

## **Can there be a global tool for reducing lifestyle footprints?**

First reflections from setting up the Sustainable Lifestyles Accelerator

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# WORLD RESOURCES FORUM 2019

## MAKING NATURAL RESOURCE GOVERNANCE FIT FOR THE 21ST CENTURY

### MEETING REPORT



October 23 – 24, 2019

Geneva | Switzerland

This report was drafted by WRF staff based upon inputs from workshop reporters, volunteers, speakers and participants.

The report has not been reviewed by the speakers.

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World Resources Forum (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.



# LIST OF ACRONYMS

- 10YFP – 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns
- ACEN – African Circular Economy Network
- BMZ – German Federal Ministry for Economic Cooperation and Development
- CDE – Centre for Development and Environment (University of Bern)
- CEDARE – Centre for Environment and Development for the Arab Region and Europe
- CEE – Center for Energy and the Environment
- CEWASTE – Voluntary Certification Scheme for Waste Treatment
- CII – Confederation of Indian Industry
- CML – Institute of Environmental Sciences (University of Leiden)
- COST – European Cooperation in Science & Technology
- CO<sub>2</sub> – Carbon dioxide
- CRM – Critical Raw Materials
- CSV – Creating Shared Value
- EIT – European Institute of Innovation and Technology
- EMPA – Eidgenössische Materialprüfungs- und Forschungsanstalt
- EPFL – École Polytechnique Fédérale de Lausanne
- ESM – Entwicklungsfonds Seltene Metalle
- ETH – Eidgenössische Technische Hochschule
- EU – European Union
- EU-REI – European Union's Resource Efficiency Initiative
- FICCI – Federation of Indian Chambers of Commerce & Industry
- FOAG – Federal office for Agriculture
- FOEN – Swiss Federal Office for the Environment
- FORAM – World Forum on Raw Materials
- GHG – greenhouse gases
- GIZ – Deutsche Gesellschaft für Internationale Zusammenarbeit
- GmbH – Gesellschaft mit beschränkter Haftung
- G7 – Group of seven
- G20 – Group of twenty
- ICONTEC – Instituto Colombiano de Normas Técnicas y Certificación
- IRP – International Resource Panel
- ISI – Fraunhofer Institute for Systems and Innovation Research
- ISO/IWA – International Organization for Standardization/International Workshop Agreement
- ISR – Institute for Sustainable Resources(UCL)

- LC – Life Cycle
- LCA – Life Cycle Assessment
- LCI – Life Cycle Inventory
- LLC – Limited Liability Company
- MAC – Multistakeholder Advisory Committee
- MESTI – Ministry for Environment, Science, Technology and Innovation
- MFA – Material Flow Analysis
- NGOs – Non-governmental organizations
- NIPSECT – Nordic Institute for Product Sustainability, Environmental Chemistry and Toxicology
- NIST – National Institute of Standards and Technology (USA)
- OECD – Organisation for Economic Co-operation and Development
- OEKO – Öko-Institut
- PSI – Paul Scherrer Institute
- PUCP – Pontificia Universidad Católica del Peru
- RE – Resource Efficiency
- RECPnet – Resource Efficient and Cleaner Production Network
- REProMag – Resource Efficient Production of Rare-Earth Magnets
- RWTH – Rheinisch-Westfälische Technische Hochschule
- SCP-HAT – Hotspot Analysis Tool for Sustainable Consumption and Production
- SDGs – Sustainable Development Goals
- SLE – Sustainable Lifestyles and Education
- SRI – Sustainable Recycling Industries
- STSA – Swiss Trading and Shipping Association
- TNO – Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek
- UCL – University College London
- UK – United Kingdom
- UN – United Nations
- UNAM – Universidad Nacional Autónoma de México
- UNDP – United Nations Development Programme
- UNECE – United Nations Economic Commission for Europe
- UNEP – United Nations Environment Programme
- UNFC – United Nations Framework Classification for Resources
- UNIDO – United Nations Industrial Development Organization
- UNOG – United Nations Office in Geneva
- UNU – United Nations University
- US – United States
- USA – United States of America
- USD – United States Dollar
- VP – Vice President
- WEEE – Waste Electrical and Electronic Equipment
- WRF – World Resources Forum
- WRI – World Resources Institute
- WTO – World Trade Organization
- ZHAW – Züricher Hochschule für Angewandte Wissenschaften

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# CLIMATE NEUTRAL CERTIFICATION



This certificate verifies that

The World Resource Forum 2019

organised by World Resource Forum

is a climate neutral event.

For the period 23.10.2019 to 24.10.2019 the direct and indirect emissions have been measured and offset. The emissions amounted to

169.52 tonnes of greenhouse gas emissions

and have been offset by in

Kariba REDD+ Project, Zimbabwe (300990)

**Renat Heuberger**  
CEO, South Pole

Thank you for committing to bold climate action. Your contribution is not only a meaningful step towards mitigating climate change globally, but also changes lives for the better by contributing to the Sustainable Development Goals set out by the UN.

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# INTRODUCTION

There is a growing awareness that we must manage our natural resources better. Supplies of (critical) materials are not evenly distributed. Mining of primary materials and recycling of secondary materials face ever increasing economic, environmental, and social challenges. Policymakers have now realized that inadequate global management of materials has adverse impacts on security of supply, technological innovation, livelihoods, and quality of life of people worldwide. This leaves us with the question: How can we make resource governance fit for the 21st Century?

Well over 300 participants coming from some 50 countries and international organizations gathered together for plenary talks, workshops, scientific sessions, and side events at the World Resources Forum (WRF) 2019 from 23-24 October 2019 in Geneva, Switzerland.

Over 60 state-of-the-art scientific contributions were presented in the scientific sessions and methodologies and success stories were shared during the 18 workshops organized by international institutions. During the four plenary sessions, highlevel speakers shared their vision on how to make resource governance fit for the 21st Century. The participants enjoyed two days of discussions, networking and back to back events. The participants, representing the private sector, the public sector, academia, and civil society organizations, communicated their viewpoints and shared best practices in their informal capacity on how to make natural resource governance fit for the 21st Century.

The following report will present a summary of the main WRF 2019 highlights, including the challenges and opportunities debated during plenary sessions, as well as the exciting initiatives and solutions presented throughout the conference.



Bruno Oberle, President WRF

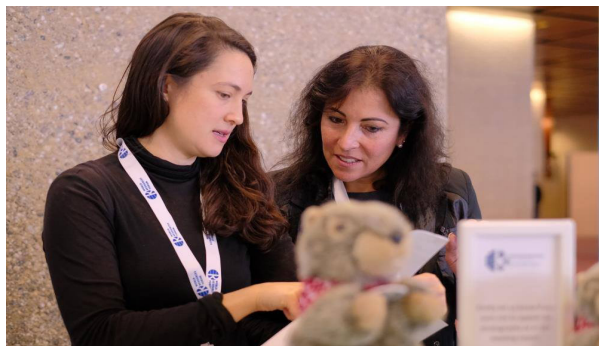


Bas de Leeuw, Managing Director WRF

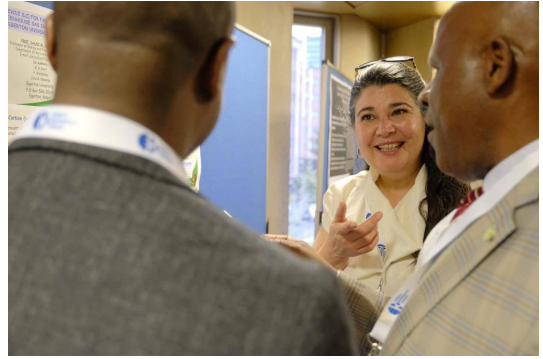
# WRF 2019 KEY MESSAGES

1. To make Natural Resource Governance fit for the 21st Century, businesses and international organizations call on governments and the public sector in general to provide long-term objectives and a level-playing field. 50 years after "Limits to Growth" of the Club of Rome, the call to take action is more relevant than ever.
2. Environmentally sound and socially responsible models are compatible with a successful business. Putting incentives in place can encourage businesses to adopt better practices, and governments can step in to drive positive change.
3. Transition to a circular economy is a clear business opportunity, and a necessity given current trends of resource usage. The social dimension needs to be considered and secondary raw materials need to be cheaper than primary raw materials.
4. Significant investment into a sustainable future environment is crucial. Potential methods could include a global carbon price, tax incentives for sustainable investments and transforming global pension systems in line with sustainability goals.
5. Current existing standards for governance of mineral resources are not enough regarding the scale and speed needed. Without improved governance, it will be impossible to ensure proper provision of the resources needed.
6. The United Nations Framework Classification for Resources (UNFC) embraces the principles of comprehensive resource recovery, circularity, zero harm and zero waste. The UN Environment vision supports positive change in the extractive sector's governance and business practices. The current political momentum and the resolutions adopted at the fourth UN Environment Assembly in March provide the foundations for this process and need to be brought further at the fifth UN Environment Assembly in 2021. Also, the new European Commission and other regional bodies speak out for strong, multilateral political leadership.
7. Sustainable consumption and production hotspots are essential components for science-based decision making. The IRP has a fundamental role to play in guiding this transition.
8. Developing countries acknowledge that natural resources are essential for development, but also consider the importance of resource efficiency and improving natural resource governance in order to reach their development goals.
9. All countries and regions are different, and while it is essential to continue global discussions, there is a need to respect country values and long-term historical perspectives. The exploitation of the past cannot continue.

# 1 PHOTO GALLERY











## 2 PLENARY SESSIONS TAKEAWAYS

### PLENARY I – GETTING THE LICENSE TO OPERATE

Moderators: Bas de Leeuw (WRF) and Barbara Dubach (engageability/ NRP 73)

#### Speakers

Bruno Oberle (World Resources Forum), Ernst von Weizsäcker (Club of Rome), Cristina Bueti (International Telecommunication Union), Daniel Weston (Nestlé-Nespresso & Board Member of the Aluminium Stewardship Initiative), Gary Litman (United States Chamber of Commerce), Brendan Edgerton (World Business Council of Sustainable Development) and Gunter Stephan (NRP 73).

#### Highlights:

- Businesses are aware of the supply and sustainability challenges regarding natural resources. Businesses want to engage with voluntary initiatives and standards, getting them the social development license to operate, and they actively call on the public sector to provide long-term objectives and to level the playing field.
- Discussions demonstrated the need to increase the level of ambition of all actors. To address the scale and urgency of the challenge, participants called for the international community to develop ambitious international rules regarding the management of mineral resources in order to close the governance gaps, in alignment with the Sustainable Development Goals (SDGs) and Paris Agreement.



Daniel Weston, Nestlé-Nespresso  
& Board Member of the  
Aluminium Stewardship Initiative



Gary Litman, US Chamber of Commerce

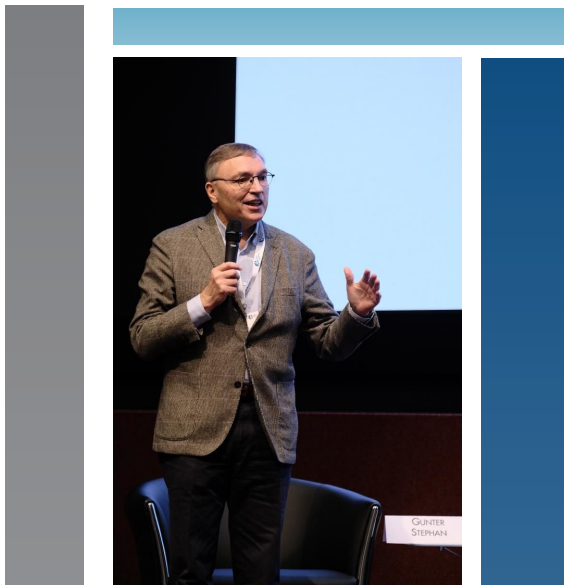


Ernst von Weizsäcker, Club of Rome

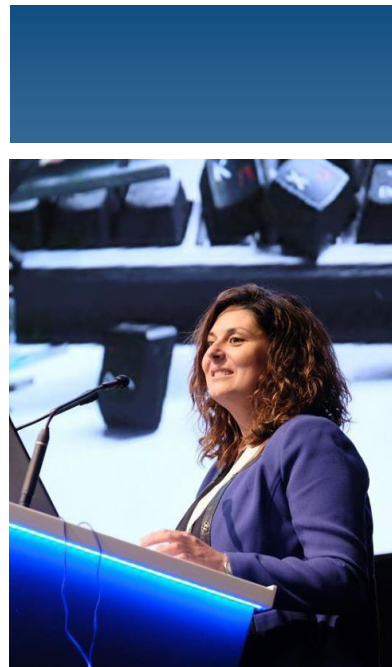
- There was general acknowledgement that environmentally sound and socially responsible business models are the only way forward. Putting incentives in place can encourage businesses to adopt better practices, and governments need to step in to help drive positive change and promote and facilitate a sustainable circular economy.
- The present generation should significantly invest into the future environment. Examples are a CO<sub>2</sub> tax, rate reductions on investment loans in sustainable investments, and reforming the pension system with the sustainability goals in mind.
- More than 50 years after the publication of the "Limits to Growth" report to the Club of Rome, the call to take action is more relevant than ever – governments should stop talking: "Come on!"



Brendan Edgerton,  
World Business Council of Sustainable Development



Gunter Stephan,  
NRP 73



Cristina Buetti,  
International Telecommunication Union



## PLENARY II – HIGH-LEVEL POLITICAL DIALOGUE ON THE GOVERNANCE OF MINERAL RESOURCES - SEARCHING FOR POLITICAL LEADERSHIP

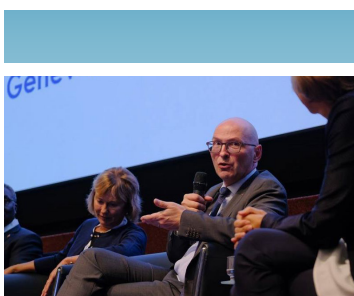
Moderators: Bas de Leeuw (WRF) and Barbara Dubach (engageability/NRP 73)

### Speakers

Marc Chardonens (Federal Office of the Environment, Switzerland), Ol'ga Algayerova (United Nations Economic Commission for Europe), H.E. Kwabena Frimpong-Boateng (Minister of Environment, Science, Technology and Innovation, Ghana), Ligia Noronha (Economy Division, United Nations Environment Programme) and Astrid Schomaker (Directorate General for the Environment, European Commission).

