Circular Economy Indicators

SDG and Environment Statistics Unit, 2025
Early Warning and Assessment Division, UNEP

What's Circular Economy ?

- Developing a circular economy model at national level is a significant challenge for governments and a complex process.
- The traditional production models are based on linear resource consumption, so structural changes are needed at national and local levels.
- In parallel to challenges, there are many opportunities arising from the development of a circular economy.

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

What's Circular Economy and how to measure it?

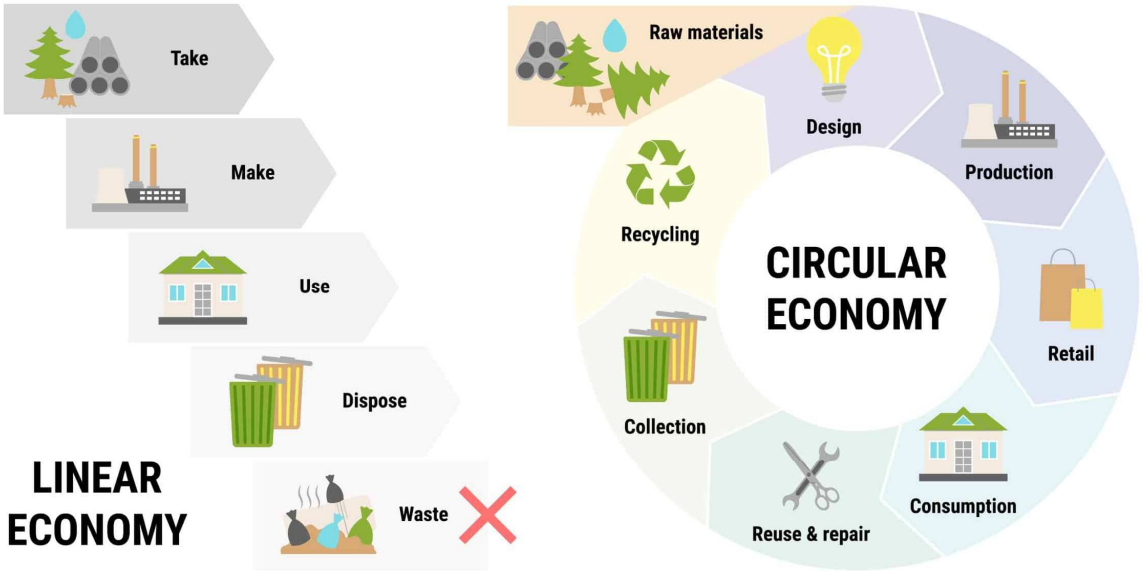
A circular economy can be defined as an economy where:

- "The value of materials in the economy is maximised and maintained for as long as posible;
- The input of materials and their consumption is minimised; and
- The generation of waste is prevented, and negative environmental impacts reduced throghout the life-cycle of materials"

UNECE 2023

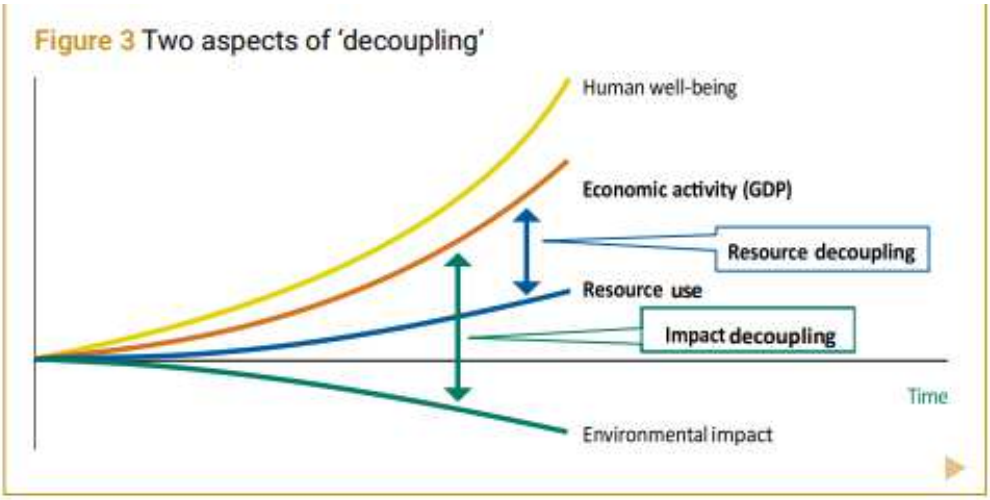
With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme



programme

Circular economy and decoupling



With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Stakeholders implied in Circular Economy implementation

Multiple stakeholders are fundamental in the shift to a circular economy:

