Workshop 16

Apply life cycle thinking to achieve green business and sustainable development
Welcome note

by

Steven Stone

Chief, Resources and Markets Branch
UN Environment Programme
Applying life cycle thinking in assessing resource efficiency

by

Dr. Stefanie Hellweg

Professor at ETH Zurich
National environmental footprints: Sustainable Consumption and Production Hotspots Analysis Tool

by

Dr. Feng Wang

Programme Officer in UN Environment Programme
Apply Life Cycle Thinking to achieve green business and sustainable development

SCP Hotspot Analysis Tool

Feng Wang,
Life Cycle Initiative, UN Environment Programme
What do we do in life cycle?

Technical and Policy Advice
- SCP Hotspot Analysis
- Addressing Marine Plastics: A Systemic Approach
- Saicm
- USEtox

Capacity Development
- Life Cycle Thinking
- E-Learning modules
- One planet
- LCA Technical Helpdesk

Knowledge, Consensus
- Global Guidance for LCIA indicators
- MarILCA
- Guidelines for Social LCA
- Social LC Alliance
What is the SCP HAT?

http://scp-hat.lifecycleinitiative.org

Data on Environmental and Socio-economic performance

171 countries over 25 years

Areas of improvements

High-impact areas and sectors

Evidence-based analysis

‘Hotspots’

Implementation of National science-based SCP strategies
Focus & Methodology

Domestic production ‘territorial approach’
Environmental pressures and impacts are allocated to the country where they physically occur

Consumption footprint ‘footprint approach’
Environmental pressures and impacts are allocated to the country where final consumers reside

26 economic sectors/product categories
Representing the level of detail of the underlying input-output model (EORA)
The prototype integrates data on:

- **Environmental pressures**
  - Raw material use
  - Land use (occupation only)
  - Emissions of greenhouse gases
  - Emissions of particulate matter and precursors

- **Environmental impacts**
  - Mineral resource scarcity
  - Fossil resource scarcity
  - Short-term climate change
  - Long-term climate change
  - Potential species loss from land use
  - Damage to human health from particulate matter

- **Basic socioeconomic data**
  (GDP, HDI, value added, output, employment per sector, men/women employment).
MODULE 1:
Country Profile

This module provides key information on a country's performance in the context of SCP-related policy areas. For each area, the policy context and the main indicators used are explained. Graphs and visualisations help to get an insight in the selected country's performance.

Country Profile for Afghanistan
MODULE 2:
Hotspots Identification

SCP HOTSPOT ANALYSIS

MODULE 2
HOTSPOTS IDENTIFICATION

POLICY ACTION BASED ON
SCP INDICATORS FOR HOTSPOT ANALYSIS

In this section a wide range of SCP indicators are provided to analyse hotspots of unsustainable consumption and production at country and sector levels. Results help to identify areas where political action is needed.

Data for Afghanistan
MODULE 3:
National Data System

USE YOUR OWN DATA

In this section, technical experts such as statisticians can insert their national data on domestic raw material extraction and greenhouse gas emissions produced and substitute the default data.

SCP-HAT builds upon a number of global datasets on national and international trade as well as on domestic environmental pressures and impacts, and different socio-economic indicators (see “Methods”).

In Module 3, users can insert their own data retrieved from national sources and substitute the model’s default data. Applying the new data will alter the results, depending on the extent to which the new data differs from the original data.

Data can be inserted for the two dimensions “raw material extraction” and “GHG emissions” in aggregated format. To do so, choose a country, the environmental category and the time frame and click directly into the cells of the appearing table. At the end click “apply” and explore the different types of analysis below. Support how to compile the data is provided via pop-up windows. For more detailed information on technical standards, refer to the official standards on Material Flow Accounting (MFA) and GHG emission accounting.
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Silver Sponsors

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One planet handle with care

International Resource Panel

WU

CSIRO
Application of life cycle thinking to address hotspots in plastic pollution

by

Joao de Sousa

Senior Programme Officer, Marine Plastics at IUCN
Mentimeter Session

Go to www.menti.com and use the code: 93 69 16
Panel discussion

How to mainstream the application of life cycle thinking in decision making for policies and business

Moderator: Sonia Valdivia (WRF)

Panelists: Elisa Tonda (UNEP), Joao de Sousa (IUCN), Dean Tashobya (Uganda National Bureau of Standards), Sanjeevan Bajaj (Sukhbir Agro Energy Ltd.), Gregor Wernet (ecoinvent)
Q&A
Thank you!
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Feng Wang,
Life Cycle Initiative, UN Environment Programme
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- Land use and biodiversity loss
- GHG emissions and climate change
- Air pollution and health

### Environmental pressures
- Raw material use
- Land use (occupation only)
- Emissions of greenhouse gases
- Emissions of particulate matter and precursors

### Environmental impacts
- Mineral resource scarcity
- Fossil resource scarcity
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- Long-term climate change
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### Basic socioeconomic data
(GDP, HDI, value added, output, employment per sector, men/women employment).
MODULE 1: Country Profile