### Highlights:

- A low-carbon and resource efficient economy requires an uptake in technologies such as electric vehicles, renewable energy, or digitalization. New technologies can require increases of the demand for specific minerals and metals.
- Evidence shows that today's governance framework is not fit for purpose. The many existing standards governing the management of mineral resources do not bring the expected results at the scale and the speed needed. Without improved governance, it will be impossible to ensure proper provision of the resources needed.



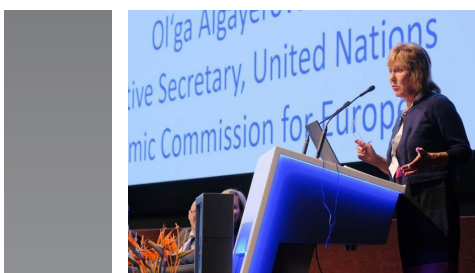
Marc Chardonens, FOEN



H.E. Kwabena Frimpong-Boateng,  
Minister of Environment, Science,  
Technology and Innovation,  
Ghana



Astrid Schomaker,  
European Commission



Ol'ga Algayerova, UNECE

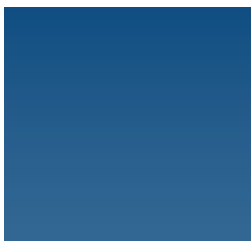


Ligia Noronha, UNEP

- The United Nations Framework Classification for Resources (UNFC) embraces the principles of comprehensive resource recovery, circularity, zero harm, and zero waste, thereby supporting the improved governance of natural resources.
- The United Nations Environment Programme (UNEP) vision supports positive change in the extractive sector's governance and business practices. The UNEP vision aims to make minerals, oil and gas work for all, with minimal harm and many benefits.
- The current political momentum and the resolutions adopted at the fourth UN Environment Assembly in March 2019 provide the foundations for this process and need to be brought further at the fifth UN Environment Assembly in 2021. Also, the European Commission and other regional bodies speak out for strong, multilateral political leadership.



Pascal Peduzzi, UNEP



Sonia Valdivia, WRF



Barbara Dubach,  
engageability/NRP 73

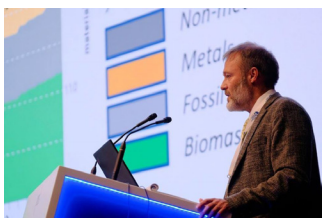
## PLENARY III – RAW MATERIALS AROUND THE WORLD

### Speakers

Peder Jensen and Elisa Tonda (United Nations Environment Programme), Lieze Cloots (Public Waste Agency of Flanders), Qingshan Zhu (Chinese Academy of Sciences), Susanne Karcher (African Circular Economy Network) and Lorena del Pilar Munoz (Universidad Vina del Mar, Chile).

### Highlights:

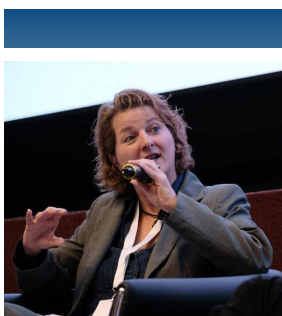
- Regional experts presented progress and highlighted the special needs of each region. The emerging circular economy networks in Africa need to be supported by the international community. Participants from developing countries acknowledged that natural resources are essential for development and that resource efficiency and improving natural resource governance is essential for reaching development goals.
- Urbanization is one of the easier leverage points: smarter cities, natural based solutions, passive houses, and sharing. Sharing experiences and establishing best practices can help support action in urban contexts.
- Sustainable consumption and production hot-spots and other tools of the sustainable lifestyles agenda are essential components for science-based decision making. The IRP, the One Planet Network and other global actors, as well as individual influencers, have fundamental roles to play in guiding this transition.
- All countries and regions are different, and that is why it is essential to continue global discussions. Governance requires a global perspective and trans-national operations should consider environmental and social liabilities produced as a consequence of mineral extractions. Yet, there is a need to respect country values and long-term historical perspectives. The exploitation of the past cannot continue.
- The fifth UN Environment Assembly in 2021 is a crucial element of the dialogue process.



Peder Jensen, UNEP



Lieze Cloots, Public Waste Agency of Flanders



Susanne Karcher,  
African Circular Economy  
Network



Qingshan Zhu, Chinese  
Academy of Sciences

Elisa Tonda,  
UNEP



Lorena del Pilar Munoz,  
Universidad Vina del Mar, Chile

## PLENARY IV – SUMMARY, AWARDS & CLOSING

Moderators: Bas de Leeuw (WRF) and Barbara Dubach (engageability/NRP 73)

Highlights:

- Fabian Ottiger moderated the Workshop Parade, where each of the workshop organizers summed up their outcomes in 30 seconds (more details on the workshops can be found on pages 19ff).
- Christian Ludwig and Sonia Valdivia handed out scientific award to the best poster and one scientific award to the best paper of each scientific session.
- Jessica Clement presented the chairman summary
- Participants expressed thanks to the WRF Secretariat, its partners and the hosts for organizing WRF 2019.
- The next World Resources Forum will be hosted by the Ghana Ministry for Environment, Science, Technology and Innovation (MESTI) in Accra, June 2020, so announced its Minister H.E. Kwabena Frimpong-Boateng.



Christian Ludwig, EPFL/PSI



Fabian Ottiger, WRF



Jessica Clement, WRF

## 3 WORKSHOP HIGHLIGHTS

### WS 1 – TOWARDS AN INTEGRATED SUSTAINABLE RESOURCE MANAGEMENT (PART 1)

Organizers: ESM Foundation  
UNECE  
EIT Raw Materials

Chairs: Alessandra Hool (ESM Foundation)  
Harikrishnan Tulsidas (UNECE)  
Roland Gauss (EIT Raw Materials)  
Julian Hilton (Aleff Group)

Speakers:

1. Scott Foster (UNECE)
2. Ester van der Voet (Leiden University and UNEP IRP)
3. Vesa Nykänen (Geological Survey of Finland GTK)
4. Michael Haschke (DTM and CERA)
5. Tunde Arisekola (Nigerian Geological Survey Agency)
6. Harikrishnan Tulsidas (UNECE Expert Group for Resource Management)
7. Julian Hilton (Aleff Group)
8. Raimund Bleischwitz (University College London)
9. Erika Ingvald (Geological Survey of Sweden)
10. Soraya Heuss-Assbichler (LMU Munich and EGRM)

Discussion:

The achievement of the UN SDGs and the implementation of the Paris Agreement require new technologies and a paradigm shift in the use of raw materials towards a circular and sustainable future. According to the Brundtland report, Sustainable Development is a process of change in which the development of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs. Clearly, the current trends of resource consumption are unsustainable, as it hinders resource efficiency, generates negative externalities, and will breach the carrying capacity of the planet sooner than later.

Strategic Raw Materials are indispensable for a sustainable worldwide access to energy, information, new forms of mobility, and the means to meet many of the basic needs. Where the supply with such materials is risky or accompanied by negative environmental or social impacts, a holistic resource management strategy needs to be implemented. To provide a sound basis for such a strategy, a transparent and standardized assessment of resources is crucial. The United Nations Framework Classification for Resources (UNFC) provides an internationally applicable scheme for the classification and reporting of energy and mineral resources.



The UNFC classifies resources in three dimensions: knowledge and uncertainty about the resource, project feasibility to attain them, and socioeconomic viability. The UNFC is being expanded as the United Nations Resource Management System (UNRMS) as a response to the urgent need to deliver on the “indivisible and integrated” action called for in by the Sustainable Development Goals (SDGs).

The workshop covered crucial aspects of strategic raw materials management, their integration into classification frameworks, the further development and application of such frameworks, their potential for a circular economy, and their role in Sustainable Development. Speakers included experts in criticality assessment, resource classification, resource recovery, and sustainable management of strategic raw materials.

After a welcome by the session Chairs, Scott Foster, UNECE, introduced in his talk on Global needs for raw materials for energy production the UNFC and UNRMS systems, which provide versatile classification tools and frameworks to facilitate sustainable management of resources. Their goal is an alignment of resource management to the 2030 Agenda and a transition to circularity, which will enable social, environmental and economic gains. Ester van der Voet, Leiden University and UNEP IRP, addressed the Challenges for global sustainable resource management. Increasing materials extraction will lead to increasing supply challenges, waste generation and environmental impacts. Well-being and economic activity need to be decoupled from the use of materials, which again needs to be decoupled from environmental impacts. This can only be achieved via a circular economy, where urban mining will be crucial to close materials loop. Vesa Nykänen, Geological Survey of Finland GTK, presented the NEXT project: developing sustainable exploration concepts and technologies. The Horizon2020 NEXT project develops ore exploration concepts and technologies to improve sustainability and social acceptance in the exploration process. Mischael Haschke, DTM and CERA, presented the EIT Raw Materials project CERA: Certification of raw materials. CERA is a raw materials certification system aiming for harmonization and cross-recognition of standards in accordance with the SDGs. It is currently in the piloting and testing phase. CERA includes four standards in one system, thus covering the entire value chain, from exploration to the final product and recycling.

Tunde Arisekola, Nigerian Geological Survey Agency, talked about the African mineral and energy resource classification and management system (AMREC). African countries currently bear significant negative social and environmental consequences from raw materials extractions, and a lack of adequate gains. UNFC-AMREC is a comprehensive system for the management of Africa’s mineral and energy resources, based on the UNFC system and including the Pan-African Resources Reporting Code (PARC). It aligns the “Africa Mining Vision”, Africa’s Agenda 2063 and the global Agenda 2030.



More information  
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([alessandra.hool@esmfoundation.org](mailto:alessandra.hool@esmfoundation.org))

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Hari Krishnan Tulsidas  
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Roland Gauss  
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ESM  
ENTWICKLUNGSFONDS SELTENE METALLE



## WS 2 – HOW TO CREATE A BIO-BASED CIRCULAR ECONOMY – FROM POLITICAL GOALS TO ACTIONS IN CITIES AND INDUSTRIES

Organizers: Chair of Societal Transition & Circular Economy at the University of Freiburg

Chairs: Prof. Dr. Sina Leipold (University of Freiburg)

Speakers:

1. Hanna Helander (University of Freiburg)
2. Machteld Simoons (University of Freiburg)
3. Anran Luo (University of Freiburg)

Introduction:

How do European bio-based industries react to circular economy policies? In the context of climate change and resource scarcity, the circular economy is a prominent concept among political discourses, with a particular emphasis on bio-based systems. However, the assumption that a circular bioeconomy is the best way of approaching sustainable development needs to be revised based on scientific evidence. Not only do we need to understand how decision makers conceive and put this idea into practice, but we also need to ensure that strategies do not compromise sustainability in its different forms. In this context, the "Circulus" Team aims to answer the following questions:

1. What strategies do cities and industries pursue to close product and material cycles and lower their use of renewable resources?
2. How do cities and industries identify the most sustainable solutions? What do we know about the environmental impacts of existing initiatives and how can science support these decisions?
3. What do we know about the political priorities and preferences of decision makers in Europe and China?

This workshop will provided empirical results addressing these questions, which was followed by a discussion in an interactive format. The goal of the workshop was twofold: (1) to critically evaluate our results and (2) to develop proposals for policy and action.

This resulted in an exchange about innovative approaches and initiatives for a bio-based circular economy with other experts from policy, science and civil society.



## Discussion:

The following questions were addressed:

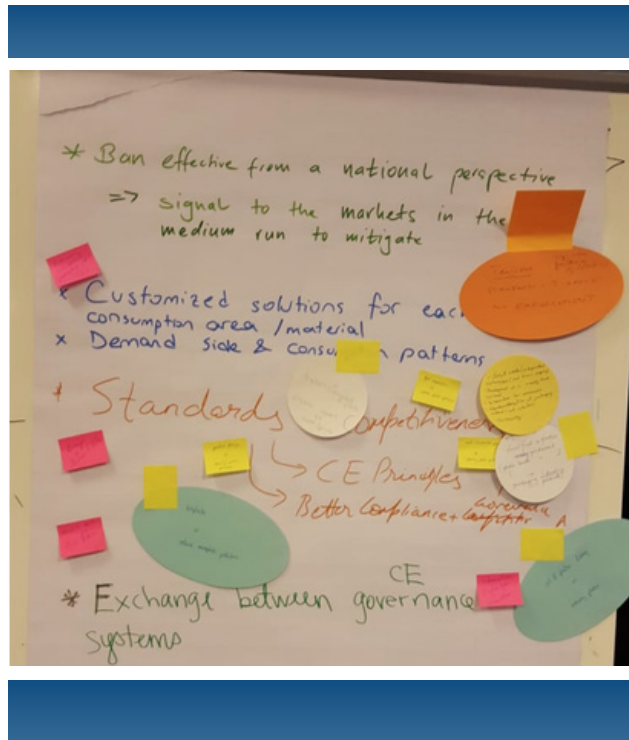
- Which strategies are prioritized and are there tensions between these strategies?
- How effective do you think current prioritized trade strategies are for a transition to a circular economy?
- What other strategies should be employed to promote circular economy globally?

Among other things, we discussed the tensions between standards and finance, information exchange and innovation, plastics, bio-plastics, WEEE, the design and demand of products and services, public procurement, urban mining, eco-labelling and the role of scale for a circular economy.

In particular, we addressed the tension between focusing on 'end-of-life strategies' such as waste management and the role of product and system design.

## Main conclusions:

From the presentations we learned that different narratives and problem definitions can be a mayor set-back for regional priority setting towards a circular economy. Furthermore, it was shown that trades is a prioritized strategy for globalizing circular economy, however, as dominant narratives are not necessarily the 'best' priorities, there is room to question the effectiveness of prioritizing trade in the promotion of global circular economy. One of the major points that came up from discussions was regarding the tensions between prioritizing 'end- of-life strategies' and 'production-phase-strategies' for a circular economy.



