CEO at Circular Economy Research GmbH</p> <p> Pascal Leroy Director General WEEE Forum</p>
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Discussion

Extended Producer Responsibility (EPR) schemes have been successfully introduced to tackle the issue of post-consumer products over the last two decades, e.g. for waste electrical and electronic equipment. Typically, EPR is implemented at the national level with diverse levels of implementation and enforcement on one hand and with many countries not having such policies in place at all on the other hand. This creates a high burden for producers to comply with a variety of approaches. At the same time there is a need for locally adapted approaches, since there is not one solution that fits every political and cultural context. That's also why responsibility is not only mandated to the producer of consumer products but this is often distributed across different actors in the value chain. In addition, EPR has been mainstreamed at a time when the mindset was focusing on "solutions for a waste problem" rather than on "strategies to improve the circularity of products".

Takeaways

- The framework of the Basel Convention needs to be modernized and better take into account the circular economy. This calls for a reformation of the Basel Convention towards new challenges and a better enforcement system, which is still a huge issue across the globe.
- More discussions should go into the feasibility of a global EPR scheme and what might potential global targets look like. These targets need to be feasible, reachable and scalable across locations. An example would be a global treaty on plastics, which sets some specific targets on waste reduction and infrastructure development throughout the entire supply chain of plastics.
- Manufacturers welcome any and all harmonization that enables them to apply the same rules to the different markets they are in. To ensure a level playing field and genuine progress, they are asking for strong incentives for companies in different markets not to settle on the lowest common denominator. One such incentive could be represented by increased consumer awareness.

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- One issue identified by consumers' organisations is that actors in the marketplace are placing the burden of responsibility on consumers, and this is neither fair nor effective. As long as infrastructure for handling waste are insufficient and the circular economy is not widely adopted, consumers have limited tools at their disposal. Placing responsibility on the companies, with a wide adoption of EPR schemes, would enable the financing of recycling facilities.
- Eco-labelling can be a powerful and effective instrument, as long as it's global. Today there is an excessive amount of labels (over 120), and it's very hard for manufacturers to follow all of them. Eco-labels with global requirements could provide a set of common rules which manufacturers would need to follow, with compliance requirements adjusted to national needs.

A global North-South partnership for a fair and inclusive circular economy transition

<p>Topic stream: Circular Economy</p> <p>Format: Online Panel Discussion</p> <p> Session Recording »</p>	 <p>Alexandre Lemille Advocate The Circular Humansphere</p>
	 <p>Hesther Brink Circular Economy Researcher at PBL Netherlands Environmental Assessment Agency</p>
	 <p>Marianne Kettunen Senior Policy Advisor and Head of Partnerships at Forum on Trade, Environment and the SDGs (TESS)</p>
	 <p>Susanne Karcher Co-founder African Circular Economy Network</p>

Discussion

As a growing number of countries state their ambitions to move towards a circular economy, policies and initiatives that take place domestically have far-reaching consequences in a highly integrated world economy, affecting environmental, social and economic outcomes around the world. Currently, very little is known on how domestic policies affect global value chains – still dominated by a linear economy logic – and not enough efforts have been carried out to bring forward a coordinated and collaborative approach able to ensure an inclusive and just transition for all the actors involved. This session is aimed at advancing our understanding of the interlinkages and effects that domestic circular economy policies in countries in the Global North have on countries in the global South, and discussing which collaborative opportunities can be leveraged to ensure that the circular economy unfolds at a global level with fairness and inclusivity.

Takeaways

- Global implications of countries shifting to a circular economy are not positive by default. Policy solutions need to be looked at in a holistic and comprehensive way. For instance, how can trade policies and trade relationships support a circular economy shift? For a fully sustainable and equitable global circular economy transition, we need a policy triangle: circular economy policy, trade policy and development cooperation policy. These three policy areas need to be working together.
- The impact of domestic circular economy policies on third countries in the Global South, depends on a variety of factors, including: type of circularity strategy (e.g. narrowing or slowing loops), who is included in the circular economy loop (whether only domestic or also foreign countries), and the local context in the third country.
- There is potential for the circular economy to contribute to some SDGs, such as SDG 8 on decent work, but for this to happen it is crucial how targets are set. If impact targets, such as the reduction of pollution and increase in decent work opportunities, are linked to circularity targets, then the circular economy can contribute to the achievement of SDGs and lead to a successful, sustainable and inclusive transition.
- New indicators need to be brought into the picture in order to accurately measure how fair and inclusive a transition is. One indicator group that has future potential is the footprint indicator, such as: what is the footprint of country X in the Global North on country Y in the Global South? This could be applied to also create a sort of social footprint indicator.



7

Swiss Event

Swiss Event

The Swiss event of WRF2021 was held on October 13th at the Empa Akademie in Dubendorf, Switzerland, consisting of a program of high-level keynotes and two stimulating panel discussions. The Swiss Event, kindly sponsored by Empa and ETH-RAT, had a focus on the topic stream of primary resources, particularly on trade and finance, and sustainability in the mining industry.

The Swiss Event was opened by keynote speeches by **Patrick Wäger** (Empa), **Martine Rohn-Brossard** (Swiss Federal Office for the Environment) and **Xaver Edelmann** (WRFA). Following the Opening session, two hybrid panel discussions took place with some speakers physically present and others connected digitally:

- 1) Fostering sustainability in commodity trading & finance: the role of transparency and technology
- 2) 'Green Mining' – how can we move from vision to reality?



Patrick Wäger
Empa



Martine Rohn-Brossard
Swiss Federal Office for
the Environment



Xaver Edelmann
WRFA





Martine Rohn Brossard
Opening keynote



Bruno Oberle
Closing keynote



Participants at the Swiss Event

Limited access and social distancing following a COVID-19 health protocol.

Fostering sustainability in commodity trading and finance: the role of transparency and technology



Martin Bardenhewer

Head of Institutional Clients & Multinationals, Zürcher Kantonalbank



Florence Schurch

Secretary General at Swiss Trading and Shipping Association



Gediminas Mikutis

Co-Founder and Chief Technology Officer, Healixa AG



Diana Culillas

Secretary General at Swiss Better Gold Association



Gerald Berger

Managing Director Gerald Berger Sustainability Consulting

Discussion

Actors and institutions involved in the trading of metal & mineral commodities and financial assets, play a key role in shaping the international commodity markets, which in turn support economic growth in resource-rich developing countries and facilitate the delivery of raw materials for the global economy. However, there are increasing calls for commodity related financial transaction and trading actors and institutions, to demonstrate transparency in their operations and evidence their sustainability credentials. Commodity traders in particular are seeing their reputational risk increase. Despite recent efforts in developing and promoting monitoring and reporting practices to address the issue, considerable challenges remain with their operationalization, harmonization and credibility. One key obstructing factor has been the lack of harmonized and comparable good-quality data that would evidence sustainability performances.

Takeaways

- In commodity trading, we witness several developments in the area of transparency, especially related to climate change and decarbonization. There is an increasing pressure to disclose climate related business risks and resilience strategies. As commodity traders heavily depend on funding for each transaction, the relationship with banks is stronger than in many other sectors, fostering cooperation for facing risks and spotting opportunities.
- A key focus area for increasing transparency should be on artisanal and small-scale mining, where we see most of the challenges related to human rights and environmental aspects. However, these are also the cases where quantitative reliable data is often missing, calling for solutions to fill this gap.
- There is a clear business case for transparency, with consumers demanding and willing to pay a premium for it, mounting pressure from NGOs, and more regulation demanding brand owners to disclose information on their supply chains.
- Transparency is difficult to achieve because manually tracking materials is inefficient, disclosing data can expose organisations' competitive advantage, and reported data might not correspond to the actual products. To overcome these challenges, a combination of digital and physical tools can give results that are both easy to scale and verifiable.

'Green Mining' – how can we move from vision to reality?



Helene de Villiers-Piaget
CEO Responsible Mining Foundation



Rohitesh Dhawan
President and CEO International Council on Mining and Metals



Gerard Bos
Director Global Business and Biodiversity Programme International Union
for the Conservation of Nature (IUCN)



Irina Bakhtina
Chief Sustainability Officer at RUSAL



Markus Noethiger
Managing Partner Enemco LLC



Gerald Berger
Managing Director Gerald Berger Sustainability Consulting

Discussion

While progress has been made in reducing the environmental, social and governance (ESG) impacts of the extractive industry, there are still challenges to be addressed to enable a sustainable transition towards low-carbon economies. Governments, researchers, mining companies and civil society are individually and collectively attempting to identify and implement technologies, best practices and processes to reduce the negative impacts associated with the extraction and processing of mineral resources. These efforts aim to improve the sector's ESG performance at different stages of the value chain. Despite these initiatives, some scholars and observers remain skeptical whether a "green mining" vision can be fully implemented in practice.

Takeaways

- The notion of 'responsible mining' should be preferred over that of 'green mining', as it encompasses a broader set of environmental and social indicators and is not narrowly focused on GHG emissions. Responsible mining is a multi-faceted issue, including tailings management, biodiversity and community relations, where not everything is easily measurable.
- Responsible mining can be done if we focus on five key factors:
 - 1) regulatory ecosystems,
 - 2) investor requirements,
 - 3) activism,
 - 4) crisis and
 - 5) leadership.
 If mining companies are to move from vision to reality, they need to think in terms of preventing harm, limiting risk and earning the trust as an industry.