MODULE FOR
ANALYSING COUNTRY PERFORMANCE

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THANK YOU!
IUCN Plastics Approach

- **Reframe the issue:** plastic pollution is not just a marine issue
- **Data and analytics:** develop, assimilate, and/or house evidence underpinning the global state of knowledge on plastic production & impacts
- **Economic and policy assessments:** determine and assess demand-responsive plastic abatement actions
- **Set standards:** develop consistent assessment methodologies that can be replicated
A growing global portfolio
The MARPLASTICS PROJECT

Goal: contain and reduce plastic pollution

- Equip governments, industry, and society with knowledge, policy options and action plans
- Work with governments and regional bodies to promote, enact, and enforce legislation and other effective measures
Plastic Waste-Free Islands

- Pacific Islands, Caribbean and Mediterranean
- Sectors: Fisheries, Tourism, Waste Management
- 2019-2022

**Overarching Goal:** Drive the circular economy agenda forward, and reduce plastic waste generation and leakage from islands

_SUPPORTED BY INTERNATIONAL UNION FOR CONSERVATION OF NATURE_
Plastic Waste Free Islands Project

Demonstrating effective, quantifiable solutions to addressing plastic leakage from small island developing states (SIDS).

• Reduce plastic waste and leakage on the islands
• Promote systemic change across 3 sectors (fishing, tourism and waste management)
• Recycle plastic waste into commercially viable products, generating jobs and reducing plastic import.
• Developing a scalable ‘blueprint’ for use by key regional bodies and Islands Govs, beyond the initial six targeted SIDS.
Expanding knowledge base

2014
Plastic Debris in the Ocean

2017
National marine plastic litter policies in EU Member States: an overview

2017
Primary Microplastics in the Oceans: A Global Ocean Health Check A report by Ocean塑胶, Ecological Footprint

2019
Mediterranean:
Quantification of the amount of plastic waste generated

2019
Plastics Balticus
The causes of, consequences from, and collective action responses to marine plastic pollution in the Baltic Sea
THE COMMON DENOMINATOR ACROSS ALL PROJECTS: QUANTIFICATION

**Marine Plastic Footprint** to calculate leakage from countries and products (developed under Baltic and Med project)

Spin off to:

Leak Project: aiming the private sector
National Guidance on plastic pollution Hotspotting and Shaping Action: countries
National guidance on plastic pollution Hotspotting and Shaping Action

A methodological framework and guidance for countries to:

1. **Identify key hotspots** towards the most relevant plastic polymers, products, and pathways leaking into the marine environment, as well as associated impacts.

2. **Prioritize key areas of intervention** relevant for the country, with key stakeholders along the plastics value chain.

3. **Support government converging towards instruments** to implement the interventions.

*The definition of hotspots is related to the magnitude of the leakage as well as on potential impacts (in a qualitative way in order to avoid potential trade-offs when adopting solutions only solving part of the problems).*
Holistic approach

- The need to use a standardized methodology for quantification

- The need to look into the whole life cycle of plastics (extraction, design, manufacturing, logistics, sales, consumption, end-of-life, recycling)

- Essentially an economic issue (end of life product with a negative value)

- When 1+1+1+1+1+1+1+1+1=0
Source to sea framework
THANK YOU
@IUCN_Plastics
plastics@iucn.org
Life Cycle Thinking for assessing resource impacts

Stefanie Hellweg
24 October 2019
Geneva, WRF
We are more interconnected and interdependent than ever. Our individual and collective responsibility has enormously increased.
Methodological approach for assessment of material impacts I

- Based on Environmentally extended multi-regional input-output analysis (Exiobase with 163 industrial sectors x 49 regions, 1995-2015)
  - Material footprint
  - Climate change impacts
  - Water stress (AWARE)
  - Biodiversity loss from land use
  - Human health impacts from particulate matter
  - Socio-economic indicators (value added, workplaces)

- Software tool for in-depth analysis of regional and material/resource supply chains: [http://dx.doi.org/10.17632/nddmgkm3cc.2](http://dx.doi.org/10.17632/nddmgkm3cc.2)
Methodological approach for assessment of material impacts II

Several perspectives to understand the value chain:

- **Production** ("territorial" approach)
  - sustainability assessment of certain production technologies.

- **Target** ("ready to use" materials)
  - Understanding cumulated upstream impacts for each material.

- **Final product perspective** sustainability assessment of consumer lifestyles.
  - Understanding the final use of each material (in products)

- **Consumption footprint** ("footprint approach")
  - sustainability assessment of consumer lifestyles.