More information  
University of Freiburg:

Sina Leipold  
([sina.leipold@transition.uni-freiburg.de](mailto:sina.leipold@transition.uni-freiburg.de))



## WS 3 – TRADE RELATIONS AND SUSTAINABILITY

Organizers: NRP 73

Chairs: Prof. Dr. Regina Betz (CEE, ZHAW and co-president NRP 73)

Speakers:

1. Dr. Elisabeth Bürgi Bonanomi (CDE, University of Bern)
2. Prof. Dr. Joseph Francois (WTI, University of Bern)
3. Dr. Chris Mutel (Paul-Scherrer-Institute)
4. Dennis Kolcava & David Presberger (ETH Zurich)

Panelist:

1. Kate Dasse (International Affairs and Food Security, Federal Office for Agriculture FOAG)
2. Dr. Ankai Xu (Research Economist World Trade Organization WTO)
3. Daniel Weston (General Counsel & Global Head of CSV and Corporate Communications at Nestlé Nespresso SA)

Objective:

The objectives of this workshop were to present the work of four NRP 73 research projects and to discuss solutions for trade relations and sustainability.

Key questions:

The key questions touched upon were:

- What are the global burdens associated with current Swiss production and consumption?
- How can governments create more sustainable trade relations complying with international obligations?
- What are the impacts of trade liberalization on sustainability and on food security?
- What's the role of the private sector?



### Projects presentation:

The following four NRP 73-research projects presented initial research findings:

- Dr. Elisabeth Bürgi Bonanomi, CDE, University of Bern: [Sustainable trade relations for diversified food systems](#)
- Prof. Dr. Joseph Francois, WTI, University of Bern: [Switzerland's sustainability footprint](#)
- Dr. Chris Mutel, Paul-Scherrer-Institute: [Open assessment of Swiss economy and society](#)
- Dennis Kolcava, & David Presberger, ETH Zurich: [Environmental impact of trade relations](#)

### Discussion:

Thereafter, participants discussed how governments can create more sustainable trade relations complying with international obligations, the implications of trade liberalization on diversified food systems as well as the role of the private sector in international trade relations and how they can contribute to more sustainability.

### Closing:

The workshop closed with a panel discussion with representatives from FOAG international, the World Trade Organization and Nestlé Nespresso. The key take-aways from the discussion are:

- The work done by NRP 73 is exciting and relevant for the 'real world'.
- International trade tends to offload the environmental and social burdens to developing countries but trade can also foster green technology and circular economy.
- For the private sector to take responsibility, the right public policies are crucial, e.g. carbon taxes, tariff preferences, pricing externalities. This will drive business into the right direction for a sustainable development.
- Still more and open data is needed to calculate externalities and to enable traceability in supply chains (monitoring of emissions and resource use).
- Fair, non-discriminatory and effective provisions in trade agreements can contribute to a sustainable development.

## WS 4 – TOWARDS A CIRCULAR ECONOMY FOR ELECTRONICS

Organizers: United Nations Environment Programme (UNEP)

Chairs: Alessandra Hool (ESM Foundation)  
Harikrishnan Tulsidas (UNECE)  
Roland Gauss (EIT Raw Materials)

Speakers:

1. Ligia Noronha (UNEP)
2. Adrian Clews (Hinckley Associates Nigeria)

Panelists:

1. David McGinty (PACE, Platform for accelerating the circular economy)
2. John A. Pwamang, (Acting Executive Director, EPA Ghana)
3. Mathias Schluep, (World Resources Forum)
4. Daniel Hinchliffe, (GIZ)
5. Christina Meskers, (Umicore)
6. Pascal Leroy, (WEEE Forum)

Abstract:

The UN 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 include providing policy and technical support, defining the roadmap for the implementation of Extended Producer Responsibility (EPR) legislation, and setting up a suitable framework for the electronics producers to establish a management system, to take care of the collection and recycling of end-of-life electrical and electronic appliances. At the same time, UNEP is leading a component to develop circular economy approaches and best cases for the electronics sector in Nigeria and Africa.

This workshop brings together stakeholders from electronics sector, governments, international manufacturers. It collects insights and share best practices/examples on circular economy for electronics. This work supports the implementation of GEF project "Circular Economy approaches for the electronics sector in Nigeria", and it also helps to raise awareness and gain support from electronic manufacturers and other relevant stakeholders on the implementation of EPR systems in Africa and also at the global level.

#### Discussion:

Developing circular economy in developing countries means that it needs to take full consideration of the reality of the informal sector and their well-being, as well as the socio-economic conditions. The modality and approaches shall be flexible and pragmatic to have sufficient buy-in from the informal sector while creating value for both the environment and local economy. It is critical to address the issue of consumption by working better with the consumers.

For the GEF Nigeria project, it is paramount to support NESREA (National Environmental Standards and Regulations Enforcement Agency of Nigeria) to define the policy roadmap with clear policy targets, setting clear responsibilities for all relevant stakeholders and establishing monitoring & evaluation plans. Only with this policy in place, the PRO (Producer Responsibility Organisation) can start its operation with legitimate reference to the policy framework. Development of EPR (Extended Producer Responsibility) policy framework cannot directly copy the model from other countries. It needs thorough examination of the situation in Nigeria, and select the most plausible policy instruments and options from similar countries/context, and conduct stakeholder consultation to reach agreement on the best modality to move forward.

#### Main conclusions:

The value of the Nigeria GEF (Global Environment Facility) project recognised during the workshop is that: it provides a framework to pull many important elements of circular economy together. It includes policy instruments and incentives, engagement of the private sector, collaboration with the informal sector and creating a financing mechanism. We look forward to creating further synergies for all the initiatives and organisations that work on circular economy of the electronics sector in Africa and also at the global level.

More information

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## WS 5 – TOWARDS AN INTEGRATED SUSTAINABLE RESOURCE MANAGEMENT (PART 2)

Organizers: ESM Foundation  
UNECE  
EIT Raw Materials

Chairs: Alessandra Hool (ESM Foundation)  
Harikrishnan Tulsidas (UNECE)  
Roland Gauss (EIT Raw Materials)  
Julian Hilton (Aleff Group)

Speakers:

1. Scott Foster (UNECE)
2. Ester van der Voet (Leiden University and UNEP IRP)
3. Vesa Nykänen (Geological Survey of Finland GTK)
4. Michael Haschke (DTM and CERA)
5. Tunde Arisekola (Nigerian Geological Survey Agency)
6. Harikrishnan Tulsidas (UNECE Expert Group for Resource Management)
7. Julian Hilton (Aleff Group)
8. Raimund Bleischwitz (University College London)
9. Erika Ingvald (Geological Survey of Sweden)
10. Soraya Heuss-Assbichler (LMU Munich and EGRM)

Discussion:

In the afternoon session, Harikrishnan Tulsidas, EGRM, and Julian Hilton, Aleff Group, introduced The UN resource management system, which has experienced a crucial step change within the last years towards a comprehensive resource standard. UNRMS shall develop into an overarching framework for Government resource management and industry reporting, which encompasses a system perspective and a shift in paradigms: from short-term to long-term thinking, from shareholder to stakeholder values, and from a linear to a circular economy. Natural resource management decisions have historically been made on a project-by-project or sector-by-sector basis, and usually by a single government entity. This approach has come up significantly short, lacking a broad, “bird’s-eye” perspective on project effects and often with a limited diversity of knowledge and viewpoints used to support informed decision-making. UNRMS is an attempt to move away from the “commodity-based” approach and unify resource management as one and provide a broad canvass for integrated resource management. Raimund Bleischwitz, University College London, provided an overview on Global governance for sustainable resource management.



He emphasized the need for a systems approach on resource management, addressing raw materials, but also water, energy, food, and land use. Better data and material footprint profiles are needed to fully assess and manage resources on a global level. Erika Ingvald, Geological Survey of Sweden, highlighted UNFC as a tool for the sustainable management of CRM resources. She showed how UNFC supports Scandinavian efforts towards a holistic resource Governance, taking into account the needs of various stakeholders, and highlighting important points such as the assessment of waste as a resource, and the various social aspects connected to mining. Soraya Heuss-Assbichler, LMU Munich and EGRM Anthropogenic Resources Working Group, demonstrated the Application of UNFC for secondary resources. UNFC is a generic framework and broadly accepted for the classification of primary resources, with bridging documents and specifications existing for other applications, such as anthropogenic resources. Several case studies have been conducted on applying UNFC to secondary resources. The application of UNFC to anthropogenic resources requires a clear set of tools and indicators, which would allow it to be used in decision-making at various levels (company, sectoral, national, and international).

#### Main conclusions:

- The 2030 Agenda on Sustainable Development and the Paris Agreement on Climate Action require a holistic and integrated approach to the sustainable development of all natural resources.
- A shift of focus will be needed to make the transition from using up materials as a consumable good to utilizing materials in a service-oriented and sustainable way.
- Current standards in resource management were developed in the 1970s to support a linear industry, fragmented into sectors such as minerals, petroleum, renewable energy, water and other resources, with limited focus on social and environmental issues.
- A new transformative system for sustainable management of all resources is urgently required. This system must promote circularity, enhance efficiency, eliminate waste, and strengthen inter-connections transparently with all areas of the society and economy.

#### More information

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## WS 6 – SUSTAINABLE RECYCLING INDUSTRIES (SRI) PROJECT

Organizers: EMPA  
WRF

Chairs: Alessandra Hool (ESM Foundation)  
Harikrishnan Tulsidas (UNECE)  
Roland Gauss (EIT Raw Materials)

Speakers:

1. Mathias Schluep (SRI Programme Manager at World Resources Forum)
2. Ghada Moghny (Programme Coordinator at CEDARE)
3. Letitia Nyaaba (Principal Programme Officer at GNCPC)
4. Carlos Hernandez (SRI project coordinator Colombia)

Discussion:

To start things off, the SRI programme was introduced to the participants by explaining the logical framework of the programme with the different components and the five outcomes (policy, normative, business, problematic fractions, and international exchange).

It followed an introduction of the different projects of the SRI partner countries showcasing the progress made during the first phase of the SRI programme and also remaining challenges broken down to the five defined outcomes.

The Strategy of SRI phase II was presented with the specific focus points for the different project countries.

To maximize and measure the positive impact of the programme, life cycle based metrics for the environmental and socio-economic benefits of implemented changes will be developed and applied for the second implementation phase of the programme. Limits and opportunities of such metrics were discussed such as to:

- Support an informed decision-making process on policy level, improve methods for the implementation and enforcement of normative frameworks, including related assurance and verification systems, as well as analyse optimized recycling value chains and appropriate technology options, and
- measure and monitor changes directly or indirectly induced by activities of the SRI programme (or development cooperation projects in general), such as a quantification of the contribution to actions on climate change mitigation.

Main conclusions:

- The workshop showed a broad overview of the SRI programme, and showed key strategies for the second implementation phase, which was met with interest from many participants
- Initiative by organizations representatives interested in lending their expertise to the SRI programme is encouraged, especially by representatives from developing nations to foster South-South exchange
- As SRI goes into the second phase, the next steps include setting up a detailed plan of action with the project countries as well as further development of the SRI international engagement.

More information

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**Empa**

Materials Science and Technology

## WS 7 – TOWARDS A PUBLIC INNOVATION COMPASS

Organizers: Dr Ulrike Wunderle (Federation of German Scientists)

Chairs: Caroline Paulick-Thiel (Politics of Tomorrow)

Speakers:

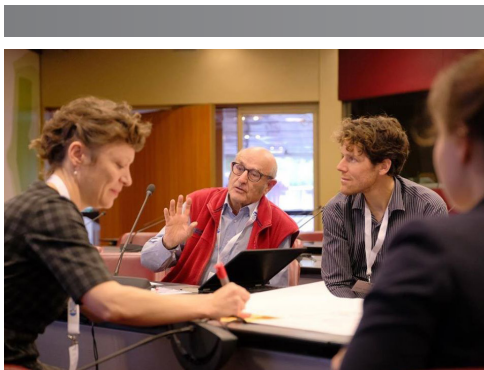
1. Lene Krogh Jeppesen (Center for Offentlig Innovation, Denmark)
2. Angela Hanson (Senior Consultant, Observatory for Public Sector Innovation, OECD)

Discussion:

The workshop generated by the Social Lab „Climate Action, Environment, Resource Efficiency and Raw Materials“ in the framework of the EU-funded NewHorizon project focused on new approaches to come to more societally relevant research and innovation in ecologically sustainable public sector initiatives, taking the potentials of Responsible Research and Innovation for orientation in public innovation processes into account.

Accordingly, the workshop

- outlined the need for public innovation: strengthen the public sector to face, actively support and take a lead in transitions linked to the present great societal challenges.
- showed current developments: public innovation labs, units and teams or as research shows - individuals - are moving projects forward that establish new competencies and capacities in environments that are otherwise hierarchical and rigid.
- Intended to develop a theory of change: based on the participants experience and expertise, the workshop considered desirable futures for the public sector, ways to get there and tools, such as a compass, that help us to stay on course.



Main conclusions:

- Public innovation needs science based models to navigate public investments: like the OECD innovation facets
- This needs reliable data & iterative evaluation that show effects, impact and public value
- A public innovation compass has to support behavioural and cultural change towards the SDGs incentivized by regulations and laws for the individual, organisational and systemic level

More information  
New Horizon:

[www.newhorizon.eu](http://www.newhorizon.eu)



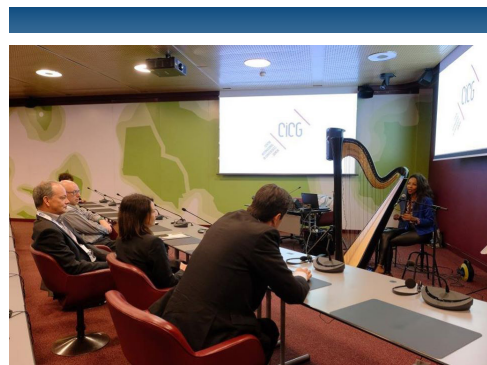
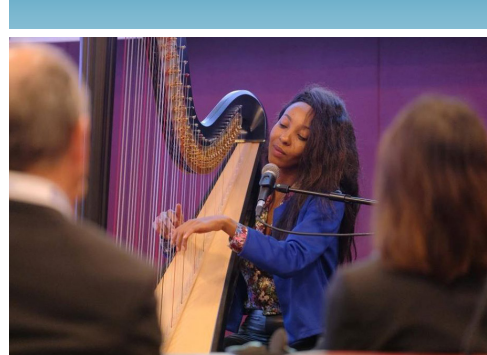
## WS 8 – A MUSICAL WORKSHOP HOSTED BY ZEM

Organizers: ZEM

ZEM is a remarkable young woman, musician and singer from Ethiopia. She lost her parents due to natural resources scarcity. Sustainability is her personal story. She played and sang and communicated through her music with the audience of World Resources Forum 2019 at the plenaries, welcome reception, and in a personal workshop.