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- If mines are managed in a socially and environmentally responsible manner and supply chains become more transparent and accountable, there is a big opportunity for the industry to shift public perception from a low-tech, heavily polluting industry to being perceived as part of the solution towards a cleaner and greener economy. Mining companies can play a role as land stewards and key contributors to economic development in remote areas.
- The circular economy represents an opportunity rather than a threat for the mining industry. With a shift in mindset, mining companies can see themselves not anymore as responsible for getting metals out of the ground, but rather as stewards of those metals throughout their lifecycle.
- The mining sector should embrace nature-based solutions and ensure that measures to decarbonize do not come at the expense of nature. Mining companies can have a nature positive agenda by looking at opportunities such as the re-design of non-operating mines.



8

Ghana Event

8 Ghana Event

The Ghana event of WRF2021 was held on October 14th in Accra, consisting of a rich program of high-level keynotes, stimulating panels, roundtables and fruitful networking events. The event was hosted by the Ministry of Environment, Science, Technology and Innovation of the Republic of Ghana, and was commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) through the E-Waste Programme, a Technical Cooperation implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ Ghana) in partnership with MESTI. The Ghana Event had a focus on the topic stream of secondary resources, particularly on the sustainable management of electrical and electronic waste.

Opening Session

The day started with a keynote from **Ms. Cynthia Asare Bediako**, Chief Director of Ghana's Ministry for Environment, Science, Technology and Innovation. In her speech, she highlighted the importance of a circular economy transition for Ghana, with a special focus on plastics and e-waste.

The Chief Directors's speech was followed by a keynote by **Mr. Heinz Kaufmann**, the Deputy Head of Mission and Head of Development Cooperation at the Swiss Embassy in Accra. He highlighted the good and longstanding collaboration between Switzerland and Ghana, especially in the areas of trade, infrastructure development and promotion of peace and human security. Mr. Kaufmann specifically mentioned the aim to promote attractive framework conditions for sustainable growth and the creation of decent income opportunities for the population, as it is for example done in the Sustainable Recycling Industries programme.

Finally, the opening session was concluded by the intervention of **Ms. Franziska Jebens**, Deputy Head of Development Cooperation at the German Embassy in Ghana who stressed that: "The world's resources are limited, there is a need to shift our mindsets towards minimizing waste and using our resources to the maximum. Events like the WRF21 are opportunities for us to come together, discuss common ideas, share common visions and celebrate joint efforts towards a more sustainable future."



"Ghana strongly believes that the current linear patterns of production and consumption are not sustainable, and that is why we have fully embraced the concept of circularity. Indeed, Ghana has already taken steps to join the club of nations that are leading the efforts to transition to a Circular Economy. We are using our approaches to the management of the plastics value-chain and E-Waste to pilot a structured transition to Circular Economy."

Ms. Cynthia Asare Bediako

Panel debate I:

National Approaches for E-Waste Management in the African Region

This session was led by three distinguished speakers: **Ms. Lydia Essuah** (Director of Policy Planning, Monitoring & Evaluation at MESTI), **Mr. Juma Ooro** (Chairperson at EACO Working Group 7), and **Ms. Mishelle Govender** (Chief Director of Hazardous Waste Management & Licensing in South Africa). The three speakers presented the approaches for e-waste management that are followed in their respective countries. As a key takeaway, the speakers highlighted the need for more and especially also streamlined regulations for e-waste management on both national and regional levels.

Panel debate II:

Interfaces between formal and informal sector

The panel consisted of **Mr. Markus Spitzbart** (GIZ/MESTI E-Waste Programme), **Mr. Sampson Atiemo** (Sustainable Recycling Industries), **Mr. Larry Kotoe** (Environmental Protection Agency) and **Mr. Nana Yaw Konadu** (Elektro Recycling Ghana). The speakers explained the crucial role of the informal sector and why formal-informal interface models are so important for the effective management of secondary resources. In addition, they also highlighted the challenges – such as creating a level playing field and the building of relationships that are based on trust – which must still be overcome using the example of Ghana. Approaches to strengthen the inclusion of the informal sector included the fostering of entrepreneurship, offering incentives and the enforcement of regulations that are adapted to the specific circumstances.

Closing Keynote:

The link between secondary resources and circular economy

To conclude the event, **Mr. Oliver Boachie**, Special Advisor to the Minister of Environment, Science, Technology and Innovation of the Republic of Ghana, held a keynote highlighting the link between secondary resources and circular economy. Mr. Boachie stressed the strong linkage between secondary resources and circular economy and the importance of differentiating between waste and secondary resources. Making this differentiation in turn leads to the appreciation of the value-adding processes of circularity.



You can watch an after-movie of the event here »



Ouma Rousanda Amadou

A warm welcome to all the participants from the moderator of the event.



Lydia Essuah

The opening speech during the first Panel Debate of the day.



The organizing team of the Ghana Event.



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Workshops

Circular Economy policy and business solutions to e-waste challenges in Africa

<p>Organisers: EU Switch to Green Facility, on behalf of European Commission DG-INTPA, in collaboration with DG-ENV</p> <p>Topic stream: Secondary Resources Circular Economy</p> <p>Chair: Alexander Charalambous Team leader EU Switch to Green Facility</p>	 <p>Carla Montesi Director, Green Deal and Digital Agenda, European Commission, DG International Partnerships</p>
	 <p>Joost de Kluijver Director Closing the Loop</p>
	 <p>Rosemond Boohene Director of the Centre of Entrepreneurship and Small Enterprise Development, University of Cape Coast Ghana</p>
	 <p>Mishelle Govender Chief Director Hazardous Waste Management and Licensing, Department of Forestry, Fisheries and the Environment, South Africa</p>

Discussion

This panel discussion on circular economy policy and business solutions to e-waste challenges in Africa shared a variety of circular economy approaches across the electronics and ICT value chains. **Carla Montesi** highlighted the commitment of the EU to a clear agenda for achieving sustainability goals in these value chains. At the policy level, with the Circular Economy Action Plan and the upcoming Sustainable Product Initiative, but also at the financing and implementation levels with the European Sustainable Development Fund. **Prof. Rosemond Boohene**, coordinator of the EU-funded E-Magin Ghana project stressed the need for inclusion of the informal sector when promoting a circular economy for electronics. Awareness raising and capacity building are essential elements to enable local SMEs to treat and manage e-waste in a more environmentally sound manner. **Mishelle Govender** stressed the importance of standards but also recognised that solutions to the e-waste challenge are not restricted to national borders. **Joost de Kluijver** stressed that the market is part of the solution, leveraging the experience of Closing the Loop, a circular business model based on the idea of waste compensation which aims at showing how reducing e-waste can be economically attractive.

Takeaways

- Establishing circular solutions embraces a cooperation of multiple stakeholders ranging from the informal sector, NGOs to business and legislators but also consumers and academia – as a Circular Economy cannot be developed in isolation.
- A transition to a circular economy needs to be a just transition – in case of e-waste this calls for including the informal sector in measures such as waste collection and recycling schemes. Formalising informal groups can facilitate better access to capacity building or business opportunities.
- Circular approaches are not only a way forward for e-waste but can be equally transferred to plastics, textiles or other product groups.
- E-waste is an opportunity rather than a challenge. The discussion highlighted that a mindset shift is needed to motivate more businesses and consumers to realize and appreciate the opportunities of circular electronics value chains.

A showcase of policy solutions benefiting Africa's circular economy MSMEs

<p>Organisers: SEED</p> <p>Topic stream: Secondary Resources Circular Economy</p> <p>Chair: Linde Wolters Head of Communications SEED</p>	 <p>Arab Hoballah Executive Director SEED</p>
	 <p>Bernadette Dzifa Agbefu Plant Manager JVL-YKMA Recycling</p>
	 <p>Wisdom Adongo Senior Project Officer Private Enterprise Federation</p>
	 <p>Letitia Abra-Kom Nyaaba Deputy Director, Ghana National Cleaner Production Centre & Environmental Protection Agency (EPA)</p>

Discussion

During this MSME Policy Collaboration Lab, panelists highlighted the role that eco-inclusive enterprises play towards an economy valuing waste and in the transition to a circular economy. **Dzifa Agbefu**, Plant Manager from JVL-YKMA Recycling Plant, shared the enterprise's mission, business model and impact. She also talked about enabling policy and her vision for improved government support for circularity relevant enterprises. **Letitia Abra-Kom Nyaaba**, Deputy Director at the Environmental Protection Agency (EPA), and **Wisdom Adongo**, Senior Project Officer at Private Enterprise Federation, presented Ghana's waste policy context and how MSME are affected by this. They shared a draft solution for an industry waste platform matching supply and demand for industrial by-products, as well as policy recommendations for Ghana's circularity stakeholders.

Takeaways

- MSMEs have a significant contribution to make to circularity. They have the transformative potential of eco-inclusive entrepreneurship to speed up the adoption of a circular economy-upstream and downstream. Promoting this also has co-benefits for resilience and green recovery.
- Government policy, however, is often focused on larger private sector players, resulting in lack of support and funding for small-scale players. Globally this results in key barriers and challenges in incorporating CE principles into MSMEs, including access to finance, markets, technology, skills, infrastructure. Ghana's waste enterprises indicated as challenges legislation targeting bigger projects, by-laws not covering scope of activities and poorly implemented, and needing capacity building to fully tap into programmes or incentives.

Global Policy recommendations to support MSMEs include: 1) Targeted business support services, such as improving market access and capacity building; 2) Providing technology access and support on digitalization of processes; 3) Identifying new avenues for finance and infrastructure; 4) Skill development, such as vocational and technical training, skill upgradation, skill mapping, certification; 5) R&D collaboration between industry and academia to develop cost-effective technology; 6) Targeted financial support for MSMEs in export markets; 7) Cluster service approach – with a local service provider/manufacturer.

Recommendations from local Ghana experience include: 1) promote policies that make landfilling unattractive; 2) incentives for SMEs to find alternative uses of waste; 3) source segregation of waste to support the Materials in Transition (MINT) position of the National Environmental Sanitation Policy; 4) government as part of its procurement policy should prioritize buying products from secondary raw materials.