• Software tool for in-depth analysis of regional and material/resource supply chains:
  http://dx.doi.org/10.17632/nddmgkm3cc.2

A new method for analyzing sustainability performance of global supply chains and its application to material resources

Livia Calenard *, Stephan Pfister, Stefanie Hellweg

Swiss Federal Institute of Technology (ETH) Zurich, Department of Civil, Environmental and Geomatic Engineering, Institute of Environmental Engineering, Ecological Systems Design, jetzt-riem-Neumam-Wihl 6, 8093, Zurich, Switzerland
Swiss Federal Institute of Technology, ETH Zurich, Department of Humanities, Social and Political Sciences, Institute of Science, Technology and Policy (DSTP), Universitätsstrasse 41, 8092, Zurich, Switzerland.

HIGHLIGHTS

A new method for analyzing sustainability performance of global supply chains and its application to material resources

Published: 15 May 2019 | Version 1 | DOI: 10.1016/j.scitotenv.2019.05.090

Contribution(s): Livia Calenard, Stephan Pfister, Stefanie Hellweg

Description of this data

OVERALL DESCRIPTION: We share here the data compiled to calculate the results presented in the study. A new method for analyzing sustainability performance of global supply chains and its application to material resources. In order to allow for the comparability of all results, we provide a Matlab tool. The tool is based on the multi-regional input-output model. HAT uses a similar methodology. G20 country factsheets
In relative terms, resource-related environmental impacts decoupled from GDP and also impacts from extracted mass of resources, but impacts still increased on an absolute scale.

Global Resources Outlook 2019
Environmental impacts in the value chain of materials resource extraction and processing phase

- 50% of global climate change impacts
- 90% of global biodiversity loss and water stress
- 50% of global climate change impacts

Global Resources Outlook 2019
Unequal impacts: Impacts of material consumption are 3 to 7 times greater in high-income countries than in low-income countries

Key dynamics at play

- Newly industrialised countries are building new infrastructure
- High-income countries outsource large shares of the production related impacts to middle- and low-income regions through trade.
Natural Resource Use in the Group of 20

Status, Trends, and Solutions

European Union

Production Perspective

Consumption Perspective

Relative to the level of 1995 (x1)

- Population
- GDP (current prices)
- DE & MF
- Climate change impacts
- PM health impacts
- Water stress
- Value added
- Workforce

European Union

G20

European Union

G20

IUCN
Natural Resource Use in the Group of 20

Status, Trends, and Solutions

European Union

- Materials (MFA) [tonnes/capita]
- Climate change impacts [t CO2 eq/capita]
- Water stress [m3 H2O eq/capita]
- Value added [Euro/capita]

Net exports
Net imports

G20’s per capita average
Fossil per capita
Non-metallic minerals per capita
Metals per capita
Biomass per capita

IUCN
Climate change impacts related to the production of materials consumed or traded by China (Year 2011)

<table>
<thead>
<tr>
<th>Production</th>
<th>Cradle-to-gate</th>
<th>Final product</th>
<th>Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass</td>
<td>13%</td>
<td>Biomass 15%</td>
<td>12% Direct material consumption</td>
</tr>
<tr>
<td>Fossils</td>
<td>18%</td>
<td>Fossils 22%</td>
<td>17% Manufacture</td>
</tr>
<tr>
<td>Metals</td>
<td>14%</td>
<td>Metals 28%</td>
<td>36% Construction</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>18%</td>
<td>Non-metallic minerals 30%</td>
<td>14% Other downstream economy</td>
</tr>
<tr>
<td>Other upstream economy</td>
<td>24%</td>
<td>Abroad 4%</td>
<td>21% Abroad</td>
</tr>
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</tbody>
</table>
Climate change impacts related to the production of materials consumed or traded by Japan (Year 2011)
INTERFACE

Application to Global Chemicals & Plastics Production

Target-Sectors

- Chose between 163 industrial sectors
- Chemicals & plastics

Target-Regions

- Choose between 49 regions
- All regions

Environmental (E) & Socioeconomic (S) Indicators

- Climate Change Impacts
- PM Health Impacts
- Water Stress
- Land-use related Biodiversity Loss

Years

Time-frame:
1995 – 2011

Which results do you want to display?

- Production, Target, Final Supply, Final Demand Perspective
- Linkages
- Multiple indicators
- Timelines

How to display your results?

- Unit &/ Global Shares

2) Insert the name of your folder where the results will be stored

3) Start Calculation (Press Button)
Climate Change Impacts of Global Chemicals & Plastics Production

- Region where GHG emissions take place
- Region where chemicals & plastics are produced
- Region where chemicals & plastics are consumed

Year 2011

7% Share of chemicals & plastics in total global climate change impacts

- China
- Other Asia
- India
- Africa
- Europe
- Latin America
- North America
- Middle East
- Russia
- Australia
- Domestic flows
Application

- International policy making (e.g. domestic and displacement effects)
- National policy making (e.g. SCP)
- Environmental organizations (e.g. IRP, OECD, IPCC, …)
- NGOs (e.g. fairtrade, alliance for responsible mining, …)
- Retailers (e.g. food, textiles, electronics, …)
- Private companies (e.g. construction) and public companies (e.g. railways)
- Extracting, processing & manufacturing industries (e.g. plastics, building materials, machinery equipment, recycling, …)
Thank you for your attention!