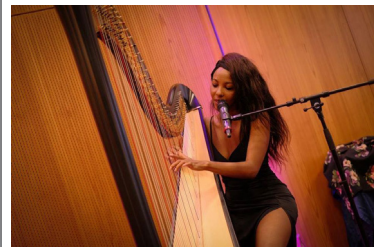
ZEM is a sing-songwriter, plays the semi-electric harp in an eclectic way from folk to triphop. ZEM writes and sings in three languages (EN, FR, NL).

ZEM was born in Ethiopia. As an orphan she was adopted by a Belgian/Dutch family and raised in Ghent. She studied classical harp (private student of Susanna Mildonian) and piano and started her career as singersong writer in a hiphop-formation at the age of 16. She participated in 'The Voice 2014'. From 2017 onwards, her artistic quest gets a whole new dynamic: ZEM returns to her first, great love, the Harp. In 2018 she wins the TV5MONDE public award at the "Concours de la Chanson Alliance Française".



More information  
ZEM:

[www.zem-music.com](http://www.zem-music.com)



## WS 9 – VOLUNTARY CERTIFICATION SCHEME FOR CRM RECYCLING (CEWASTE PROJECT)

Organizers: CEWASTE Project Consortium

Chair: Mathias Schluep (WRF)

Speakers:

1. Shahrzad Manoochehri (WRF)
2. Otmar Deubzer (UNU)
3. Sonia Valdivia (WRF)
4. Yifaat Baron (Oeko Institute)
5. Pascal Leroy (WEEE Forum)
6. Michael Gasser (representing Heinz Boeni, EMPA)
7. Julio Alejandro Giraldo (ICONTEC)
8. Tatiana Terekhova (Basel Convention)

Background Information and Workshop's Goal:

This workshop was organized by the Horizon 2020 funded project, [CEWASTE](#) (Voluntary Certification Scheme for Waste Treatment), which aims to develop, validate and launch a voluntary certification scheme for collection, transport and treatment facilities of key types of waste containing significant amounts of valuable and critical raw materials (CRMs) such as waste electrical and electronic equipment (WEEE) and batteries. With this, the project aims to address the specific challenges of securing sustainable access to CRMs for the EU economy, meeting the objectives set by the EU action plan for the Circular Economy and supporting the development of environmentally and socially sound recycling systems globally. To increase credibility and ownership of this scheme, CEWASTE intends to ensure a transparent stakeholder process and allow contributions from a wide range of experts and beneficiaries who are involved in recycling of CRMs.

The main objective of the CEWASTE workshop was to present the key findings of the project and to identify and engage with relevant stakeholders and experts among the audience of the WRF conference and give them the opportunity to contribute to the design and content of the CEWASTE certification scheme.



### Summary of Presentations and Discussions:

The CEWASTE consortium partners introduced the audience to the approach and key outcomes of CEWASTE. Since the start of the project in November 2018, the project has identified 14 types of key CRM-containing equipment (KCEs) from WEEE, batteries contained in WEEE and end-of-life vehicles (ELVs) that it will focus on. By taking stock of existing standards and guidelines, the project has identified and developed a set of normative requirements for the environmental, social, technology and governance performance of collection, transport and treatment facilities of the identified key CRM equipment. Furthermore, an assurance system and related verification mechanisms have been established to ensure that the facilities in the value chain comply with the defined requirements.

The invited speakers spoke about the challenges associated with the conformity assessment of the critical raw materials, the position of Colombia in adoption to national and international standards related to WEEE, and recent statistical data from Basel Convention about the transboundary movement of the hazardous waste.

In an open plenary discussion, the audience was asked to provide recommendations for advancing CRM recovery.

### Key Outcomes:

- Re-designed and updated Extended Producer Responsibility (EPR) models were highlighted as potential solutions towards optimized CRM recovery practices. The positive effect of updated EPR models on collection and recycling rates will lead to economies of scale for recyclers.
- Recycling of Critical Raw Materials (CRMs) is a complex system which will therefore require a comprehensive and multidimensional conformity assessment process. It was pointed out that reliable data from upstream and downstream processes is needed to assess sound CRM recycling practices.
- In order to develop and promote environmentally sound waste management systems in a global level and control the transboundary movement of (hazardous) waste, it is crucial to enhance international cooperation and achieve multi-national agreements.
- To be a globally accepted certification scheme, CEWASET should take regional and local needs into consideration. Among others, the importance of Chain of Custody and the key role of informal sector in recycling practices in developing countries were highlighted.
- Consideration of third country state of art operations and the competitive advantage of developing countries in being a hub for recycling operations was mentioned.



### Next steps:

To engage with a broad range of stakeholders in a transparent consultation process, the project has organized a face-to-face Consultation Meeting on 22 October in Geneva and will publish a draft version of the CEWASTE certification scheme on the project's website for online public consultation (Dec.19 – Jan.20). All interested stakeholders are invited to register for the CEWASTE Network to receive updates about the consultation process: <https://cewaste.eu/get-involved/>.

### More information:

Project's website: [www.cewaste.eu](http://www.cewaste.eu)

Contact: [info@cewaste.eu](mailto:info@cewaste.eu)

LinkedIn: CEWASTE Horizon 2020 project

Twitter: @cewaste1

CEWASTE Project Partners: World Resource Forum, Oeko Institute, Sofies SA, United Nations University (UNU), WEEE Forum, Austrian Standards International (ASI), European Electronics Recyclers Association (EERA), European Environmental Citizens' Organisation for Standardisation (ECOS) and SGS Fimko.



CEWASTE WORKSHOP REPORT  
ORGANIZED AT WRF 2019 CONFERENCE  
23 OCTOBER 2019, GENEVA, SWITZERLAND



This project has received funding  
from the European Union's horizon 2020  
research and innovation programme  
under grant agreement N° 820859

## WS 10 – ACTING ON 1.5: AN ANATOMY OF ACTION

Organizers: United Nations Environment Programme (UNEP), Sustainable Lifestyles Programme

Chairs: Garrette Clark (Sustainable Lifestyles Programme Officer at UNEP)  
Bas de Leeuw (Managing Director at World Resources Forum)

Speakers:

1. Chloe Kian (Instagram & YouTube Influencer)
2. Katrin Bienge (Sustainable Production and Consumption Project Co-ordinator at Wuppertal Institute)
3. Atsushi Watabe (Sustainable Production and Consumption Programme Director at the Institute of Global Environmental Studies (IGES))
4. Marie-Claire Graf (Swiss Youth for Climate)

Abstract:

How can we activate lifestyles that allow people to live better while containing global warming at a maximum of 1.5°? The Anatomy of Action was developed as an answer to this question: the media toolkit maps out the top-priority actions people can take to reduce their environmental footprint – and shows that sustainable living is accessible, fun and cool. Under this motto, the workshop brought together scientific experts and youth influencers, to discuss with the participants how we can engage people to take small but impactful actions.

Summary of presentations and discussions:

Garrette Clark first gave some background about the work of UNEP's Sustainable Lifestyles Programme before explaining its latest initiative, the Anatomy of Action (AoA) which was launched in September 2019. There are many factors influencing whether individuals will make sustainable lifestyle choices, such as their personal situation or socio-technical conditions. One common obstacle is that the language of sustainable is not accessible to people. They do not wake up to hurt – nor help – the environment. Discussing energy, water, climate change, pollution and so on will have less relevance unless it is connected to how people live: eat, move, stuff, money and fun. The AoA combines defining the evidence-based actions and how to reach people.



To launch the toolkit, UNEP ran a 15-day grassroots campaign to harness the power of social media and reach a young and global demographic. UNEP worked with influencers to challenge and encourage their communities to commit to one of the AoA actions for 15 days. The pilot challenge was successful: Over 1,000 #AnatomyOfAction posts from 40 countries were shared during the challenge, to an audience of a combined 5 million followers.

The participants were asked to discuss in pairs which of the AoA domains they were already taking action in, and to present them to the group. This interactive session was broken up by pitches from the workshop speakers about their areas of expertise.

Chloe Kian is one of the aforementioned 'influencers': creating content on her social media accounts is her job, and she uses her voice to raise awareness and share with her audience of over 120,000 about her journey experimenting with various aspects of sustainability. In her opinion, Instagram and YouTube are a great tool because information gets shared very quickly and reaches people from different backgrounds. The sources of information are often relatable, which helps to take action. She believes the AoA is useful because it removes the idea of perfection as a barrier to action.

Next, Atsushi Watabe gave insights into IGES' work on lifestyle footprinting, which looks at both direct and indirect GHG emissions. For instance, Energy and Automobiles, which are the main focus of conventional approaches, account for about 40% of individuals yearly emissions, whereas the various emissions relating to Food, Products and Services account for about 60%. The three key approaches to reduce lifestyle carbon footprints will be to 1) reduce the physical amount of goods/services consumed, 2) improve efficiency through low-carbon technologies, and 3) to shift to less carbon-intensive consumption modes.

Katrin Bienge explained her project The Sustainable Lifestyles Accelerator, whose goal it is to assess and implement social and technological changes in the target corridor of 1.5 degrees lifestyles. Based on the analysis of household footprints in national perspectives, Wuppertal Institut and their partners will develop the tool that households can use and will be tested for 3,500 households in a first round in 2020.

Finally, Marie-Claire Graf spoke about one essential action that everyone should consider as part of sustainable living, which is to vote. She highlighted the importance of voting in political elections to effect large-scale changes, but also reminded participants that they have a power to vote in most areas of their lives, such as their workplace, university, bank, supermarket, and more. She also underlined the need to involve Youth in the discussions and decisions of our time.

#### Outcomes and potential next steps:

- Scientific evidence is the foundation of our messaging, but when communicating to people, we must keep it actionable and engaging – social media is a key tool for this!
- Take action by voting – not just in political elections, but in everything you do – you can influence the politics in your work, bank, brands etc.
- #staycurious is one of the 15 AoA asks. There is always something to learn, so keep exploring what can be done by you, business and governments in the different areas of life.

The Anatomy of Action is a self-contained tool, so any individual or institution can use it for educational purposes and to raise awareness. UNEP plans to reactivate campaigns like the Take Action Challenge periodically around major events such as the IUCN Global Summit next year in Marseilles. In the meantime, anyone can launch their own challenge at any time! All assets are available on [www.Anatomyofaction.org](http://www.Anatomyofaction.org).

More information  
Anatomy of Action:  
UN Environment:

[www.anatomyofaction.org](http://www.anatomyofaction.org)  
[www.unenvironment.org](http://www.unenvironment.org)



## WS 11 – SCOPING WORKSHOP FOR A NATION-WIDE STUDY ON RESOURCE EFFICIENCY AND CLIMATE CHANGE IN INDIA

Organizer: Confederation of Indian Industry - CII

Chair: Nandini Kumar (CII)

Speakers:

1. Prof. Raimund Bleischwitz (Director, The Bartlett School of Environment, Energy and Resources)
2. Prof. Ernst von Weizsäcker (co-President, Club of Rome)
3. Dr. Peder Jensen (Head of Secretariat, The International Resource Panel)
4. Dr. Dieter Mutz (Team Leader, EU-Resource Efficiency Initiative Project)

Abstract:

As one of the world's largest economies, India's resource use is a subject of high importance in terms of the impact on economy and environment. This assumes significance in view of the Government of India's renewed focus on expanding the manufacturing and infrastructure sectors in its overall effort to make India an USD 5 trillion economy (Budget speech of Finance Minister, 2019).

In view of the importance and implications of a study quantifying the benefits that RE measures bring to GHG reduction, the Confederation of Indian Industry (CII) proposes a nationwide study to assess these.

The framework of the study was presented: the aim of the workshop was to gather as many inputs and feedback on different aspects of the study in one intensive session. CII also assessed if there was interest in the audience to participate in the study as partners.

Discussion:

A presentation introduced the audience and speakers to the current policy environment and chief features of the Indian economy relating to resources and GHG emissions.

The four panel members spoke about their areas of expertise; underpinning concepts from economics and science were pointed out, as were the situation in China, with respect to resource efficiency, the policy environment, resource efficiency activities in India, and, a few highlights of the International Resource Panel's report on the potential of improvements in resource efficiency to reduce GHG emissions in the transport and construction sectors.



A broad framework of the intended study was presented; after this, the audience formed two groups and discussed their way through some guiding questions put up on the screen relating to the study's organization and content. Two professors from the Indian Institute of Technology, Mumbai, carrying out research in resource efficiency and related areas, participated via skype.

#### Main Conclusions:

CII had sought feedback on aspects such as the project's governing/management structure, sectors for study, and the approach that would be most appropriate.

Overall, the proposed structure and aspects of study were corroborated. There was interest and offers of support from audience members as well as panel members, both of which will be valuable as the work progresses.

On sectors to be chosen for study, the following criteria were suggested:

- Sector(s) that cause most emissions or use most resources (such as cement).
- Base the sector(s) to be studied on availability of data.
- Identify high-impact sector(s) via sustainability hotspot analysis (UNEP toolkit can be used for this).
- Choose sector(s) where the study would add to the international body of knowledge, not necessarily one where studies have already been carried out.
- Sector(s) such as electronics or air-conditioning, which are likely to grow rapidly in coming years.
- Plastics are an important area of study, dominated as their manufacture and conversion is by medium and small enterprises. Information and data on the current situation would be a good starting point to identify efficiency improvement options/potential.