In Africa for Africa: weaving solutions for textile circularity challenges

<p>Organisers: Green Industry Platform and Global Opportunities for Sustainable Development (GO4SDGs)</p> <p>Topic stream: Secondary Resources Circular Economy</p> <p>Chair: Hannes MacNulty Senior Green Industry Advisor, Green Industry Platform</p> <p> Session Recording »</p>	 Isaac Maluki Chief Executive Officer Shona EPZ Ltd
	 Zubeida Zwavel Executive Director, Centre for African Resource Efficiency and Sustainability
	 Karfa Yakoro Director Commerce et Artisanat pour le Bien Etre Social (CABES)
	 Maïga Fatouma Sawadogo National Coordinator ITC Ethical Fashion Initiative
	 Wandia Gichuru CEO Vivo

Discussion

This workshop discussed how retailers and small and medium-sized enterprise (SME) suppliers in Africa can better collaborate for coordinated circularity efforts, to bridge the communication gaps along textile value chains. Isaac Maluki, CEO of Shona EPZ Limited, a Kenyan company with 600 workers producing over 300,000 units of garment per month, highlighted the opportunity textile manufacturing in Africa represents for economic growth. Yet, the onus is for the African textile industry to improve local manufacturing conditions, promote sustainable international trade, and solve textile circularity challenges. Ms. Wandia Gichuru – CEO of Vivo Brands and ShopZetu, a multi-brand e-commerce platform operating across Kenya – stressed the importance of locally produced textiles to create a local economy. She underlined the dominance of fast fashion, which is drowning Africa’s textile market with second-hand clothing in the form of dumping. Ms. Fatouma Sawadogo Maïga – national coordinator of the Ethical Fashion Initiative project in Burkina Faso – explained the competitive advantages for SMEs implementing sustainable business models. Karfa Yacoro, director of CABES – a social enterprise in Burkina Faso encompassing around 50 local artisans producing and selling danfani fabrics made with organic cotton – highlighted the opportunity that organic cotton represents in Africa.

Takeaways

- **Improve pan-continental collaboration** between organizations supporting textile-sector SMEs on resource efficiency and sustainable business models in East and West Africa. This has the potential to support the increased development of sustainable local and regional markets to reduce reliance on imports.
- **Address the overproduction of garments by fast fashion brands** to reduce the excessive amount of second-hand clothing distorting local markets and impacting local brands. An overall paradigm shift towards producing valuable items that remain in use for a long period before being repurposed or recycled, is key to moving towards circularity.
- **Support targeted capacity-building programmes for textile-sector SMEs** to help take advantage of improved local market conditions. A cost-effective approach to producing textile products sustainably can drive business competitiveness.

The Value Chain Approach: a tool for prioritized action on sustainable consumption and production

<p>Organisers: International Resource Panel and One Planet Network</p> <p>Topic stream: Secondary Resources Circular Economy</p> <p>Chair: Jorge Laguna-Celis Head of the 10YFP Secretariat, United Nations Environment Programme</p> <p> Session Recording »</p>	<p> Maria Jose Baptista Programme Management Officer, UNEP</p>
	<p> Jesus Alquézar Socio-economic Analyst, European Commission</p>
	<p> Andrea Dreifke-Pieper Director International Economy Unit, WWF</p>
	<p> Rijit Sengupta Centre for Responsible Business in India</p>








Discussion

This workshop presented the Value-chain Approach as an analytical tool to catalyse science-based policy action on sustainable consumption and production (SCP) and to illustrate its potential through a panel discussion between policy makers, civil society and business representatives. **Jesus Alquezar** from European Commission highlighted that the Value-Chain Approach helps bring clarity to complex issues and helps understand and design policies in a systemic manner, making them more efficient in identifying key points of intervention with the biggest impact. **Katharine Tyndall** from WWF stressed the benefits of using the Value-Chain Approach as a methodology for better understanding opportunities and gaps to reduce natural resource use and environmental impact in food systems. Change cannot be achieved by only working with smallholders nor only consumers on their choice behaviour. It is necessary to look at the entire value chain and include actors in the middle, such as processors, traders, the retail and foodservice industry. The information baseline that the value chain analysis can provide is a prerequisite for the impact efficacy research. **Rijit Sengupta** from the Centre for responsible Business in India brought the perspective of the private sector. He said that the Covid-19 pandemic has highlighted that we cannot continue business as usual. The Value-Chain Approach is a great opportunity for business to identify risks and it provides an inclusive and systemic framework. Another fresh aspect about this tool is its focus on stakeholders, and this is something that is not part of other methodologies. It is not only about the movement of goods and commodities, but also about the people, understanding the interrelation between skills, context and culture. The Value-Chain Approach is a good reminder that stakeholder mapping helps ensure that a value chain is more robust and resilient.

Takeaways

- The Value-Chain Approach provides a practical interface between the science and data on natural resources use and environmental impacts, and the actions stakeholders can take towards SCP and Agenda2030.
- The Value-Chain Approach is a robust methodology, which however requires optic, absorption and use. The best practice examples need to be transferred to other regions to be sure that there is global uptake.
- There is a need to build further cases to assure stakeholders that this is a tool to build better sustainable business and track them in a coherent and inclusive manner.

Are the policies and principles of the Basel Convention and the circular economy compatible?

<p>Organisers: Sustainable Recycling Industries, PREVENT Waste Alliance, StEP Initiative</p> <p>Topic stream: Secondary Resources Circular Economy</p> <p>Chair: Elisabeth Smith Executive Officer StEP Initiative</p> <p> Session Recording »</p>	 <p>Daniel Hinchliffe Advisor Concepts for Sustainable Waste Management and Circular Economy, GIZ GmbH</p>
	 <p>Chris Slijkhuis General Manager MGG Polymers</p>
	 <p>Jim Pucket Executive Director and Founder, Basel Action Network</p>
	 <p>Isabelle Baudin Scientific Officer, Swiss Federal Office for the Environment</p>
	 <p>Sam Adu-Kumi Coordinator, Chemicals and Waste EPA Ghana</p>
	 <p>Kimberley Botwright Global Leadership Fellow and Lead, Trade and Investment, world Economic Forum</p>



Discussion

The discussion focused on the compatibility of the Basel Convention and Circular Economy. The Basel Convention was adopted more than three decades ago and remains a bulwark in combating the environmental justice of “the toxic trade” of wastes, with a special focus on waste Electrical or Electronic Equipment. The question of whether and under what conditions exports of non-functional hazardous electronic equipment should be allowed, has been hotly debated. The main purpose of the Convention to combat toxic trade and promote minimization of waste and its cross-border movement is indisputable. However, concerns are raised about whether the convention is hindering a transition to a circular economy. Some stakeholders from the recycling industry voice strong doubts that the current rules and notification procedure are compatible with the globalized nature of supply chains, hindering rather than facilitating opportunities for circularity.

Takeaways

- The concepts of the Basel Convention and Circular Economy are in principle well compatible, but improvements to the implementation process of the Basel rules need to be made, especially in terms of traceability, digitalization, transparency and efficiency.
- The Basel Convention was installed to protect poor countries from the negative externalities of linear thinking. However, there are persistent problems with implementing the Basel Convention in developing countries. In order to become easier and quicker, the process should be digitalized and be made more transparent.
- Classifying more waste as hazardous will make trade very difficult as shipping companies do not accept hazardous waste anymore. A balance needs to be found between what is called hazardous and controlling illegal dumping.
- Establishing bilateral cooperation between countries could help to create jobs on both sides and support the implementation of the Basel Convention.
- There are still loopholes in the Convention which need to be addressed to ensure that non-functional, non-repairable items are not ending up in developing countries.

Setting the scene for African CE business platforms: lessons learnt from Lagos, South Africa and other inter(national) CE Hubs

<p>Organisers: African Circular Economy Network (ACEN) and Holland Circular Hotspot</p> <p>Topic stream: Circular Economy</p> <p>Chair: Susanne Karcher Co-Founder African Circular Economy Network</p>	 <p>Susanne Karcher Co-Founder African Circular Economy Network</p>
	 <p>Abdulla Moustafa Project Manager Holland Circular Hotspot</p>

Discussion

During the first part of the discussion, **Abdulla Moustafa** provided an overview on lessons learnt for the establishment of CE hubs, including the recently launched Lagos CE Hub. Every platform comes with its own country-specific opportunities and challenges, however it always involve a multi-stakeholder process. Abdulla outlined how circular hubs can be organized, set-up – stage by stage according to a proven methodology of optimized data gathering/evaluation) and financed with global examples. Finally, he provided some of the key findings of the Lagos CE Business Platform.

Circular economy hubs are communities of stakeholders that all strive for the transition towards a circular economy. Some of the key activities include networking and advocacy, sharing best practices through online and offline events, mapping the potential of the circular economy and low-hanging fruits within a specific region, access to financing. The set up of the CE platform in Lagos was a result of a cooperation between the African Circular Economy Network and the Holland Circular Hotspot.

Takeaways

- Every circular economy hub is context-dependent and therefore each different from the other. Despite contextual differences, however, the process for setting up a CE Hub presents commonalities across contexts. The context strongly influences which stakeholders collaborate and how for the creation of a CE Hub.
- Most stakeholders involved in the setup of a CE platform fit into one of four categories:
 - 1) Government and Public Institutions,
 - 2) Consumers and Citizens,
 - 3) Businesses and Entrepreneurs,
 - 4) Knowledge Institutions.
- CE Hubs and platforms have been shown to be of great help focusing on either of these areas: Networking and Joint Advocacy; Sharing Best Practices; Mapping Potential, Identifying Priority Sectors, Initiating Projects; Knowledge Sharing and Capacity Building; Access to Finance.