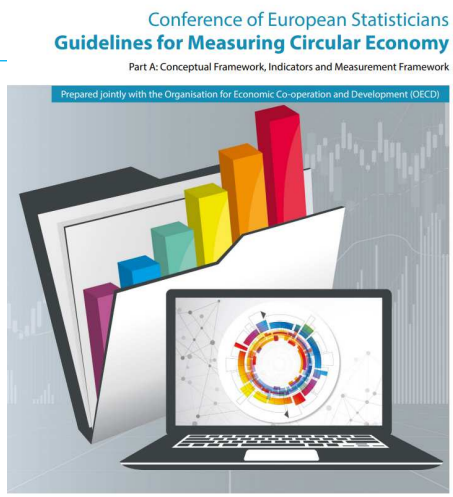
- **Governments** as the creators of adequate conditions to promote changes at the production sector level and within the society.
- **Businesses** as producers of goods and services, and as the final responsible entity for decision making about production conditions and private investments, within the context of the regulatory environment.
- **Consumers** as their demand and behaviour have an important role in the shift to a circular economy as purchasers of the goods and services produced.

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Guidelines for measuring CE

- The Conference of European Statisticians (CES) endorsed the “CES Guidelines for Measuring Circular Economy, Part A: Conceptual Framework, Indicators and Measurement Framework” in 2023.



With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Circular Economy indicators

Framework	Indicators
Material life-cycle and value chain	Domestic Material Consumption National Recycling Rate
Interactions with the environment	Water stress GHG Emissions
Responses and actions	Taxes and investments
Socio-economic opportunities for a just transition	Jobs in the CE sector

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Circular economy indicators

Framework	Themes	Proposed core indicators
Material life-cycle and value chain	The material basis of the economy	Material consumption and productivity a. Domestic Material Consumption (DMC) b. Raw Material Consumption (RMC) c. Material productivity d. Raw material productivity
	The circularity of material flows and the management efficiency of materials and waste	Total waste generation Proxy: Municipal waste generation
		Circular material use rate
		National recycling rate Proxy: Municipal waste recycling rate
		Waste going to final disposal
	Interactions with trade	none
Interactions with the environment	Natural resource implications	Placeholder: Natural resource index/depletion ratios
		Intensity of use of renewable freshwater resources

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Framework	Themes	Proposed core indicators
	Environmental quality implications	GHG emissions from production activities Proxy: Total GHG emissions
		Pollutant discharges from material extraction and processing to water bodies and share safely treated Proxy: Total discharges to water bodies and share of total discharges safely treated
	Impacts on human health	Placeholder
Responses and actions	Support circular use of materials, promote recycling markets and optimize design	Taxes and government support for circular economy business models
	Improve the efficiency of waste management and close leakage pathways	Investments in waste management, waste collection and sorting
		Tax rate/tonne landfilled or incinerated
	Boost innovation and orient technological change for more circular material lifecycles	Government and business R&D expenditure on circular economy technologies
	Target setting and planning	Placeholder: distance to targets
	Strengthen financial flows for a circular economy and reduced leakage	Business investment in circular economy activities
	Inform, educate, train	Placeholder
Socio-economic opportunities for a just transition	Market developments and new business models	Gross value added related to circular economy sectors
		Jobs in circular economy sectors
	Trade developments	none
	Skills, awareness, and behavior	Placeholder
	Distributional aspects of circular economy policies	Placeholder

CE Core Indicators

Framework	Proposed core indicators
Material life-cycle and value chain	Material consumption and productivity a. Domestic Material Consumption (DMC) b. Raw Material Consumption (RMC) c. Material productivity[6] d. Raw material productivity[7]
	Total waste generation Proxy: Municipal waste generation
	Circular material use rate
	National recycling rate *Proxy: Municipal waste recycling rate*
	Waste going to final disposal
Interactions with the environment	Intensity of use of renewable freshwater resources
	GHG emissions from production activities
	Proxy: Total GHG emissions
	Pollutant discharges from material extraction and processing to water bodies and share safely treated *Proxy: Total discharges to water bodies and share of total discharges safely treated*
Responses and actions	Taxes and government support for circular economy business models
	Investments in waste management, waste collection and sorting
	Tax rate/tonne landfilled or incinerated
	Government and business R&D expenditure on circular economy technologies
	Business investment in circular economy activities
Socio-economic opportunities for a just transition	Gross value added related to circular economy sectors
	Jobs in circular economy sectors

UN environment programme

Training on CE Indicators

Material life-cycle and value chain

1. Domestic material consumption
2. Material footprint or Raw material consumption
3. Circular Material use rate
4. Food loss index
5. Food waste index
6. Proportion of municipal waste collected and managed in controlled facilities out of total municipal waste generated, by cities
7. Hazardous waste generated by type, including e-waste
8. Proportion of hazardous waste treated, by type of treatment
9. National recycling rate, tons of material recycled

Interactions with the environment

10. Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
11. Total discharges to water bodies and share of total discharges safety treated
12. Total GHG emissions