On approach, the basic model would be one superimposing GHG emissions on material flow at different stages of a product's life-cycle. Other approaches could be identified or examined with help from the International Resource Panel.

The governance/steering structure for the project would involve stakeholders from NGOs, research organizations, policy-makers, industry: overall, it could vary with sector, depending on the value chain.

#### Next Steps:

CII will incorporate these inputs gathered from the workshop for the framing of a detailed plan for a nation-wide study on resource efficiency and climate change; will stay in touch with participants who expressed an interest in the study and were willing to participate as partners.

More information

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## WS 12 – G20 EMERGING ECONOMIES' PERSPECTIVE ON RESOURCE EFFICIENCY CHALLENGES AND Prospects

**Organizers:** Two GIZ (German Bilateral Development Cooperation Agency) Projects: "Resource Efficiency Initiative for India (EU-REI)" and "Initiative Resource Efficiency and Climate Action"

**Chairs:** Dieter Mutz (Team Leader EU- Resource Efficiency Initiative)

**Speakers:**

1. Astrid Schomaker (EU Commission Environment)
2. Monika Dittrich (IFEU)
3. Rachna Arora (EU-REI)
4. Marisa Ortiz (Minister of the Environment, State of Guanajuato, Mexico)
5. Abhinav Bharti (Govardhan Eco Village)

**Abstract:**

According to recent UNEP International Resource Panel predictions, the rise in global resource use is intensifying environmental problems such as climate change, soil degradation and the loss of biodiversity, potentially beyond planetary boundaries. The G20 countries currently represent 80% of global economic output and 82% of CO2 emissions. While the G7 countries are overall still leading in resource consumption, emerging G20 countries such as Brazil, China, India, Indonesia, Mexico and South Africa, with their strong economic growth, are now also making increasing contributions.

Given this urgency, there is an increasing intensified effort by international policy networks to tackle unsustainable resource use and improve resource efficiency. Comparatively, extensive experience exists in G20 emerging economies with approaches to increasing energy efficiency.

The Workshop explores the various approaches currently applied by G20 emerging economies in tackling the issue of reliable data and its utilization and above all, its translation into effective policies, strategies and policies at different levels: G20 community, national activities (Indian ex-ample), State level application (success story of the State of Guanajuato, Mexico) and implementation at community level (Govardhan Eco Village, India).

**Summary of Presentations and Discussion:**

- The recent G20 meeting reconfirmed the need for horizontal exchange and experiences among member countries and beyond.
- Many G20 countries have already a direct or indirect policy on resource efficiency (RE) but name it differently with different sectoral focus and approaches based on national context and priorities. In some cases RE is part of an overarching environmental protection initiative. To comply with SDG and to promote circular economy is the driving force in most of the countries. However, there is a need for a unified G20 vision and greater presence of emerging economies for a richer dialogue.





- RE is still dominated by the objective to protect the environment. However, equal attention must be given to link RE with economic and social development and to establish linkages with climate change efforts for both mitigation and adaption towards a resilient economy and secure livelihood.
- For emerging economies like India, RE is gaining increasing prominence. This is because concerns of resource security are becoming pronounced especially in relation to critical materials. India has recently drafted a National RE Policy with focus on institutionalisation in order to approach the issue in a systemic and holistic manner.
- The challenge to transfer national/international RE policies to the local level remains. More efforts should be undertaken by national decision makers towards implementation and trans-latability of RE at State and local level. However, the open question remains who has capacities and resources to implement RE at local level, and if this can be integrated with the local priorities for greater success.
- There is a common understanding that any kind of RE activity needs the industry and service providers as partner as they are concretizing RE on the ground. Joint efforts and common understanding among all stakeholders across the world is needed for a smoother transition involved is key to success.
- The question, how to measure RE progress still needs to be answered. There were suggestions that integrating this with the SDG framework is useful and avoids additional burden. Further, different frameworks and indicators fulfil varied objectives. One of the ways to measure progress could be to assess the extent to which the secondary raw materials replace virgin resources in the focused sectors of a policy or action plan.

More information

GIZ: [www.giz.de](http://www.giz.de)

EU-REI: [www.eu--rei.com](http://www.eu--rei.com)

**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH



Bundesministerium  
für Umwelt, Naturschutz  
und nukleare Sicherheit



## WS 13 – NURTURING 'THE HUMAN SIDE' OF THE CIRCULAR ECONOMY

Organizers: ACEN (African Circular Economy Network)

Chairs: Susanne Yvonne Karcher (ACEN Co-Founder)  
Alexandre Lemille (ACEN Co-Founder)

Speakers:

1. Susanne Karcher (ACEN)
2. Alexandre Lemille (ACEN)

Aim:

This workshop aimed to critically look through the lens of “how to optimally embed and tap into existing and future human capacities and capabilities” as part of a CE transition model design that is functional and feasible for Africa and in order to expend the current Eurocentric understanding and scope of what CE can and should deliver on. The important point to consider is that the design, strategy and implementation of circular economy will be different in Africa due to the differences in regional socioeconomic and cultural needs.

Session 1 (co-presented by Susanne Karcher and Alexandre Lemille):

This workshop provided first a comprehensive introduction into the vision and workings of the African Circular Economy Network (ACEN) ([www.acen.africa](http://www.acen.africa)). It shared the key objectives of the organisation and how ACEN is structured and supported through more than 90 representatives in now over 30 African country chapters.

Session 1 then shared the unique African interpretation of a desired CE transition offering an approach where the (African) Human Capital is defined and valued as a future provider of protective and where needed regenerative/restorative “service” functions linked to both the biosphere and technosphere rather than merely being a consumer/user of resources.



It was further argued that a growing CE culture in Africa needs to be designed with an additional social dimension in mind (the Humansphere) to ensure the well-being of all people by enabling meaningful, equitable and dignified creative human activities spurred on by appropriate technologies and ingenious product designs based on local culturally engrained knowledge.

The human activity embedding CE model also provides naturally a symbiotic fit to achieve the SDGs and provide an (environmentally) safe and (socially) just space as contemplated in the Doughnut Economic Model (as describe by Kate Raworth).

Session 2 (facilitated by Susanne Karcher):

With the expanded understanding of what the CE agenda should deliver on in Africa the second part of the workshop was spent to identify the key leverage points that are required to unlock its full potential in four areas namely:

1. Politically: Policies required /available to fully unlock African Human Capital ?
2. Socially: Humansphere functions and related tasks that benefit Africans particularly ?
3. Locally: Identify most promising seed countries to push the Africanized CE agenda ?
4. Financially: Funding/ financing sources for research and African networking ?

Inputs were collected in the format of a World Café exercise where participants changed locations and joined the new topic of discussion every 10 minutes and with the aim to build on and expand on the answers provided by the previous group.

World Café Key Findings and Outcomes:

*Theme: Policies required /available to fully unlock African Human Capital?*

- Value human capital properly through tax reform- move away from taxing human labour to taxing resources.
- Increase the tax on virgin raw materials to promote the recovery of secondary materials instead.
- Better educational systems, (CE needs to be introduced to the curriculum and taught at early age) augmented by appropriate technologies (low tech and high labour intensive).
- Critical evaluation of certain imports and “donations” to Africa- e.g. cheap second hand textiles destroy Africa’s own textile industry. Certain trades, skills and talents that are unique need to be more valued and where necessary protected.
- Green procurement policy is a key enabler to value local supplies and strengthen employment
- Policies that enable meaningful informal (waste) sector integration are needed urgently
- Stick to government policies –e.g. Ghana Technical e-waste guidelines that do not create bottlenecks for people to do their job by overregulating certain activities or even making them unnecessarily illegal.
- A new understanding of what meaning “informal sector integration” looks like is required- “formalizing the informal sector” is probably not what works in Africa. Rather create enabling conditions and provide a safe activity space..
- A systematic mapping of any existing policies that promote any aspect of CE.

*Theme: Humansphere functions and related tasks that benefit Africans particularly?*

- Focus on key functions (clean air, clean water).
- Protect the environment, so that we would not need to take over the tasks of nature.
- Keep local culture and traditions alive.
- Important to have policies that support environmental protection.
- Environmental education of society.
- Groom Africa as centre of excellence to cover any service aspect of CE.
- Best of 2 World strategies.
- Meaningful partnership with Global North to provide fairly compensated value-added functions.
- Technosphere specialists already- e.g superior skills and knowledge related to providing a second lease of life to electronics- repair, reuse, refurbish.
- Collection service of informal sector can not be beaten regarding efficiencies and need to be encouraged and strengthened. De-stigmatization and fair compensation for service rendered (not just the materials collected by doing the collection itself) must be provided for e.g. through EPR schemes).
- Active protectors of biodiversity and wildlife- more policies to create opportunities for nature conservation programmes.
- Restorative farming practices need to be promoted and re-introduced – Africans are historically “organic farmers”.
- Re-forestation to combat climate change and avoid flooding and soil erosion is a crucial restorative human activity for Africans.

*Theme: Identify most promising seed countries to push the Africanized CE Agenda ?*

- What should be the criteria to determine ‘most promising’; criteria that the group considered – potential to raise funds, some initiatives already in pipeline, political stability.
- KNOWN early adopters of innovative and CE inspired projects are mostly startups, entrepreneur type people found to come from
- Ghana – because of government support evident from participation at WRF 2019, Rwanda – because of environment friendly initiatives already taken (e.g. plastic ban), Kenya – because of new initiatives after last election, Nigeria, Cote D’Ivoire, Senegal, South Africa, Uganda, Tanzania, Egypt, Morocco.
- It is however believed that many other African countries offer similar experience but have simply not yet been in the publicized about it. ACEN is collaborating with other parties (e.g. Footprints in Ghana to develop a framework for the collection and comparison of all known and future case studies of projects and their initiators.

*Theme: Funding/ financing sources for research and African networking ?*

International key funding sources, organisations and programmes identified to facilitate networking and research include but is not limited to:

- Switch Africa Green programme
- GIZ and BMZ
- World Economic Forum
- World Resources Forum
- African Development Bank
- Finland's SITRA fund
- PACE
- UNIDO
- European Investment Bank
- European Commission (e.g. Horizon 2020 projects with scope beyond Europe)
- Partnering for Green Growth and the
- Global Goals 2030 Initiative
- African Circular Economy Alliance partners
- to name a few...

Also a range of cooperation have started actively to fund research projects around CE inspired solutions e.g in the field of packaging- Unilever and Coca Cola , textiles- the C&A Foundations.

- A general comment was that the international programmes which have a focus on development projects in Africa are the main funding sources for supporting African CE networks. The examples of UN organizations, in international level, and GIZ, in national level, were given.
- Connection with the European science funding organizations and involvement in research proposals. This was mainly recommended for ACEN which has many high-level scientists as members.
- International funding opportunities such as Global Innovation Fund and Circular Economy 2030 were mentioned.
- African private sector (wealthy Africans).

## WS 14 – CHALLENGES AND BEST PRACTICES OF SUSTAINABLE SUPPLY CHAIN MANAGEMENT

Organizer: Federal Office for the Environment (FOEN)

Chair: Susanna Fieber (FOEN)

Speakers:

1. Susanna Fieber (FOEN)
2. Carsten Nathani (Rütter Soceco)
3. Antonio Hautle (Global Compact Network Switzerland)
4. Dominique Roques (VP Naturals Sourcing at Firmenich)

Background/Aim:

Today's economy is highly interconnected. Supply chains often span the entire globe. As a result, the environmental impacts caused by the production of goods are spread all over the world. Often the environmental impacts that occur in a company's supply chain are higher than those that occur at the site itself. Companies are increasingly expected to deal with their supply chains and be transparent about the impact of their business activities, including their upstream activities. In addition, there are national as well as international Guidelines and initiatives that pursue this goal (OECD Guidelines for Multinational Enterprises, EU directive on non-financial reporting etc.).

At present, however, most environmental measures and objectives, as well as the (sustainability) reporting of companies is largely based on the company's own production facilities. This does not reflect the importance of supply chains. The Swiss Federal Office for the Environment (FOEN) therefore wishes to raise awareness among companies of the environmental relevance of their supply chains and show ways and best practices in which environmental impacts can be reduced throughout the entire value chain.

Key questions:

We discussed the following questions. What is the need for action and what are the expectations for sustainable supply chain management? What do we know about environmental hotspots in the supply chain of companies? Which tools and support do companies need to improve the sustainability of their supply chains. We were discussing with various stakeholders how organizations from different industries can better assume their responsibility for sustainable supply chain management.

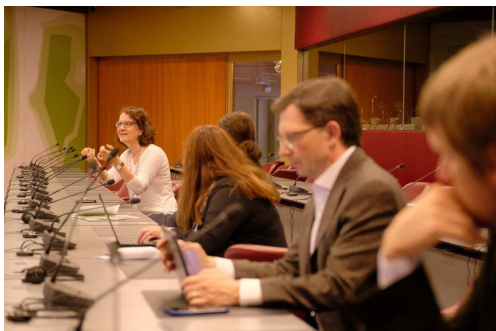




Benefits for the audience:

The participants learned:

- How politics is committed to the topic of supply chain management and what support it provides.
- How green public procurement is driving the issue forward.
- How to analyse hotspots in supply chains and what data is available.
- What kinds of challenges and opportunities exist for companies in managing global value chains.
- Which tools and networks can help to optimize supply chain management.
- How Firmenich leads the way as a best practice example in supply chain management.