Enhancing circularity in electronics value chains in Africa

<p>Organisers: United Nations Environment Programme (UNEP)</p> <p>Topic stream: Secondary Resources Circular Economy</p> <p>Chair: Eloise Touni Programme Officer UNEP</p>	 Feng Wang Programme Officer UNEP
	 Miranda Amachree Director Inspection & Enforcement, National Environmental Standards & Regulations Enforcement Agency
	 Ibukun Faluyi Executive Secretary EPRON
	 Andrea Cararo WEEE Policy Associate International Telecommunication Union (ITU)
	 Reinhardt Smit Supply Chain Director, Closing the Loop

Discussion

The United Nations Environment Programme (UNEP) is supporting the government of Nigeria to implement a project for developing the circular economy of the electronics sector in Nigeria, funded by the Global Environment Facility (GEF). The key activities of the project include supporting the operationalisation of Nigeria's Extended Producer Responsibility (EPR) system, understanding the best channels for the collection and recycling of end-of-life electrical and electronic appliances and their treatment cost, and developing circular economy approaches and best cases for the electronics sector in Nigeria and Africa.

This workshop brought together stakeholders from the electronics sector, governments and international manufacturers in order to share the latest progress of the project, present the key findings from the report on circular economy for electronics in Africa, and collect insights and best practices/examples on circular economy for electronics.

Takeaways

- There is a real need for policy intervention to mandate collection systems and a sustainable financing model for e-waste management. Extended producer responsibility is the main recommended approach for sustainable and long-term management of e-waste collection and improved, environmentally-sound recycling practices.
- Globally, more than two thirds of countries still don't have such legislations and policies nor a government-mandated requirement to collect and treat e-waste.
- Enforcement of EPR rules is a huge priority. Nigeria's government has taken great steps forward, linking the registration of the EPR system to the underlying registration for imports and tax registrations for businesses.
- The reality is that an EPR scheme is not an easy thing to create and enforce. This is why medium and short-term, smaller scale action can give a vision for a long-term shift and build the commitment among the many stakeholders needed for a gold standard solution.

Local impacts of mining: tools to measure them & enable constructive stakeholder dialogue

<p>Organisers: ETH Nadel & Responsible Mining Foundation</p> <p>Topic stream: Primary Resources</p> <p>Chair: Fritz Brugger Executive Director ETH Nadel</p> <p> Session Recording »</p>	 Felicita Fischer Researcher ETH Nadel
	 Pierre De Pasquale Head of Stakeholder Engagement at Responsible Mining Foundation
	 Desiree Ruppen Researcher ETH-ISTP

Discussion







The primary extraction of natural resources that are highly demanded on our global markets generates impacts and costs at the local level, where mining takes place. As pressure increases on the environment, the labour market and local communities, the relationship between mining companies and local stakeholders can become conflictual. In this context, relevant and evidence-based information that reflects the perspectives of all stakeholders is essential to prevent harm, build trust and limit risk. In situations where reliable data and evidence are scarce, promoting citizen-led assessment and engagement can be a fruitful means of addressing locally-relevant environmental issues generated by mining operations.

In this workshop, ETH-NADEL introduced the Resource Impact Dashboard (RID), a policy instrument that enables evidence-based deliberation and constructive discussions around local resource governance. Then, ETH-ISTP and RMF briefly presented recent initiatives that illustrate the potential for mining-affected communities to actively engage with local mining companies on environmental issues. With limited external assistance in the form of capacity-building and modest financial support, community members can use constructive, evidence-based engagement methods like the Mine-site assessment tool (MSAT) and the Citizen Science Project to seek an improvement in companies' environmental management and disclosure.

Takeaways

- Impact happens at the mine site level, especially concerning the health of workers and communities nearby and the natural landscape surrounding the site. This is why great efforts should be directed towards building transparent, trustful and fair relationships between communities and operators.
- With simple tools to gather and evaluate data, citizens science has the potential to empower local stakeholders and communities to get a seat at the table and be empowered in the decision-making process.
- Transforming evidence into sustainability solutions needs not only agreeing on the problem, but also deeply depends on finding the right cooperation with other stakeholders through coalitions and finding synergies.

The elephant in the extractives room: the neglected value of sand

<p>Organisers: UNEP/GRID-Geneva</p> <p>Topic stream: Primary Resources</p> <p>Chair: Pascal Peduzzi Director GRID-Geneva, UNEP</p> <p> Session Recording »</p>	<p> Ian Selby Director of Sustainable Geoscience, Sustainable Earth Institute, University of Plymouth</p>
	<p> Daniel Franks Professor, University of Queensland's Sustainable Minerals Institute</p>
	<p> Kiran Pereira Founder and Chief Storyteller Sandstories</p>
	<p> Halinishi Yusuf Managing Director Makueni County Sand Conservation and Utiliza-tion Authority in Kenya</p>
	<p> Marc Goichot Freshwater Lead Asia Pacific, WWF</p>

Discussion

Despite its apparent availability in many places of the world, sand is rarer than one thinks, and should be considered a strategic resource in need of global governance and environmental sustainability. The high profile panelists of this session shared their experience about the issue, touching upon a wide range of topics such as sand supply, alternatives to sand, awareness raising, sand management, sand extraction rates and the accompanying ecological and societal impacts. This session took the form of a dialogue between the moderator Prof. Peduzzi, Director of UNEP/GRID-Geneva, and the panelists, who highlighted possible solutions to the environmental, governance and societal challenges related to sand. The panelists highlighted existing solutions, such as byproducts from mining activities, resource mapping efforts in the Netherlands and innovative governance mechanisms for sand monitoring in Kenya.

Takeaways

- There is an urgent need to transition away from the current business context, driven by limitless sand extraction, towards a new paradigm, which puts the emphasis not only on equity and inclusion, but also cost effectiveness and how we source, use and manage sand resources.
- Experts called for an integrated policy and legal framework that is driven by robust, equitable and responsive institutions and has two major characteristics. First, this framework should work as a comprehensive umbrella of sand management that goes beyond the regional level. Second, the framework should recognise the importance of fostering markets for alternatives to the use of sand, while supporting people involved in artisanal and small-scale activities of sand extraction.
- Efforts should be directed towards rethinking how to upscale the alternatives that could drive us away from the current sand extraction activities.

New Circular Economy standards from ISO for global alignment and practical implementation

<p>Organisers: ISO/TC 323 Circular Economy & Sustainable Recycling Industries</p> <p>Topic stream: Circular Economy Secondary Resources</p> <p>Chair: Catherine Chevauche Chair ISO/TC 323 Circular Economy</p> <p> Session Recording »</p>	<p> Hans Kroder Convenor Working Group 3 “Measuring and Assessing Circularity”, ISO/TC 323 Circular Economy</p> <p> Llorenç Milà I Canals Head of the Secretariat – Life Cycle Initiative, Economy Division, UN Environment Programme</p>
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Discussion

ISO is developing a full package of five new Circular Economy standards for public and private organisations to assist in retaining, regenerating and adding resource value, while contributing to sustainable development (e.g., the SDGs). Alignments with existing standards like Life Cycle Assessment and Social LCA will be a big advantage. The frameworks are applicable to multiple levels of an economic system, ranging from national and regional, individual and groups of organisations and (partly) to products.

This workshop provided an update and engaged the participants through pools for capturing their understanding of key elements of the ISO TC323 work, such as the ‘Circular Economy’ definition, principles and framework. A focus on metrics was also provided. A wrap-up of the discussions served the current ISO TC 323 discussions on circular economy.

Takeaways

- Standards are fundamental to provide a common language, able to propose an answer to environmental and social emergencies. Those standards should not only take into account environmental issues, but also social issues related to the Sustainable Development Goals.
- Creating standards on circular economy requires a wide participation of global stakeholders and consensus on what is circular economy, how to implement it, how to move from a linear business model to a circular business model, and which metrics should we use to measure and assess circularity

Public and private partnerships to tackle human and children's rights issues

<p>Organisers: UNICEF</p> <p>Topic stream: Primary Resources</p> <p>Chair: Jennifer Yablonsky Head of Social Protection UNICEF Ghana</p>	 Angela Bettiol Programme and Planning Specialist UNICEF Burkina Faso
	 Daniella Savic Corporate alliances specialist, UNICEF Democratic Republic of Congo
	 Emelia Ayipio Asamoah Country Director, World University Service of Canada
	 Wisdom Puplampu Principal Research Analyst and Statistical Officer, Ghana Minerals Commission
	 Esther Fox Senior Trade Commissioner High Commission in Canada
	 Emmanuel Okan Head Community Liason, Ghana Minerals Development Fund






Discussion

Public-Private Partnerships PPP are one of the relevant modalities for international organisations to address systemic issues that need to be addressed to achieve the Sustainable Development Goals. Driving PPP on mining governance could be a game changer to improve the wellbeing of millions of children. The power, influence, and revenue from the extractive activities can significantly benefit government, communities and business sustainability. Building on successful best practices implemented by UNICEF and based on the experience from key representatives from the extractive sector in Ghana such as the Ghana Mineral Development Fund, Ghana Extractive Transparency Initiative and the World University Services of Canada, the workshop explored which kind of improvements are needed to ensure extractive revenues contribute to an equitable and the sustainable development of the country and how public and private sector can cooperate together to strengthen national systems and services.

Takeaways

- When thinking about the revenues from the mineral sector, human development should be put at the center of those discussions, with a particular attention on women, children and youth.
- There is a need to increase the availability of information, transparency and accountability around revenues, both concerning how they are collected and distributed, and what the obligations are, both at a national and local level.
- Participatory and inclusive planning, particularly involving multiple stakeholders at the local level, has an important role to play to identify how the revenues from mining activities can be best reinvested into the community.
- Legal and regulatory frameworks should also try to reach artisanal mining activities, which are often left out but can have major impacts on communities.
- Two gaps emerged: the lack of existing good practices and the lack of discussions about revenues use for social investments at the macro-level.