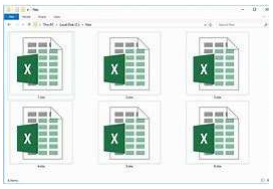
With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Training on CE Indicators

Guidelines report for Measuring Circular Economy

Excel files - calculations



UN environment programme

CE indicators

Indicator	SDG
Domestic material consumption	8.4.2 - 12.2.2
Material footprint or raw material consumption	8.4.1 - 12.2.1
Circular Material use rate	_____
Food loss index	12.3.1 (a)
Food waste index	12.3.1 (b)
Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities	11.6.1
Hazardous waste generated, by type, including e-waste	12.4.2 (a)
Proportion of hazardous waste treated, by type of treatment	12.4.2 (b)
National recycling rate, tons of material recycled	12.5.1
Level of water stress	6.4.2
Total discharges to water bodies and share of total discharges safely treated	6.3.1
Total GHG emissions	13.2.2.

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Analysis of the viability of CE indicators

Indicator	SDG	Institution responsible for the indicator	Institutions data source	Viability	Periodicity	Limitations
Domestic Material Consumption	8.4.2 12.2.2					
Material Footprint	8.4.1 12.2.1					
Circular Material Use Rate	_____					
Food Loss Index	12.3.1 (a)					
Food Waste Index	12.3.1 (b)					

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Analysis of the viability of CE indicators

Indicator	SDG	Institution responsible for the indicator	Institutions data source	Viability	Periodicity	Limitations
Proportion of MSW collected and managed, by cities	11.6.1					
Hazardous waste generated, including e-waste	12.4.2 (a)					
Proportion of hazardous waste treated	12.4.2 (b)					
National recycling rate	12.5.1					

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Analysis of the viability of CE indicators

Indicator	SDG	Institution responsible for the indicator	Institutions data source	Viability	Periodicity	Limitations
Water stress	6.4.2					
Total discharges to water bodies and share of total discharges safety treated	6.3.1					
Total GHG emissions	13.2.2					

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Data providers for CE indicators calculation

- For most of the indicators, data are compiled by a national governmental agency.
- This agency differs depending on the theme of the indicator and the country's administrative organization:
  - Ministry of commerce
  - Ministry of trade
  - Ministry of industry
  - Ministry of agriculture/livestock
  - Ministry of environment
  - Ministry of water resources
  - National Statistical Office (NSO)
  - Any other national agencies/ministries.

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Data sources for CE indicators calculation

The different options for data collection include:
- Surveys (census or sampling surveys).
- Administrative sources.
- Modelling: When the previous options are not available, modelling tools can be used to estimate national data.
- A combination of multiple options previously presented.

Independently of the data collection method used, countries are encouraged to always provide quality reports containing a description of the collection method applied.

The value of conducting surveys lies within their regular use and maintenance. One-off survey can have some punctual value to formulate circular economy policies, but they cannot be used as evidence base for policy monitoring over time.

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

Circular Economy: from Indicators and Data to Policy-making

UN environment programme

UN environment programme

Circular Economy: from Indicators and Data to Policy-making

- The report evaluates the importance of core indicators in targeted policy-making to advance the shift towards a circular economy.
- It presents country examples of what has been achieved in selected countries.
- Instances of how circular economy indicators could be used in monitoring targeted policies include resources decoupling.

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Examples of CE policies

Box 9 Policy framework – sectoral example: South Africa

National Waste Management Strategy (NWMS) 2020

"The National Waste Management Strategy has the concept of circular economy at its centre. The following are the outcomes that will be achieved through effective and efficient implementation of the NWMS 2020 by all stakeholders from all sectors of the society:

- Prevent waste, and where waste cannot be prevented ensure – 40% of waste diverted from landfills within 5 years; 55% within 10 years; and at least 70% within 15 years leading to Zero-Waste going to landfill;
- All South Africans live in clean communities with waste services that are well managed and financially sustainable; and
- Mainstreaming of waste awareness and a culture of compliance resulting in zero tolerance of pollution, litter and illegal dumping."

National Waste Management Strategy (NWMS) 2020
(South Africa, Department of Environment, Forestry and Fisheries 2020)

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Examples of CE policies

Box 20 GHG emissions from production activities - country example: Nigeria

The overall objective of the National Climate Change Policy for Nigeria (NCCP) 2021-2030, "is to strengthen measures to reduce greenhouse gas emissions (direct and fugitive emissions), mainly from the energy (including power generation), oil and gas, biomass (agriculture, forest and land use), health, industry, transport, water and waste sectors." Hereunder, some examples of the measures included in the NCCP by sector:

With financial support from the Programme Cooperation Agreement between the European Commission and UNEP

UN environment programme

Thank you

UN environment programme

https://sdgs.unep.org/circular-economy

https://sdgs.unep.org/