More information

FOEN:

Rütter Soceco:

Globalcompact:

[www.bafu.admin.ch](http://www.bafu.admin.ch)

[www.ruetter-soceco.ch](http://www.ruetter-soceco.ch)

[www.globalcompact.ch](http://www.globalcompact.ch)



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Confederation

Federal Office for the Environment FOEN

## WS 15 – CRITICALC: SCOPING A CRITICALITY LIFE LONG LEARNING COURSE

Organizers: Leiden University-CML (Netherlands)  
TNO (Netherlands)  
Chalmers University (Sweden)  
Fraunhofer ISI (Germany)  
EIT Raw Materials

Chair: Prof. Arnold Tukker (Leiden University - CML and TNO, Netherlands)

Speakers:

1. Prof. Arnold Tukker (Leiden University - CML and TNO, Netherlands)
2. Dr. Luis Tercero (Fraunhofer ISI, Germany)
3. Associate Prof. Maria Ljunggren Söderman (Chalmers University, Sweden)
4. Mr. Elmer Rietveld (TNO, Netherlands)
5. Dr. Benjamin Sprecher (Leiden University - CML and TNO, Netherlands)

Summary:

Assessing the criticality of materials as input into production processes is crucial for companies, countries and economic sectors. It helps to understand how vulnerable their economic performance is to supply disruptions. Various methods and approaches for assessing criticality have been developed, most notably by the National Research Council in the US, the European Commission, and others from academia, government and industry. The CRITICALC project, funded by the EIT Raw Materials, will build an education program on criticality assessment that can be used in MSc, PhD and lifelong learning programs. Learning objectives are to understand what makes materials critical and how to assess criticality and analyse economic and other implications of criticality at company, sector and country level. From there, professionals can develop strategies to reduce criticality risks. To support the learning objectives, we envisage to redevelop and use a criticality assessment tool developed by TNO for Dutch SMEs ('grondstofscanner'). During this workshop at the WRF the project team cross-checked decisions made in the scoping phase of the project with a wider audience, and tried to come up with the best possible mix of course materials and supporting tools for the different needs of the audience.

More information:  
Prof. Arnold Tukker - University of Leiden

## WS 16 – APPLY LIFE CYCLE THINKING TO ACHIEVE GREEN BUSINESS AND SUSTAINABLE DEVELOPMENT

**Organizers:** UNEP (United Nations Environment Programme)  
Life Cycle Initiative

**Chairs:** Alessandra Hool (ESM Foundation)  
Harikrishnan Tulsidas (UNECE)  
Roland Gauss (EIT Raw Materials)

**Speakers:**

1. Steven Stone (UNEP)
2. Stefanie Hellweg (ETH)
3. Feng Wang (UNEP)
4. Joao de Sousa (IUCN)

**Abstract:**

Current approaches to Sustainable Consumption and Production, are regularly lacking a holistic system perspective in decision making processes. Addressing social, environmental and economic challenges through an integrated systems approach, is vital to achieving green business and sustainable development. Life cycle thinking helps identifying priorities and opportunities to improve production and consumption systems, while avoiding unintended trade-offs in environmental, social and economic impacts. Decisions made in isolation, i.e. decisions driven by only one sustainably dimension (e.g. reduction of greenhouse gases), without considering their full life cycle perspective or their broader implications, may generate unintended trade-offs for businesses.

The workshop opens a strategic dialogue among stakeholders from government, business, academia, on how to bring life cycle thinking into critical decision-making processes, to achieve resource efficiency and sustainable development in a circular economy. Discussions focus on topics related to national environmental footprints (e.g. the SCP-HAT), sectoral hotspots and actions (e.g. plastics, electronics), and capacity development.



### Discussion:

Steven Stone from UNEP welcomes everyone to participate in the workshop. Professor Stefanie Hellweg presents the work on assessing resources impacts based on life cycle assessment, based on the methodology and work of the report from the International Resource Panel 'Global Resources Outlook 2019'. Feng Wang from UNEP presents the work of the Life Cycle Initiative, and highlights the project SCP-HAT (The Hotspot Analysis Tool for Sustainable Consumption and Production: <http://scp-hat.lifecycleinitiative.org/>) which provides the environmental footprints data for more than 170 countries. Joao de Sousa from IUCN presents IUCN's work on closing the plastic tap by using life cycle thinking and other approaching to address the issue of plastic pollution. The presentations show the diversity of applying life cycle thinking and LCA in different dimensions, sectors, and topics for both business and the government.

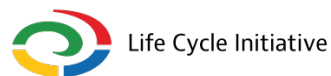
Life Cycle Thinking is still perceived as being complex by the participants, but regarded as a very good tool to provide a holistic overview of problems and support decision making in various topics (consumption and production, circular economy etc.) and sectors (construction, food, energy, mobility, plastics etc.). It is discussed that results from LCA should be better interpreted and translated to suit the purpose of specific policy or business demand. Also the result of analysis needs to be linked to actions that can make improvement in the system, to show the relevancy and applicability of LCA. There is a recognition that more LCA data with better quality are needed to support decision making, and several participants requests the support from UNEP on provide expertise and experience on data collection. There is a specific interest raised on the application of life cycle thinking in building and construction, especially measuring different scenarios in the built environment (such as the energy use, life time of building and demolition etc.).

### Main conclusions:

The workshop provides a good demonstration for the on-going work of the life cycle community to apply the concept of life cycle thinking and LCA in different application areas. There is a need for more harmonized methodologies and better access of LCA data to enable consistent analysis at the global level. In the meantime, tailor-made tools and support are needed to provide specific evidence, assessment and prioritization to support decision making in various areas. Under the coordination of the Life Cycle Initiative, the life cycle community will work together to make sure that practical and effective methods, tools, and knowledge are developed by working closely with the users and stakeholders.

More information

Kate O'Brien  
([kate.obrien@un.org](mailto:kate.obrien@un.org))



## WS 17 – INTRODUCTION OF SUSTAINABLE E-WASTE MANAGEMENT IN GHANA: AN INNOVATIVE COOPERATION BETWEEN MESTI AND GIZ

Organizers: GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH)  
MESTI (Ministry of Environment, Science, Technology & Innovation, Ghana)

Chair: Levina Owusu (Chief director, MESTI)

Speakers:

1. Levina Owusu (Chief director, MESTI)
2. Lydia Essuah (Director PPME, MESTI)
3. Markus Spitzbart (GIZ)
4. Joseph Sikanartey (GIZ)
5. Sampson Atiemo (MRI)
6. Veronika Johannes (GIZ)
7. Oliver Boachie (MESTI)

Abstract:

In recent times, growing prosperity in Ghana has enhanced technological advancement and helped to bridge the digital gap with developed countries. In addition to changing consumption patterns, population growth has contributed to an increase in the volumes of waste electrical and electronic equipment (e-waste) in the country.

E-waste is known to contain both valuable and hazardous fractions. Ghana has recognized the challenge and is rolling out several legislative instruments and to improve the e-waste management system in Ghana. To support this development, the Technical and Economic Cooperation Agreement between the Government of the Republic of Ghana and the Government of the Federal Republic of Germany gave rise to the Environmentally Sound Disposal and Recycling of Electronic Waste (E-Waste Programme). Implementing it is the Ghana Ministry of Environment, Science, Technology and Innovation (MESTI), with technical support by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Ghana.

## Discussion:

Oliver Boachie opened the discussion by welcoming the guests and participants, with a special welcome to H.E Hon. Minister Frimpong-Boateng, Ghana Minister of Environment, Science, Technology & Innovation. He then continued to shortly introduce the challenges posed by e-waste in Ghana and the different speakers presenting the solutions being implemented.

First Speaker of the presentation was Mrs. Lydia Essuah, Director of Policy Planning, Monitoring and Evaluation at MESTI. In her presentation, she introduced an overview of the current e-waste situation in Ghana and the challenges it poses, following an introduction of the legislative instruments put together by the Government of Ghana to tackle these challenges:

- The Hazardous and Electronic Waste Control and Management Act (Act 917)
- LI 2250
- The Technical Guidelines

She elaborated further that the National Strategy to improve the e-waste situation as well includes a National Integrated Management System as part of Operationalizing the Act 917, and developing partnerships with Germany, Switzerland and the EU. As one of these Cooperations, the E-Waste Programme was briefly introduced, highlighting the activities within the Programme that support the Ministry in their objectives.

Moving forward, Mr. John Pwamang, Chief Executive Officer of the Ghana Environmental Protection Agency (EPA) dived deeper into one of the key legislative tools to introduce sustainable e-waste management in Ghana; The Hazardous and Electronic Waste Control and Management Act (Act 917) After the introduction of the National Strategy by MESTI and EPA, Mr. Markus Spitzbart continued to introduce the Technical Cooperation of the E-Waste Programme by GIZ. He gave a general overview of the objectives and the main levels of implementation:

- Informal Sector: Institutional and individual capacity development on the Old Fadama scrap yard regarding appropriate recycling and management of e-waste to avoid health and environmental risks.
- Business Models: Developing and introducing sustainable business models in the formal sector to support the establishment of a sustainable e-waste recycling industry.
- Policy Advice: Facilitating the improvement of political conditions to create an appropriate legal and administrative basis for the proper collection and recycling of electronic waste.

He emphasized that the main approach to supporting MESTI was a bottom-up one; focused on creating interfaces between the formal and the informal sector, and a transfer of experiences and lessons learned to the Policy Dialogue.



Further introducing the implementations in the informal sector, which are strongly focused on the Old Fadama scrap yard, were Mr. Sampson Attiemo and Ms. Veronika Johannes. The Old Fadama scrap yard, better known as Agbogbloshie, lies in the Greater Accra Region and is well-known internationally for informal recycling methods.

First, Mr. Attiemo presented one of the main activities in Agbogbloshie; the Institutional Capacity and Peace Building Process. This activity is aimed at supporting the Greater Accra Scrap Dealer's Association (GASDA) in improving their capacities as a recognized institution on the scrap yard, as well as bridging the gap and promoting peace between the different leaderships. Ms. Veronika Johannes then introduced an overview of other activities in Agbogbloshie; the construction of a Technical Training Center, Health Post and Football Pitch; the Training Courses on environmentally sound manual dismantling of e-waste; and the Visioning Process, an activity aimed at facilitating the creation of a coherent vision of all relevant stakeholders in regard to the future of the Old Fadama scrap yard.

Mr. Joseph Sikanartey was next to introduce the different support areas in which GIZ aims to support MESTI on a policy level. He introduced the strategy to create interfaces for Stakeholder Dialogue on various levels; in the informal sector, this activity is implemented through a Development Theatre, which regularly communicates pressing issues relating to e-waste to the community of Old Fadama and promotes discussions; within the formal sector, this was achieved by supporting the creation of a Recycler Association, the E-Waste Recycler Roundtable (E-WROTA). Other activities include the support for the development of an optimized e-waste recycling chain, as well as supporting the setup of the e-waste recycling fund.

Last, but certainly not least, Mr. Andreas Manhart of the Oeko-Institute presented the results of the Piloting Payment system, an activity carried out on the Old Fadama scrap yard. During this pilot phase, hazardous fractions from e-waste were bought from informal collectors - focusing in this pilot on cables, which are usually sent for burning – and through an incentive system sent for proper disposal to formal recycling companies.

Overall, the Workshop highlighted once again the value of Cooperations to support the National Strategy, and the importance of creating sustainable interfaces between sectors to support an optimized approach for e-waste management in Ghana.

More information

GIZ: [www.giz.de](http://www.giz.de)  
MESTI: [www.mesti.gov.gh](http://www.mesti.gov.gh)

**giz** Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH



## WS 18 – IMPLEMENTING THE UN GUIDING PRINCIPLES ON BUSINESS AND HUMAN RIGHTS IN COMMODITY TRADING

Organizer: STSA (Swiss Trading and Shipping Association)

Chair: Dr. Nina Eggert (STSA)

Speakers:

1. Barbara Schedler (Federal Department of Foreign Affairs)
2. Mark Bradley (Forcefield)
3. Alexander Peters (ArrowMetals and Trading)
4. Philip Goodswen (Business lawyer specializing in international trade, energy and commodities)



More information  
STSA:

[www.stsa.swiss](http://www.stsa.swiss)

**STSA** 

## 4 SCIENTIFIC SESSIONS & AWARDS

This year, following key topics were addressed in eight scientific sessions:

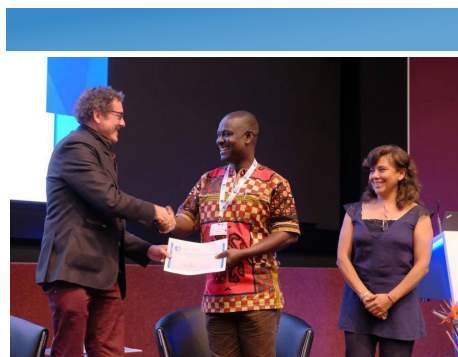
- Meeting the SDGs
- Life cycle thinking
- Circular Economy: From Ideas to Implementation
- Resource efficiency and materials flows management
- E-waste
- Sustainable Lifestyles and Education

Many abstracts from 25 countries were submitted this year to the WRF, 60 of which were finally accepted by the Scientific Committee for oral presentation and 15 for poster presentation during one of the scientific sessions and poster sessions organized in Geneva. Scientific presentations were clustered in 8 sessions with dedicated themes. These gave place to highly interesting and inspiring speeches and very stimulating lively discussions with the public.

Four oral scientific presentations and one scientific poster have been particularly appreciated and were prized by the Scientific Session Chairs – Prof. Christian Ludwig (Paul Scherrer Institut – PSI and EPFL, Chair Scientific Committee) and Prof. Sonia Valdivia (WRF, Co-Chair Scientific Committee) – with the support of the public.

These were:

- Hotel Lobbies as Workspaces for the Modern Worker, presented by Dolapo Oluteye (UCL, United Kingdom)
- Incentive based collection of e-waste – Results from pilot implementation in Ghana, presented by Andreas Mahnhart (GIZ, Germany)
- Physicomechanical Properties of Starch-Based Bioplastic Films, presented by Tender Ferolin (Ateno de Davao University, Philippines)
- Assessing the contribution of Circular Economy to Urban Sustainability: an analysis based on the use of indicators, presented by Valeria Superti (EPFL, Switzerland)
- Development and characterization of a water-based end-of-life recycling process of lithium ion batteries, presented by Lorena Toledo Reyes (EMPA, Switzerland)



Scientific Sessions Awards



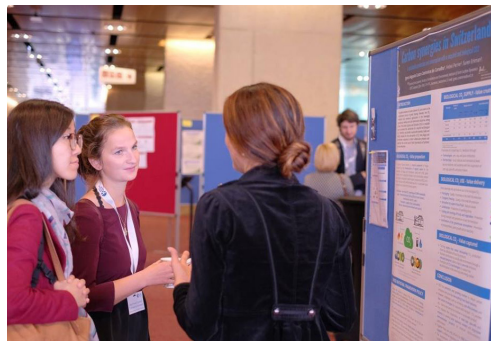
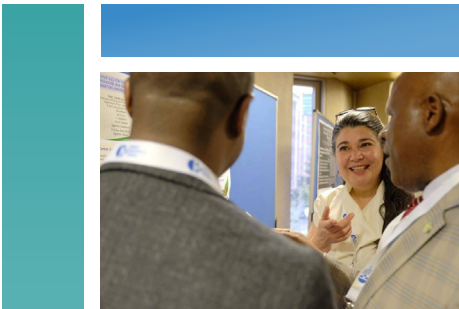
Scientific Sessions Awards

These and other WRF 2019 presentations can be consulted on the World Resources Forum website.