Roots of the future: the businesses regenerating Africa's soils

<p>Organisers: Footprints Africa</p> <p>Topic stream: Circular Economy Primary Resources</p> <p>Chair: Joanna Bingham Founder and CEO Footprints Africa</p> <p> Session Recording »</p>	<p> Kofi Boa Director The Howard G Buffett Foundation supported Centre for No-Till Agriculture</p>
	<p> Tadi Joda Team Lead One Billion Trees Africa</p>
	<p> Aarti Shah Title lorem ipsum per Verde</p>
	<p> Neal Spackman Founder and CEO, Regenerative Resources Co</p>

Discussion

This workshop launched the Footprints Africa report on regenerative agriculture. The session dived into the report by highlighting the findings in terms of business opportunities, enablers and imperative of transitioning to regenerative agriculture. To bridge the gap between theory and practice, three businesses who are piloting and mainstreaming regenerative agriculture in Africa had the opportunity to share their stories, including key steps in their journeys and what their advice would be if they were to start this over again.

Takeaways

- Agriculture is central in the African context, but traditional agriculture has not been working for people and planet. This calls for a transition to regenerative agriculture, designed as 'radical, simple and complex'. Radical because it goes against the conventional thinking of how agriculture should be done. Simple because all the solutions are there, and complex because the implementation is not as straightforward.
- Context matters, so we should not try to find one-size-fits-all solutions. Rather, we should adapt to the wisdom already existing in communities and make sure that is applied at scale.
- There is a real urgency to operationalize the wisdom of local communities through policy incentives, markets and through working communities.

Waste tyres and other hazardous fractions: solutions for Ghana in the nexus of upcycling and co-processing

<p>Organisers: Sustainable Recycling Industries Ghana</p> <p>Topic stream: Secondary Resources Circular Economy</p> <p>Chairs: Sampson Atiemo Local Coordinator of the SRI Ghana Programme</p> <p>Tobias Schleicher Senior Researcher Oeko-Institut e.V.</p>	 Ed Verhamme Alternate Resource Partners
	 M. Chandrasekhar Babu General Manager Savanna Diamond Company Ltd
	 Matilda Payne Boakye-Ansah UTUA
	 Yennem Venkata Subba Reddy Process Manager, Savanna Diamond Company Ltd
	 Ebenezer Appah Sampong Deputy Director Environmental Protection Agency Ghana

Discussion

The Sustainable Recycling Industries Ghana team recently elaborated and published a baseline study on waste tyre management in Ghana, revealing two very relevant downstream options. On the one hand, Ghana has got a vivid community of waste tyre upcycling companies that, with the support of SRI, founded the Waste Tyre Upcycling Association of Ghana in April 2021. On the other hand, the SRI team identified the only cement plant of Ghana collaborating to assess the possibilities for co-processing of waste tyres (and possibly other fractions such as plastics) as a replacement fuel instead of coal. Hence, the SRI Ghana team seeks to discuss the nexus between upcycling and energy recovery of waste tyres, also in the context of Act 917.

Takeaways

- A major barrier is represented by the acceptance of upcycled products, in this case upcycled used tyres. It is a niche sector. To get upcycling out of the niche towards a circular economy, a strong linkage to the EPR system, which means Act 917, is key to make sure that business models become even more attractive.
- Governments should support upcycled materials in green public procurement.
- For the specific case of co-processing of tyres in the cement industry, three major benefits were identified: materials recovery in the process, self-cleaning from toxic gasses and required infrastructure already in place in the cement industry,
- Currently co-processing is not very much supported by the government, but it has clear potential for being linked to the legislative framework in Ghana. To facilitate this, a pilot project should be put in place.

A Global Definition for Responsible Sourcing

Organisers: RE-SOURCING Topic stream: Primary Resources Chair: Alexander Graf Project Manager & Research Fellow, Vienna University of Economics & Business	 Andreas Endl Vienna University of Economics and Business
	 Lisl Pullinger SRK
	 Alejandro Gonzalez Centre for Research on Multinational Corporations (SOMO)
	 Marie-Theres Kügerl Researcher Montanuniversität Leoben

Discussion



Responsible Sourcing has gained attention amongst international actors, institutions and initiatives as a contributory factor to achieving the Sustainable Development Goals and the Green Transition. Despite the advancements made, there is still a lack of global agreement on the concept and an accepted definition for what such practices entail. This stems from the fact that global value chains of raw materials are complex and involve a wide group of diverse actors, who focus on different aspects of responsible sourcing based on the type of minerals, their sector or level of operations.

A key step towards harmonizing these fragmented approaches and creating a level playing field is to establish a common understanding of responsible sourcing and foster its applications and concept among various sectors, levels and regions. Given the complexity of global value chains, this is not a straightforward process. It requires a collective, consultative and collaborative approach to inspire the global agenda in which the needs and challenges of all stakeholder groups can be equally understood and taken into consideration. The Horizon 2020 RE-SOURCING project funded by the European Commission, which is setting up an international platform to facilitate the development of such a definition and foster the emergence of responsible sourcing in international political fora. This workshop hosted a discussion in a rather informal setting on the topic of a common understanding for responsible sourcing.

Takeaways

- Preventing negative impact on human rights and environment is a key objective behind responsible sourcing. Additionally to risk management, however, responsible sourcing is also about having standards of conduct on the side of businesses with the duty to care about people and the impact we have on them.
- From a policy perspective, resilience is an additional objective for achieving responsible sourcing, such as in the case of critical raw materials.
- From a business perspective, responsible sourcing mainly started as a compliance activity, then moved into a sort of ‘business consciousness’ – where responsible sourcing is the right thing to do – and has now further transition to the question of how we create value on the local level, for local communities, through for example local procurement and local value chains. The key word now is value equity: creating value not only for mining companies and industry, but also for local communities. This value equity becomes a business case on itself.
- In terms of processes and systems for responsible sourcing, we do not need more of them, but rather to harmonize and implement them. In order to achieve impact and create a level playing field for all actors, a mandatory approach is preferred.

Framing an Africa-wide Circular Economy Action Plan

<p>Organisers: African Circular Economy Alliance and African Development Bank</p> <p>Topic stream: Circular Economy</p> <p>Chair: Bonmwa Fwangkwai Program Manager African Circular Economy Alliance</p>	 <p>Astrid Schomaker Director Global Sustainable Development, European Commission, DG Environment</p>
	 <p>Oliver Boachie MESTI</p>




Discussion

In March 2020, the European Union launched the Circular Economy Action Plan (CEAP). A regional framework for the CE is still lacking in Africa, albeit some initiatives led by the African Union Commission and the African Ministerial Conference on the Environment (AMCEN) to mainstream circularity as an engine for green and inclusive recovery post-COVID 19. This workshop intended to host a peer exchange to frame a common understanding on the rationale for a regionally coordinated approach for the promotion of the CE in Africa. Tangible examples from the EU's CEAP were examined to assess opportunities for replication among African countries, as well as the potential for North-South technology and knowledge transfers.

Takeaways

- The Circular Economy presents a great opportunity for the African continent, and it is recognized as a key contributor to the Green Action Plan and its model of sustainable development.
- The creation of an Africa-wide Circular Economy Action Plan should be an all-inclusive process involving different ministries and stakeholders, including private sector, civil society and academia. It should not only be seen as responsibility of Ministry of Environment, but rather of several Ministries as a tool for achieving sustainable development.
- For financing the action plan, both public and private sources need to be leveraged. This also requires a baseline measurement of circular economy, which is currently missing in Africa.

Financing Roundtable: unlocking a plastics circular economy in Ghana

<p>Organisers: Ghana National Plastics Action Partnership & World Bank Group</p> <p>Topic stream: Circular Economy</p> <p>Chairs: Clem Ugorji Acting Manager Ghana National Plastics Action Partnership</p> <p> Session Recording »</p>	 Sanjay Srivastava Practice Manager World Bank
	 Jonas Byström Lead Engineer Circular Economy Division, European Investment Bank
	 Georges Sander Project Investment Manager, Alliance to end plastic waste
	 Oliver Boachie MESTI
	 Pierre Frank Laporte Country Director World Bank
	 Samu Salo Senior Industry Advisor, International Finance Corporation

Discussion

This session focused on sharing key insights of the Financing Roadmap for Plastic Action, which lays out a blueprint for achieving a comprehensive system change scenario to eradicate plastic pollution entering Ghana's oceans by 2040. To achieve this aim, capital investments of 5 billion USD and cumulative operational investments of 6 billion USD are required by 2040 across the plastic value-chain to rapidly achieve a circular economy. Mobilization of needed finance will require new financial tools not currently utilized at scale in the plastics sector in Ghana. The Financing Roadmap offers a suite of financial tools that are applicable to the plastic action space and discusses implications for developing and adopting such tools within the national context.

Takeaways

- There is a need for African countries to invest in infrastructure for the collection, sorting and recycling of plastics. Currently, there is little opportunity for large-scale use of plastic waste, with over 70% of plastic collected in Ghana being exported in South-East Asia and Europe.
- In order to ensure that plastics continues to stay in the loop, more efforts should be directed towards creating products that are locally relevant and affordable. Ghana is called to create and implement an effective EPR policy that ensures that players within the industry take responsibility and make financial contributions to enable large-scale collection and recycling of plastics.
- A combination of lack of political will, lack of capacity by regulators and lack of interest by industry is at the core of the slow progress achieved for an EPR policy. Regulatory capacity to design systems that work country-wide is still a big challenge.
- In Ghana and many African countries, there is no regulatory approval for the reuse of recycled plastics for food-grade applications. Therefore, it is important to work on standards and approvals that can unlock solutions in this field.