This year, the format of the scientific sessions was adapted according to recommendations by participants from previous WRF editions. The new format consists mainly in allocating more time for feedback and direct discussion, which was overall well received by the audience.

The Scientific Committee in charge of the review of abstracts submission, headed by Prof. Ludwig and Prof. Valdivia, consisted of several experts from all around the world. We would like to thank them all once again for their continuous engagement and great work!

## IMPRESSIONS – SCIENTIFIC SESSIONS



## 5 MORE HIGHLIGHTS

### PRESIDENTS MEETING

In the last couple of years, the number of international organizations devoted to creating spaces to discuss resources management and sustainability solutions has increased significantly, as well as the number of events addressing these crucial issues. In spite of the differences in target audiences, focus topics and regions, these organizations share the common goal of supporting the transition towards sustainable development. Fostering collaboration between them is a key step forward.



Following the first meeting in 2017, presidents of such organizations got together during the WRF 2019 to discuss synergies and coordinate future activities. The network created and the exchange of information will allow a better coverage of topics, stakeholders and region-specific issues. Organizations based in Germany, China, India, Ghana, France and Switzerland were part of this second gathering.

### ESM - SHORT COURSE ON RESOURCE MANAGEMENT



On 22 October, EIT Raw Materials and the International Raw Materials Observatory co-organised an “Executive Short Course on Resources Management using the United Nations Framework Classification for Resources”. This one-day course on the UNFC was designed for senior policymakers and industry leaders from the public and private sector and was held at the Centre International de Conférences (CICG) in Geneva, Switzerland.

It provided the know-how and insights required to work towards better management and governance of oil, gas, mineral and anthropogenic resources and contributed to the 2030 Agenda for Sustainable Development and the Sustainable Development Goals. At the end of the course, the participants were able to use the United Nations Framework Classification for Resources (UNFC) as a resources’ management tool. Places were distributed on a first-come-first-served basis and only 20 seats were available. Registration was free of charge for all EIT Raw Materials partners and European Geologist title holders. The short course was organised back-to-back with the World Resources Forum (WRF) 2019.



## CEWASTE CONSORTIUM MEETING

At the end of October, prior to and as part of the World Resources Forum conference. The CEWASTE consortium held a series of meetings, consultations and workshops that highlighted the progress the project has made and will dictate the crucial next steps. The project consortium meeting was held across the 21<sup>st</sup> and 22<sup>nd</sup> October and this was followed by the much anticipated consultation meeting that gave the opportunity for external stakeholders to discuss the first draft of the certification scheme outline.

CEWASTE aims to develop and test a voluntary certification scheme for collection, transport and treatment facilities of key types of waste containing significant quantities of valuable and critical raw materials (CRMs). In order to ensure broad acceptance of the scheme and to allow contribution from relevant experts, the project is engaging with a wide range of stakeholders in a transport consultation process.

## STEP CAPACITY BUILDING WORKSHOP

On the 25th of October, Experts from the "Solving the E-waste Problem (StEP)" Initiative met in Geneva for a stakeholder event under the topic of "Capacity Building for Sustainable E-Waste Management". In line with the one of StEP's main objectives to support sustainable e-waste solutions on a global level and to facilitate cooperation among different stakeholder groups, this event aimed at analysing current training needs and requests, map existing training programmes and expertise as well as identify gaps which need to be addressed.

## ZEM

The Ethiopian Harpist ZEM performed at WRF2019. She is a remarkable young woman, musician and singer playing the semi-electric harp in an eclectic way from folk to triphop. ZEM writes and sings in three languages (EN, FR, NL).

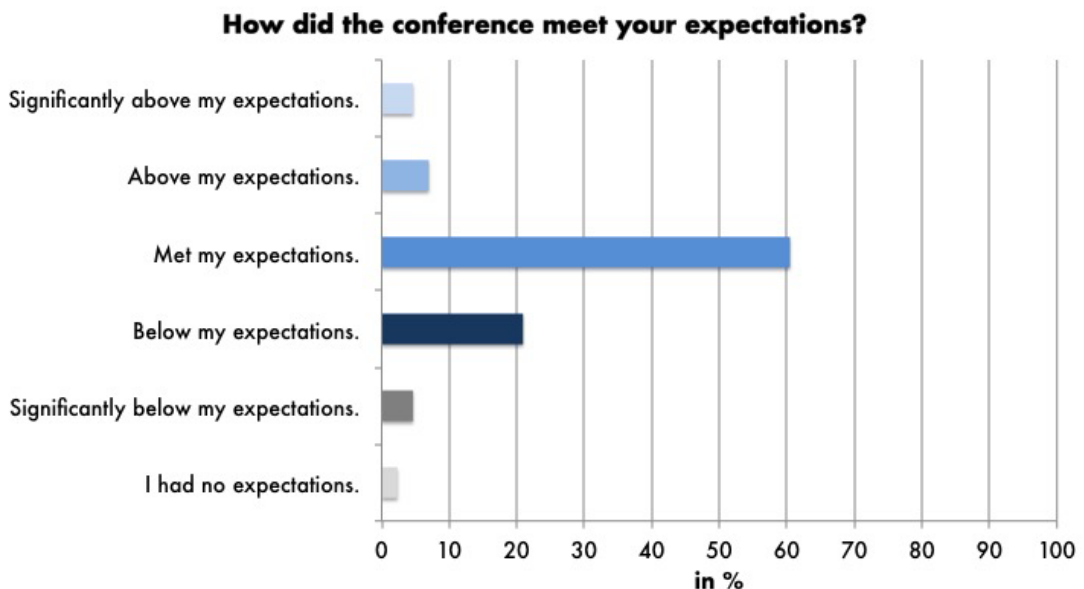




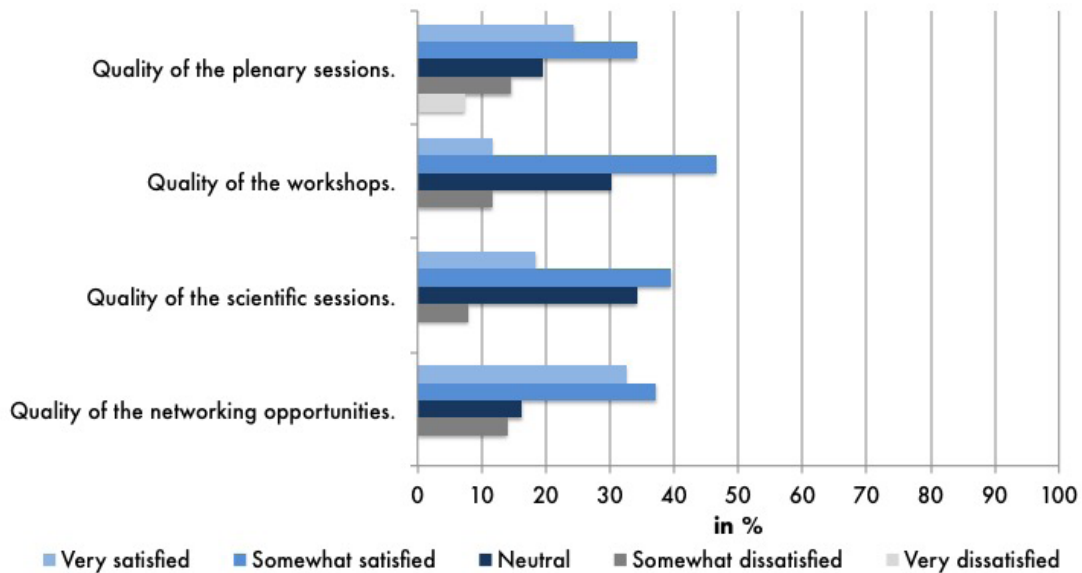
## 6 PARTICIPANT SURVEY

Good satisfaction with WRF 2019, results of participant survey show

For the eighth consecutive year, the WRF carried out a survey after the conference. Results show that the event met (or exceeded) the expectations of a big majority of respondents (over 72.1%). For 11.63% of the respondents the event was above or significantly above their expectations (See Graph 1). The quality of the plenary sessions, the workshops, the scientific sessions and the networking opportunities was perceived as satisfying by the majority of participants (See Graph 2). Participants also found that the WRF gave them the opportunity to meet in particularly interesting researchers and interesting representatives of international organisations, but also the representatives from the industry and the public sector were perceived as interesting (See Graph 3). Even if responses are very positive; they show that there is still room for improvement. This is true in particular in relation to the timing of the events and catering. As usual, all the comments received will be considered by the organizing committee to further improve the WRF events. We will be pleased to get your feedback at any point in time. Please check our WRF website or send us an email at [info@wrforum.org](mailto:info@wrforum.org).

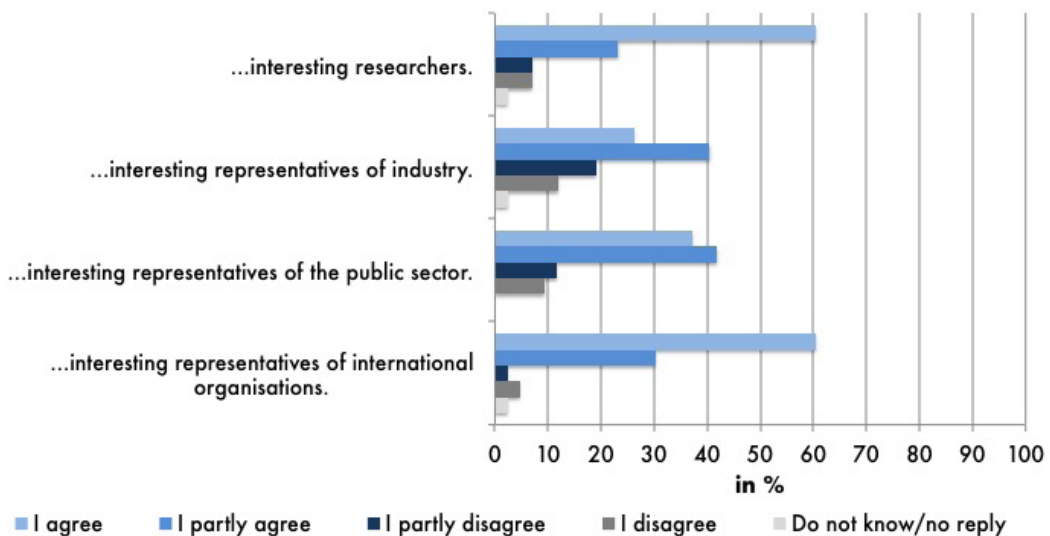


Graph 1: Shows how the conference met the expectations of the participants. 72.1% of all respondents said it met or even exceeded their expectations.



Graph 2: Shows how the participants valued the quality of the plenary sessions (58.54% somewhat or even very satisfied and 19.51% neutral), the workshops (58.14% somewhat or even very satisfied and 30.23% neutral), the scientific sessions (57.89% somewhat or even very satisfied and 34.21% neutral) and the networking opportunities (69.77% somewhat or even very satisfied and 16.28% neutral).

### The WRF gives me the opportunity to meet...



Graph 3: Shows how the participants experienced the opportunity to meet interesting people from different sectors. 83.73% agreed or partly agreed that there were interesting researchers to meet. 66.67% agreed or partly agreed that there were interesting representatives of industry. 79.07% agreed or partly agreed that there were interesting representatives of the public sector and 90.7% agreed or partly agreed that there were interesting representatives of international organisations to meet.

# APPENDICES

## APPENDIX A: CONFERENCE PROGRAMME

# WRF 2019

## Making Natural Resource Governance fit for the 21<sup>st</sup> Century

Networking/Free Time Session

Workshops & Scientific Sessions

Plenary Sessions

WEDNESDAY OCTOBER 23

8.00 – 8.30	Registration					
8.30 – 10.00	Workshops (WS) & Scientific Sessions (SS)					
	<div> <div>WS 1</div> <div>room 3</div> <div> <a href="#">Towards an Integrated Sustainable Resource Management (Part 1)</a> </div> <div> ESM, UNECE &amp; EIT RM </div> </div>	<div> <div>WS 2</div> <div>room 5</div> <div> <a href="#">How to Create a Bio-Based Circular Economy</a> </div> <div> University of Freiburg </div> </div>	<div> <div>WS 3</div> <div>room 6</div> <div> <a href="#">Sustainable Trade Relations</a> </div> <div> NRP 73 </div> </div>	<div> <div>WS 4</div> <div>room 4</div> <div> <a href="#">Towards a Circular Economy for Electronics</a> </div> <div> UNEP </div> </div>	<div> <div>SS 1</div> <div>room 13</div> <div> <a href="#">Life Cycle Sustainability Assessment</a> </div> <div> 1. Daudi Mongeri Nyaanga 2. Edgar E. Sacayón 3. Benjamin Fritz 4. Marcus Andreas Berr 5. Harald Ulrik Sverdrup 6. Gregor Wernet </div> </div>	<div> <div>SS 2</div> <div>room 18</div> <div> <a href="#">Meeting the SDGs</a> </div> <div> 1. Marzia Traverso 2. Vandana D Ravi 3. Fritz Brugger 4. Anna Hulda Olafsdottir 5. Marcos Rodrigues Queiroz </div> </div>
10.00 – 10.30	Coffee Break					
10.30 – 12.00	Plenary I: Getting the License to Operate <div> Moderators: <a href="#">Bas de Leeuw</a> (WRFA) and <a href="#">Barbara Dubach</a> (engageability/NRP 73) <ul style="list-style-type: none"> <li><a href="#">Bruno Oberle</a> (World Resource Forum Association)</li> <li><a href="#">Ernst von Weizsäcker</a> (Club of Rome)</li> <li><a href="#">Cristina Bueti</a> (International Telecommunication Union)</li> <li><a href="#">Daniel Weston</a> (Nestlé-Nespresso &amp; Aluminium Stewardship Initiative)</li> <li><a href="#">Gary Litman</a> (United States Chamber of Commerce)</li> <li><a href="#">Brendan Edgerton</a> (World Business Council for Sustainable Development)</li> <li><a href="#">Gunter Stephan</a> (NRP 73)</li> </ul> </div>					
12.00 – 12.30	Power Lunch <ul style="list-style-type: none"> <li><a href="#">E[co]work</a> Dismantling Mobile Phones Demonstration Booth</li> </ul>					