10 Scientific Sessions

WRF2021 offered a rich and diverse programme of scientific sessions, covering a variety of topics across the three conference tracks of primary resources, secondary resources and circular economy. The scientific sessions, which took place fully online in 50 mins slots, hosted a maximum of 5 scientific papers each, with a presentation by the author and an open space for Q&A and discussion. Over 145 papers were submitted during the international call for abstracts, out of which 88 were approved for presentation by the WRF2021 Scientific Committee, which was composed of 31 members from 17 countries. In total, 18 scientific sessions took place, with 88 papers and 9 posters presented. Scientific presenters came from more than 25 countries. Thanks to a collaboration with the Springer Journal “Circular Economy and Sustainability”, selected papers presented at WRF2021 will be published in a special Issue of the Journal, titled “A Green Deal for Sustainable Resources – Extraction, Recovery, Circularity” starting from February 2022.

A few words from Sonia Valdivia, WRF Scientific Director



“The Scientific Sessions of WRF2021 provided an open space for presenting and discussing groundbreaking findings from researchers working across a wide range of disciplines and geographies. The circular economy track had the highest number of contributions, as a further testimony to the fact that the topic is gaining traction globally. CE presentations varied from sector to regional and methodological specific topics. The field of secondary materials followed in terms of number of contributions, with a special attention on the topic of e-waste. Finally, case studies on primary resources, especially related to the (un)sustainable extraction of raw materials, complemented the scientific sessions program. Notably, it is worth highlighting the well-balanced mix between practical, real-world cases and methodology and theory-related topics. The active participation and informed engagement witnessed during the sessions is a sign, once again, of the importance of having science at the core of policy and business dialogues for the design of system-wide transitions towards sustainable and resilient societies.”

Sonia Valdivia
WRF Scientific Director

Paper Awards

During the scientific sessions, participants could vote for the best presenters and the most interesting presentations. In the closing session of WRF2021, Scientific Committee Co-Chairs Prof. Chris Gordon (University of Ghana) and Prof. Sonia Valdivia (WRFA), awarded the following contributions:



Peter Desmond
African Circular Economy
Network

.....



Alexandre Lemille
The Circular
Humansphere

Peter Desmond (African Circular Economy Network) and Alexandre Lemille (The Circular Humansphere) for their presentation "Making the Circular Economy Work for Human Development"



**Mario Gustavo
Pacheco Portilla**
University of Cuenca



Adrien Specker
ETH

Mario Gustavo Pacheco Portilla (University of Cuenca) for his presentation "Assessing the social impacts of e-waste management in Cuenca, Ecuador: a methodological proposal"

Adrien Specker (ETH) for his presentation "Characterizing plastic waste from Information and Communication Technology WEEE in Gauteng, South Africa"

Furthermore, Special Mentions were given to:

- **Ajay Bhagwan Patil** (Paul Scherrer Institute) for his work on "Circular Economy of critical rare earth resources: technical and economic challenges"
- **Heinz Boni** (Empa) for his work on "Do we have the right performance indicators for assessing circularity in WEEE recycling?"
- **Lorena Toledo** (Empa) for her work on "Support the development of a recycling plant to treat end-of-life Li-ion batteries retaining the circularity of key battery materials"
- **Rose Mankaa** (RWTH Aachen) for her work on "social life cycle assessment for responsible sourcing of lithiumion battery materials: impact visualization tool"
- **Lorena Muñoz** (Universidad Vina del Mar) for her work on "Circular economy and implementation of Paris agreement objectives case study – recovering, recycling of plastic waste – informal and formal sector in Mexico"
- **Ivan Vidal** (University of Cuenca) "Towards a WEEE forecasting model for developing countries. A case study for mobile phones in Ecuador"

Poster Awards

Two posters were also awarded in the closing ceremony



Leezola Zongwe
University of
Cape Town

Leezola Zongwe (University of Cape Town) for her poster on "Tracking and Returning Africa's (Stolen) Money"

Stefan Trsek (WU Economics and Business) for his poster "Mapping the land-use footprint of Brazilian soy embodied in international trade. A spatially explicit approach based on open data"



Stefan Trsek
WU Economics and
Business

11 Annexes

Annex 1. List of Scientific Sessions and contributions

1A: Circular Economy at cities, national and international scales

- “Re-balancing resource disparities between partner countries”, **David Angus Ness**, Ke Xing (University of South Australia)
- “Planning for Circular Economy in Developing countries: electric vehicles and waste recycling in India”, **Vivek Anand Asokan** (Institute for Global Environmental Strategies, IGES, Japan) and Heng Yi Teah, (Waseda University)
- “Making the circular economy work for human development”, Patrick Schroder (Chatham House), **Alexandre Lemille** (Circular Humansphere), **Peter Desmond** (Wizeimpact)
- “The Challenges of WEEE Plastics going circular”, **Chris Slijkhuis** (MGG Polymers)
- “Strategies for Regional Water Security and Hydro diplomacy in the Lake Chad and the Congo Region - A critical perspective”, **Nidhi Nagabhatla**, United Nations University, Institute for Water, Environment and Health (UNU-INWEH); Raphael M. Tshimanga, Congo Basin Water Resources Research Center (CRREBaC), University of Kinshasa, DR Congo; Mahmoud Abdelhay Radwan, The Intergovernmental Hydrological Programme (IHP), UNESCO; Alix Debray, United Nations University – CRIS, Belgium

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1B: Primary Resources: Critical Raw Materials

- “Circular Economy of critical rare earth resources: technical and economic challenges”, **Ajay Bhagwan Patil** (Paul Scherrer Institute, EPFL), Rudolf P.W.J Struis (Paul Scherrer Institute, EPFL), Christian Ludwig (Paul Scherrer Institute, EPFL)
- “Critical metals in end-of-life vehicles from shredder light fraction”, **Nora Bartolomé**, Lorena Toledo Reyes, Charles Marmy, Manuel Capelli, Rolf Widmer, Empa – Materials Science and Technology
- “Bioleaching-based processes for the bio-recovery of metals from Electronic Waste”, **Sebastien Farnaud**, Coventry University, United Kingdom
- “Southeast-European Mineral register of Primary Raw Materials”, **Duska Rokavec**, Matej Draksler, Snježana Miletic, Ursa Solc, Geological Survey of Slovenia
- “Gold planning and security issues in Burkina Faso: difficult reconciliation between bottom-up and top-down approaches”, **Zongo Tongnoma**, Centre National de la recherche scientifique et technologique du Burkina Faso

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1C: Primary and Secondary Resources: Climate Change Aspects

- “Climate change mitigation potentials from circular economy strategies: A systematic review of consumer-oriented product-service systems”, **Ryu Koide**, National Institute for Environmental Studies, The University of Tokyo; Shinsuke Murakami, The University of Tokyo; Keisuke Nansai, National Institute for Environmental Studies Japan
- “Revealing carbon-intensive material footprints including fixed-capital effects”, **Sho Hata**, National Institute for Environmental Studies Japan, The University of Tokyo; Keisuke Nansai, National Institute for Environmental Studies Japan; Kenichi Nakajima, National Institute for Environmental Studies Japan, The University of Tokyo
- “Low-carbon technology and the fourth Industrial Revolution opportunities for Africa”, **Thelma Arko**, United Nations University – Institute for Natural Resources in Africa, University of Ghana, Legon; Pedi Obani, United Nations University – Institute for Natural Resources in Africa
- “Life cycle analysis of lyophilized fruit snacks production in the Dominican company Our Flavour”, **Hiram Gabriel Quiroga**, Instituto Tecnológico de Santo Domingo, Our Flavour S.R.L.; Jose Javier Fernandez Volmar, Instituto Tecnológico de Santo Domingo, Our Flavour S.R.L.; Sabrina Jiménez Ramón, Instituto Tecnológico de Santo Domingo, Our Flavour S.R.L.; Sarah Patricia Jiménez Cornielle, Instituto Tecnológico de Santo Domingo, Our Flavour S.R.L.; Elena Regla Rosa Domínguez, Universidad Central “Marta Abreu” de las Villas; Luis Enrique Rodríguez de Francisco, Instituto Tecnológico de Santo Domingo; Yaset Rodríguez-Rodríguez, Instituto Tecnológico de Santo Domingo
- “Biological methods to increase housing resilience to flooding”, Ana Bras, Liverpool John Moores University; Irene Appeaning Addo, University of Ghana; Chris Beckett, The University of Edinburgh; Ibrahim Yakubu, University for Development Studies; Frederick Owusu-Nimo, KNUST-Kwame Nkrumah University of Science and Technology; Alexandre Gagnon, Liverpool John Moores University; **Mohit Arora**, The University of Edinburgh; Yuner Huang, The University of Edinburgh

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1D: Circular Economy across electronics value chains and E-wastes

- “Creating a circular economy for solar panels”, **Deepali Sinha Khetriwal**, Ankit Kapasi, Kishore Ganesan, Sofies India
- “Do we have the right performance indicators for assessing circularity in WEEE recycling?”, **Heinz Böni**, Charles Marmy, Andrea Wehrli, Empa
- “Towards circular electronics in Egypt”, **Ghada Moghny**, Centre for Environment and Development for the Arab Region & Europe (CEDARE); Hossam Allam, Centre for Environment and Development for the Arab Region & Europe (CEDARE); Arthur Haarman, SOFIES; Esther Thiébaud, SOFIES
- “How to change unsustainable behaviours in the Electronics-Chemical LAC industry?”, **Jamie Alberto Romero-Infante**, Alberto Forero-Buitrago Gonzalo, Elissa Calle Vergel, El Bosque University, Colombia
- “De-wasting Automotive Waste: Towards a Sustainable Recovery of Metal Values, Liquid Fuel and Solid Carbon from End-of-Life Tyres for Ghana’s Proposed Integrated Iron and Steel Industry”, **James Ransford Dankwah**, University of Mines and Technology Tarkwa, Ghana; Philip Clinton Offei Adu, University of Mines and Technology Tarkwa, Ghana; Jessica Dankwah, University of Mines and Technology Tarkwa, Ghana; James Bradford Dankwah, University of South Australia; Pramod Koshy, University of New South Wales, Australia

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1E: Primary Resources: Governance, Risks and Financial Aspects

- “Design of a green bond and financial instruments for scaling up and replicate the green districts programme”, **Lorena del Pilar Munoz**, Universidad Vina del Mar Chile
- “Curbing commodity trade-related illicit financial flows: a policy matrix”, **Irene Musselli Moretti**, Elisabeth Bürgi Bonanomi, University of Bern, Centre for Development and Environment
- “Raw materials at the science-policy interface through the JRC Africa knowledge platform”, **Falko Buschke**, European Commission Joint Research Centre, Directorate D – Sustainable Resources Unit D6; Christine Estreguil, European Commission Joint Research Centre, Directorate D – Sustainable Resources Unit D6; Lucia Mancini, European Commission Joint Research Centre, Directorate D – Sustainable Resources Unit D6; Fabrice Mathieux, European Commission Joint Research Centre, Directorate D – Sustainable Resources Unit D6; Hugh Eva, European Commission Joint Research Centre, Directorate D – Sustainable Resources Unit D1; Luca Battistella, European Commission Joint Research Centre, Directorate D – Sustainable Resources Unit D6; Stephen Peedell, European Commission Joint Research Centre, Directorate D – Sustainable Resources Unit D6
- “Implementation of the Minamata Convention on mercury through an environmentally sound management approach in the ECOWAS region”, **Fabian Ottiger**, WRFA
- “Decoding Galamsey resilience as a limited access order dynamic and a proposal for state governance effectiveness in artisanal gold mining in Ghana”, **Nene-Lomotey Kuditchar** (University of Ghana)

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1F: Secondary Resources: international frameworks and case studies

- “ISO 59014 Standard for Secondary Materials”, Sonia Valdivia, Mathias Schluemp, WRFA
- “The European policy framework for recycling of plastics from ELV, WEEE and CDW”, **Malin zu Castell-Rüdenhausen**, VTT Technical Research Centre of Finland Ltd; Anna Tenhunen, VTT Technical Research Centre of Finland Ltd; Mathilde Taveau, Coolrec Plastics B.V; Nazarena Vincenti, Erion Ltd.; Nazarena Vincenti, Erion Ltd.; Tatu Marttila, Aalto University
- “Analysis of the trade-off between the resources recovery from e-waste and the reuse potential”, **Lúcia Helena Xavier** (Center for Mineral Technology – CETEM Brazil) and Leonardo Picanço Peixoto de Abreu, Federal University of Rio de Janeiro UFRJ
- “Assessing the social impacts of e-waste management in Cuenca, Ecuador: a methodological proposal”, **Gustavo Pacheco-Portilla**, Damian Burneo, Paul Vanegas, Dolores Sucozhañay, University of Cuenca
- “The business case for e-waste management in Kenya: a case study from the off-grid solar sector”, **Veronica Di Bella**, CDC Group; Federico Magalini, Sofies; Ruweyda Stillhart, Sofies

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2A: Circular Economy: approaches and concepts

- “Data and systems-mapping for circular cities”, **Mohit Arora**, University of Edinburgh; Caitlin Bentley, The University of Sheffield; Ibukun Modupe Adesiyun, Achievers University Owo, Ondo, Nigeria; Chukwunonye Ezeah, Alex Ekwueme Federal University Nigeria; Tasfin Aziz, BRAC University Bangladesh; Shakeel Khan, Institute of Management Studies, Pakistan; Liberatha Leonidas Kawamala, Libe Green Innovation; Kenisha Garnett, Cranfield University
- “Understanding circular economy transitions out of a practitioner perspective”, **Georg Hubmann**, Technical University Berlin; Cristian Matti, Climate-KIC; Waldo Galle, VITO Flemish Institute for Technological Research NV; Cliona Howie del Rio, Climate-KIC
- “Addressing transformative innovation challenge towards joint programming on circular economy”, **Cristian Matti**, Climate-KIC; Shahrzad Manoochehri, World Resources Forum Association; Izabela Ratman-Klosinska, Environmental Technology Verification; Rebeka Kovačič, University of Maribor
- “From Anthropocene to the circular economy: is it a matter of time?”, **Ricardo Sierpe Silva**, Center for Mineral Technology – CETEM Brazil; Luciana Contador, Energy Planning Program – Federal University of Rio de Janeiro; Lúcia Helena Xavier, Center for Mineral Technology – CETEM

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2B: Primary Resources: Impacts monitoring and assessment

- “FINEPRINT: tracing environmental impacts of resource extraction along global supply chains”, **Stefan Giljum**, Vienna University of Economics and Business
- “Earth observations to improve global mining information for sustainable development”, **Victor Maus**, Vienna University of Economics and Business, International Institute for Applied Systems Analysis
- “Using geospatial data for assessing metal mining risks and impacts”, **Sebastian Luckeneder**, WU of Economics and Business
- “Estimating water input in the mining industry in Brazil: a methodological proposal in a data-scarce context”, **Stephan Lutter**, WU of Economics and Business
- “Using a global physical input-output laboratory for spatially explicit environmental impacts assessments of metal supply chains”, **Hanspeter Wieland**, Stefan Giljum, Sebastian Luckeneder, Victor Maus, Institute for Ecological Economics WU Vienna

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2C: Secondary Resources: Lithium-ion batteries' technologies, impacts and recycling

- "Li/Co for batteries in electric vehicles in the EU: LCSA approach within the context of a circular economy", **Carolina da Silva Paes**, Ghent University
- "Circular Economy of the mobility sector – recycling technology and policy for lithium-ion batteries", **Johannes Betz**, Stefanie Degreif, Peter Dolega, Oeko Institut
- "A system dynamics model of the diffusion of 1st and 2nd life PV and LIBs in a circular economy", **Maria Franco**, Stefan Groesser, Bern University of Applied Sciences
- "Development of a recycling plant to treat end-of-life Li-ion batteries retaining the circularity of key battery materials" **Lorena Toledo Reyes**, Empa; Nora Bartolomé, Empa; Olivier Groux, KYBURZ Switzerland AG; Rolf Widmer, Empa
- "Identification and quantification of potential levers to reduce the carbon impact of lithium-ion batteries in the near-to-mid-term future", **Leopold Peiseler**, Tobias Schmidt, Vanessa Wood, ETH Zurich

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2D: Circular Economy: Lifecycle Thinking and LCA Based Approaches

- "SCP-HAT: Developing an online tool to support science-based national Sustainable Consumption and Production (SCP) policy frameworks, Stephan Lutter, WU of Economics and Business
- "Life cycle sustainability assessment principles – Position paper of the life cycle initiative", Sonia Valdivia, WRFA
- "Framing sustainability within the European extractives sector: understanding tensions and trade-offs among human society and environmental dimensions", Andreas Endl, Vienna University of Economics and Business; Michael Tost, Montanuniversität Leoben; Katharina Gugerell, University of Natural Resources and Life Sciences Vienna; **Stefanie Streit**, Montanuniversität Leoben
- "Social life cycle assessment for responsible sourcing of lithium-ion battery materials: impact visualization tool", **Rose Mankaa**, David Jose, Marzia Traverso, Institute of Sustainability in Civil Engineering (INaB) RWTH Aachen
- "Evaluating the Synergies and Trade-offs between the Mining Sector and the Sustainable Development Goals", **Farnaz Eslamishoar**, Jessica Clement, Ben Milligan, Bruno Oberle, Paul Ekins, EPFL

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2E: Circular Economy across plastics value chains – regional initiatives

- “Closing the loop for plastic waste in Accra, Ghana”, Hilda Addah, ETH Zurich; **Catharina R. Bening**, ETH Zurich; Dana Mosora, ASASE Foundation; Christina Nakhle, ETH Zurich; Peter Segers, Alliance to End Plastic Waste
- “Circular Economy and Implementation of Paris Agreement Objectives Case Study: Recovering, Recycling of Plastic Waste – Informal and Formal sector in Mexico”, **Lorena del Pilar Munoz**, Universidad Vina del Mar
- “Is Mauritius prepared to become a plastic free island? Opportunities and challenges”, **Rajendra Kumar Foolmaun**, Falcon Citizen League
- “Management and Commercialisation of a Technology for Producing liquid fuel from waste plastics in Ghana”, **Jocelyn Dankwah**, Kwame Nkrumah University of Science and Technology Ghana; George Yaw Obeng, Kwame Nkrumah University of Science and Technology Ghana; James Ransford Dankwah, University of Mines and Technology Tarkwa
- “Value Addition to Ghanaian Bauxite: The Role of Post-Consumer Plastics in Minimisation of Red Mud Generation”, James Ransford Dankwah, University of Mines and Technology Tarkwa; Jessica Dankwah, University of Mines and Technology Tarkwa; **James Bradford Dankwah**, University of South Australia; Pramod Koshy, University of New South Wales

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2F: Circular Economy: regional strategies and sectoral approaches