**12.30 – 14.00 Workshops (WS) & Scientific Sessions (SS)**WS 5  
room 3[Towards an Integrated Sustainable Resource Management \(Part 2\)](#)

ESM, UNECE &amp; EIT RM

WS 6  
room 4[Sustainable Recycling Industries \(SRI\) Project](#)

SRI

WS 7  
room 5[Towards a Public Innovation Compass](#)

NewHoRRizon

SS 3  
room 13[Circular Economy: From Ideas to Implementation](#)

1. Sanjeevan Bajaj
2. Valeria Superti
3. Beatriz Granziera
4. Owen Seigo Robinson
5. Lorena del Pilar Munoz

**14.00 – 15.30 Plenary II: High-Level Political Dialogue on the Governance of Mineral Resources: Searching for Political Leadership**Moderators: [Bas de Leeuw](#) (WRFA) and [Barbara Dubach](#) (engageability/NRP 73)

- [Marc Chardonnes](#) (Federal Office of the Environment, Switzerland)
- [Ol'ga Algayerová](#) (United Nations Economic Commission for Europe)
- [H. E. Kwabena Frimpong-Boateng](#) (Minister of Environment, Science, Technology and Innovation - Ghana)
- [Ligia Noronha](#) (Economy Division, United Nations Environment Programme)
- [Astrid Schomaker](#) (Environment, European Commission)

**15.30 – 16.00 Coffee Break****16.00 – 18.00 Workshops (WS) & Scientific Sessions (SS)**WS 9  
room 4[Voluntary Certification Scheme for CRM Recycling \(CE-WASTE\)](#)

CEWASTE

WS 10  
room 3[Acting on 1.5: An Anatomy of Action](#)10 YFP SLE  
MACWS 11  
room 5[Nation-Wide Study on Resource Efficiency and Climate Change in India](#)

CII

SS 4  
room 13[Resource Efficiency](#)

1. Dola Oluteye
2. Kerstin AnstättF & Nadja
3. Wisniew-ski
4. Bhavish Patel
5. Ralph Bodle
5. Grégoire Meylan

SS 5  
room 18[Social Aspects of Sustainability](#)

1. Geoffrey I. Nwaka
2. Sally K. Springer
3. Sanjana Shiva-kumar
4. Andrés Tello

**18.00 – 19.00 Geneva Apéro Riche (host: State of Geneva) with [ZEM](#) (harpist and singer-songwriter from Ethiopia)**

## THURSDAY OCTOBER 24

**8.00 – 8.30 Registration****8.30 – 10.00 Workshops (WS) & Scientific Sessions (SS)**WS 12  
room 3

[G20 Emerging Economies' Perspective on Resource Efficiency Challenges and Prospects](#)

GIZ, BMU, IKI

WS 13  
room 4

[Nurturing 'The Human Side' of the Circular Economy](#)

ACEN

WS 14  
room 5

[Challenges and Best Practices of Supply Chain Management](#)

FOEN

WS 8  
room 6

[A Musical Workshop](#)

[ZEM](#)SS 6  
room 13

[Sustainable Lifestyles and Education](#)

1. Sandor Czellar
2. Katrin Bienge
3. Feng Wang
4. Sibel Eker
5. Dean Tashobya
6. Lynnette Wider & Thomas D. Pacioni

SS 7  
room 18

[E-waste to Resource](#)

1. Ajay Bhagwan Patil
2. Antoinette van der Merwe
3. Karoline Owusu-Sekyere
4. Andreas Manhart
5. Ron Zevenhoven

**10.00 – 10.30 Coffee Break****10.30 – 12.00 Plenary III: Raw Materials Around the World**Moderators: [Bas de Leeuw](#) (WRFA) and [Barbara Dubach](#) (engageability/NRP 73)

- [Peder Jensen](#) & [Elisa Tonda](#) (United Nations Environment Programme)
- [Lieve Cloots](#) (Public Waste Agency of Flanders)
- [Qingshan Zhu](#) (Chinese Academy of Sciences)
- [Susanne Karcher](#) (African Circular Economy Network)
- [Lorena del Pilar Munoz](#) (Universidad Vina del Mar)

**12.00 – 12.30 Power Lunch**

- [E\[co\]work](#) Dismantling Mobile Phones Demonstration Booth

**12.30 – 14.00 Workshops (WS) & Scientific Sessions (SS)**WS 15  
room 5

[CRITICALC: Scoping a CRITICALity Life Long Learning Course](#)

EIT RM

WS 16  
room 3

[Apply life cycle thinking to achieve green business and sustainable development](#)

UNEP

WS 17  
room 4

[Introduction of Sustainable E-Waste Management in Ghana](#)

MESTI and GIZ

WS 18  
room 6

[Implementing the UN Guiding Principles on Business and Human Rights in Commodity Trading](#)

STSA

SS 8  
room 13

[Material Flows and Management](#)

1. Barbara Beck
2. Shourjomay Chattopadhyay
4. Dennis Kolcava
5. Sonia Valdivia
6. Tender Panglin-Ferolin

**14.00 – 15.30 Plenary IV: Summary Parade, Awards & Closing**Moderators: [Bas de Leeuw](#) (WRFA) and [Barbara Dubach](#) (engageability/NRP 73)

- South Pole CO2 Offset
- [Christian Ludwig](#) (Paul Scherrer Institute/EPFL) & [Sonia Valdivia](#) (WRFA) - Awards
- Fabian Ottiger (WRFA) – WRF Workshop Parade
- Jessica Clement (WRFA) – Chairman Summary



## APPENDIX B: SCIENTIFIC SESSIONS PROGRAMME

Wednesday 23 October (08:30 – 10:00)

### Life Cycle Sustainability Assessment

Moderators: Tender Pangilinan Ferolin and Edgar E. Sacayón

- Life Cycle (LC) for Farm Manure at Egerton University by Daudi Mongeri Nyaanga – Kenya
- Considering Blue Carbon Sequestration in Life Cycle Assessment of Palm Oil Systems by Edgar E. Sacayón – Guatemala
- Life Cycle Inventories of Different Types of Gold Extraction from Small-Scale Mining in the Amazonian Rainforest in Brazil by Benjamin Fritz – Brazil
- Assessing Supply Risks within A Life Cycle Sustainability Assessment Framework - A Critical Review of Available supply risk indicators by Marcus Andreas Berr – Switzerland
- Assessing with the WORLD6 Model, the Global Energy Use, CO2 Emissions and Water Use of Metals, Materials and Fossil Fuel Extraction and Production by Harald Ulrik Sverdrup – Iceland
- Life cycle inventory generation and data handling in a large LCI database in a global context by Gregor Wernet – Switzerland

Wednesday 23 October (08:30 – 10:00)

### Meeting the SDGs

Moderator: Marzia Traverso

- New United Nations Social LCA Guidelines - Supporting the SDGs by Marzia Traverso – Germany
- In-House Greywater Sewage Treatment Systems: Proposing a Comprehensive Decision-Making Framework for Micro-Scale Solutions at the Point Source by Vandana D Ravishankar – India
- Mining Companies and Local Communities: Time for Change by Selina Bezzola – Switzerland
- Rethink fashion, rethink the world by Marcos Rodrigues Queiroz – Brazil

Wednesday 23 October (12:30 – 14:00)

### Circular Economy: From Ideas to Implementation

Moderators: Rudolf Struis and Harald Ulrik Sverdrup

- Circular Economy simplified: Every ending is a new beginning by Sanjeevan Bajaj – India
- Assessing the contribution of Circular Economy to Urban Sustainability: an analysis based on the use of indicators by Valeria Superti – Switzerland
- Fostering the transition to a Circular Economy in developing countries: a screening over the potentials of the Brazilian National Waste Policy by Beatriz Granziera – USA
- Systems Thinking for a Circular Economy by Seigo Robinson – United Kingdom
- Circular Economy and Positive Carbon - Case Study, Rethread Industry US and Latin America by Lorena del Pilar Munoz – Chile



## Wednesday 23 October (16:00 – 18:00)

### Resource Efficiency

Moderators: Ron Zevenhoven and Bhavish Patel

- Hotspot Analysis Tool for Sustainable Consumption and Production (SCP-HAT) by Feng Wang – UNEP
- Hotel Lobbies as Workspaces for the Modern Worker by Dola Oluteye – United Kingdom
- Simulation Games - A method for Uncovering Resource Efficiency Potentials in Manufacturing Companies by Kerstin Anstätt & Nadja Wisniewski – Germany
- Phosphorus Recovery from Bio Feedstock using the Improved Hard Process by Bhavish Patel – Switzerland
- International Governance of Resource Efficiency - Prospects for a Treaty? by Ralph Bodle – Germany
- Building capacities for a competitive circular economy - The case of wastewater in Colombia by Grégoire Meylan – Switzerland

## Wednesday 23 October (16:00 – 18:00)

### Social Aspects of Sustainability

Moderator: Sanjeevan Bajaj

- From Neglect to Recognition: Promoting the Informal Sector for Sustainable Cities in Africa by Geoffrey I. Nwaka – Nigeria
- Capability of Social Life Cycle Assessment for Representing the Artisanal Small-Scale Mining Sector of Gold in the Amazonian Rainforest of Brazil by Sally K Springer – Germany and Brazil
- A Study of the Socio-Cultural Aspects and Built Environments of the Indigenous Settlements in Coorg, India by Sanjana Shivakumar – India
- Enhancing the social value of the circular economy in Latin America by Andrés Tello – Ecuador and Belgium
- The WORLD6 global integrated assessment model; Linking natural resources, population, energy, pollution, climate change, recycling, trade, health, society, governance and the economy into one structure by Anna Hulda Olafsdottir – Iceland

## Thursday 24 October (08:30 – 10:00)

### Sustainable Lifestyles and Education

Moderator: Lorena del Pilar Munoz

- Environmental Identity and Sustainable Consumption by Sandor Czellar – Switzerland and Ireland
- Can there be a global tool for reducing lifestyle footprints? First reflections from setting up the Sustainable Lifestyles Accelerator by Katrin Biengen – Germany
- Modelling the drivers of a widespread shift to sustainable diets by Sibel Eker – Austria
- Training of Trainers in LCA - a practical experience in Uganda by Dean Tashobya – Uganda
- University-level Education in Support of Sustainable Mining: A Case Study from Columbia University and UNDP Guinea by Lynnette Widder & Thomas Pacioni – United States of America

## Thursday 24 October (08:30 – 10:00)

### E-waste to Resource

Moderators: Markus Spitzbart and Ajay Bhagwan Patil

- Rare Earth Elements Recycling from End of Life Electronics Waste: The Green Approach with Cloud Point Extraction by Ajay Bhagwan Patil – Switzerland
- Mobile Phone Recycling in Switzerland: A Potential Gold Mine? by Antoinette van der Merwe – Switzerland
- Analysis of the e-waste management conditions in Agbogbloshie through a process based MFA by Karoline Owusu-Sekyere – Germany
- Incentive Based Collection of E-Waste - Results from Pilot Implementations in Ghana by Andreas Manhart – Germany
- Energy Requirements for Recovery of (Metallic) Nanoparticulate Material from Waste by Ron Zevenhoven – Netherlands

## Thursday 24 October (12:30 – 14:00)

### Materials Flows and Management

Moderator: Atsushi Inaba

- Characterization of Gold Ores - The Basis of Gold Traceability by Barbara Beck – Switzerland
- Material Flows in the Indian Pulp-and-Paper and Steel Manufacturing Sectors in India by Shourjomay Chattopadhyay – India
- International Norms and Extra-Territorial Regulation: Are Citizens Willing to Tie the Hands of Home Corporations Abroad? by Dennis Kolcava – Switzerland
- Impacts on Climate Change and Contribution to Circular Economy of Informal E-Waste Recycling in Developing Countries by Fabian Ottiger – Switzerland
- Physicomechanical Properties of Starch-Based Bioplastic Films by Tender Pangilinan Ferolin – Philippines

## APPENDIX C: COMMITTEES

### SCIENTIFIC COMMITTEE

Prof. Christian Ludwig, Chair  
Paul Scherrer Institute and EPFL  
– Switzerland

Dr. Sonia Valdivia, Co-Chair  
World Resources Forum  
– Switzerland

Richard Anthony  
Richard Anthony Associates – USA

Dr. Sanjeevan Bajaj  
FICCI Quality Forum – India

Prof. Claudia Binder  
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UCL Institute for Sustainable Resources, University College London – UK

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Jairo Raul Chacón Vargas  
Life cycle management and sustainable supply chain management – Escuela Colombiana de Ingeniería Julio Garavito – Bogotá, Colombia

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Marcos Alegre  
The Global Network on Resource Efficient and Cleaner Production-RECPnet

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Prof. Marzia Traverso  
RWTH Aachen University – Aachen, Germany

## SCIENTIFIC COMMITTEE WRF 2019



## ORGANIZING COMMITTEE



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– Switzerland



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Vice-President, World Resources  
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Martine Rohn-Brossard  
Board Member, World Resources  
Forum  
FOEN – Switzerland



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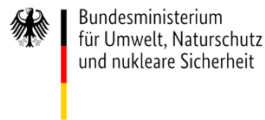
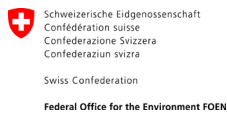


Robert Stürmer  
Associate Photographer  
– Switzerland

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- Emma Nelissen
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- Marcus Beer

## APPENDIX D: THANK YOU!



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