- “Evaluation of three circular economy strategies applied to the Mexico City water system”, **Maribel Garcia Sánchez**, Leonor Patricia Güereca Hernandez, Instituto de Ingenieria UNAM
- “Fostering the circular economy in fashion – policy barriers and enablers for textile fibre recycling in the EU”, **Mandy Hinzmann**, Martin Hirschnitz-Garbers, Anurodh Sachdeva, Ecologic Institute Germany
- “Africa Collect Textiles: The untapped potential of textile collection and recycling in Nairobi and Lagos”, **Elmar Stroomer**, Africa Collect Textiles; Eno Andrew-Essien, Africa Collect Textiles; Moritz Kasper
- “Circularity of the Global Aluminum Cycle”, **Izhar Hussain Shah**, Rupert J. Myers, Imperial College London
- “Circularity Index applied to sustainable supply chains in Brazil”, Luciana Contador, Federal University of Rio de Janeiro; Larissa Sampaio Freire, Federal University of Rio de Janeiro; Luca Apolonio, Federal University of Rio de Janeiro; **Lúcia Helena Xavier**, Center for Mineral Technology – CETEM

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3A: Circular Economy across several value chains – case studies

- “Involve yam value chain actors for integrated soil fertility management through a circular economy”, **Esther Oka**, Centre Suisse de Recherches Scientifiques, Cote d’Ivoire; Anne Floquet, Université d’Abomey-Calavi Benin
- “Circular systems of bioenergy production: comparative LCA of briquettes in Brazil based on four different recycling allocation methods”, **Diogo Aparecido Lopes Silva**, Federal University of São Carlos; Remo Filleti, Methodist University of Piracicaba; Ricardo Musule, Universidad Nacional Autónoma de México; Antonio Carlos Farrapo Junior, Federal University of São Carlos; Thiago Matheus, Federal University of São Carlos
- “Nature-based solutions case studies for the circular management of industrial effluents”, **Alexandros Stefanakis**, Technical University of Crete
- “BetterBuilding Manifest – mobilizing key stakeholders to collaborate on substantially transforming the construction industry towards more efficiency and sufficiency of resource utilization”, **Mateusz Wielopolski**, AEVOLUTION Circular Materials Innovation; Willem Bulthuis, Corporate Ventures Advisory GmbH; Joachim Holder, Maffei & Co GmbH and Empetus GmbH

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3B: Primary & Secondary resources: informal sector participation

- “Evaluation of improper mercury trade flow to the artisanal and small-scale gold mining (ASGM) sector”, **Yingchao Cheng**, Kenichi Nakajima, Keisuke Nansai, National Institute for Environmental Studies Japan
- “Dismantling productivity analysis of informal sector recyclers in Delhi”, **Deepali Sinha Khetriwal**, Ecowork Association International; Andrea Wehrli, Ecowork Association International; Michael Gasser, Ecowork Association International; Shushant Vasisth, Ecowork Association International; Ibrahim Mansoori, Sofies
- “Inclusivity through App Connection – Informal Waste Collection Sector Integration in South Africa”, **Susanne Yvonne Karcher**, Christopher Roderick Whyte, African Circular Economy Network
- “Trust be key: exploring existing linkages between formal and informal actors in Ghana’s E-waste sector”, **Morton Hemkaus**, adelphi; Ebenezer Kumi, adelphi; Prince Boateng, adelphi; Rosemond Boheene, University of Cape Coast Ghana; Letitia Nyaaba, Ghana National Cleaner Production Centre; Lambert Faabeloun, Ghana National Cleaner Production Centre; Jürgen Meinel, City Waste Recycling Ghana; Vivian Ahiayibor, City Waste Recycling Ghana
- “Changes in artisanal small-scale gold mining through time and associated environmental impacts in the Atiwa West District, Ghana”, Morton Hemkaus, adelphi; **Ebenezer Kumi**, adelphi; Prince Boateng, adelphi; Rosemond Boheene, University of Cape Coast Ghana; Letitia Nyaaba, Ghana National Cleaner Production Centre; Lambert Faabeloun, Ghana National Cleaner Production Centre; Jürgen Meinel, City Waste Recycling Ghana; Vivian Ahiayibor, City Waste Recycling Ghana

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3C: Secondary resources: regional and national e-waste frameworks and enabling conditions

- “Conceptualising the Urban Mine in Southern and East Africa: the law of regional integration for effective waste electrical and electronic equipment”, **Aysha Lotter**, University of Cape Town
- “Regulatory policy frameworks on e-waste challenges and opportunities: a case study of Bungoma County, Kenya”, **Anthony Simiyu Mabele**, Masinda Muliro University of Science and Technology; Rachele Rael Nekesa Khisa, University of Nairobi
- “CARITAS Ghana E-waste campaign ‘care for our common home’. Georg Kerkloh, **Zan Akologo**, Caritas Ghana
- “Towards a WEEE Forecasting model for Developing Countries: a case study for mobile phones in Ecuador”, Ivàn Vidal, **Gabriela Sucozhañay**, Melanie Haupt, Paul Vanegas, University of Cuenca Ecuador
- “Global research on e-waste – a literature review”, **Vanessa Heinrich**, Magnus Fröhling, Technical University Munich

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3D: Circular economy across plastics value chains – challenges and opportunities

- “The future of plastic use in a carbon-constrained world”, **Takuma Watari**, Keisuke Nansai, Masahiro Oguchi, National Institute for Environmental Studies, Japan
- “Challenging ‘Cash for Trash’ – packaging waste management and the need for reliable financing”, Stephna Löhle, **Jana Brinkmann**, Thilo Vogeler, Wassim Chaabane, Nicola Drotos, cyclos
- “Characterizing plastic waste and the Material Flow chain from Information and Communication technology WEEE in Gauteng, South Africa”, **Adrien Specker**, ETH Zurich; Nora Bartolomé, Empa; Andreas Bill, Empa; Andrea Wehrli, Empa
- “Impact of the ingestion of plastic waste in fish”, **Alberto Huiman**, Peru Waste Innovation S.A.C.
- “VinylPlus: driving the European PVC industry towards a low-carbon circular economy”, **Brigitte Dero**, Erica Lo Buglio, VinylPlus

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3E: Primary resources: technology & governance development aspects

- “Innovative technologies in the mining sector: attaining Sustainable Development”, **Farnaz Eslamishoar**, Soroush Maghsoudy, Christopher Tucci, EPFL
- “Post Covid Local Development Agenda in Mining Communities”, **Sandra Carrillo Hoyos**, Pontificia Universidad Catolica del Peru
- “The RE-MINING Approach: combining environmental and resource technology to utilize valuable elements from tailings and simultaneously eliminating hazardous substances”, **Stefan Dirlich**, Helmholtz-Institute Freiberg for Resource Technology Germany; Toni Helbig, Helmholtz-Institute Freiberg for Resource Technology Germany; Arite Werner, Helmholtz-Institute Freiberg for Resource Technology Germany; Falk Thürigen, GEOS Ingenieurgesellschaft GmbH; Sabine Meissner, Saxonia
- “Stakeholders engagement and information technology as enablers for successful implementation of local content requirements in African countries”, **Arron Tchouka Singhe**, African Development Bank
- “Oil dependency, political institutions and urban-rural disparities in access to electricity in Africa”, Armand Totouom, University of Dschang; **Herve Kaffo**, University of Maroua

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3F: Secondary resources: new certification scheme for recycling of Critical Raw Materials (CEWASTE)

- “Products, Technologies, and Normative Requirements for Recycling of valuable and critical raw materials”, **Otmar Deubzer**, United Nations University; Steven Art, Umicore; Yifaat Baron, Öko Institut, Matthias Buchert, Öko Institut; Inga Hilbert, Öko Institut; Lucia Herreras, WEEE Forum; Shahrzad Manoochehri, World Resources Forum Association; Lindsey Wuisan, ECOS; Norbert Zonneveld, EERA
- “CEWASTE requirements for sound recycling and transboundary movements of WEEE with Critical Raw Materials”, **Shahrzad Manoochehri**, World Resources Forum Association; Sonia Valdivia, World Resources Forum Association; Yifaat Baron, Oeko Institut; Norbert Zonneveld, EERA; Mathias Schluep, World Resources Forum Association
- “The CEWASTE Assurance and Verification System for the Certification of Waste Management Operators with CRM Focused Requirements”, **Yifaat Baron**, Oeko Institut; Adeline Maijala, SGS FIMKO OY; Viviana Lopez, Oeko Institut; Esther Thiebaud, Sofies; Arthur Haarman, Sofies; Harri Kaartin, SGS FIMKO OY; Lucia Herreras, WEEE Forum; Enikö Hajosi, WEEE Forum; Lindsey Wuisan, European Environmental Citizens Organisation for Standardization; Josef Winkler, Austrian Standards International; Karl Gruen, Austrian Standards International; Inga Hilbert, Oeko-Institut; Sonia Valdivia, World Resources Forum Association; Shahrzad Manoochehri, World Resources Forum Association; Otmar Deubzer, United Nations University; Norbert Zonneveld, European Electronics Recyclers Association
- “Pilot testing of the CEWASTE certification scheme”, Yifaat Baron, Oeko Institut; Adeline Maijala, SGS FIMKO OY; Viviana Lopez, Oeko Institut; Esther Thiebaud, Sofies; **Arthur Haarman**, Sofies; Harri Kaartinen, SGS FIMKO OY; Lucia Herreras, WEEE Forum; Enikö Hajosi, WEEE Forum; Sonia Valdivia, World Resources Forum Association; Shahrzad Manoochehri, World Resources Forum Association; Norbert Zonneveld, European Electronics Recyclers Association
- “Roadmap for long-term sustainability of the CEWASTE scheme”, **Federico Magalini**, Sofies; Marina Porto, Sofies; Mathias Schluep, World Resources Forum Association

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- Dr. Masuma Farooki, MineHutte
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- Jennifer Rietbergen-McCracken
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