



**LAND MANAGEMENT, ENVIRONMENT & SOLID-WASTE:
INSIDE EDUCATION AND BUSINESS IN CENTRAL ASIA
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MICRO-CREDENTIAL

**CIRCULAR ECONOMY FOR LAND AND WASTE
MANAGEMENT**

13.- Assessment Tools and Indicators of Circular Economy

Discussion

***What should be measured to demonstrate real
circularity?***



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Objective

The objective of this discussion is to help students critically evaluate how circular economy performance should be demonstrated.

Students should move beyond simple measures such as recycling rates, tonnes of recovered material or numbers of circular projects and consider whether real circularity requires measurable reductions in virgin-resource use, waste generation, pollution, land pressure and environmental impacts.

Discussion prompt

What should be measured to demonstrate real circularity?

Students should discuss which indicators provide credible evidence that a product, company, farm, city or region has genuinely become more circular.

The key question is whether circularity should be demonstrated through:

- higher recycling
- lower waste generation
- lower virgin-resource consumption
- longer product life
- increased reuse
- reduced landfilling
- reduced greenhouse-gas emissions
- lower water consumption
- lower pollution
- improved soil and ecosystem health
- or some combination of these

Initial post

Write **300–450 words** addressing the following questions:

1. Is recycling rate enough to demonstrate circularity?
2. Should absolute resource consumption always be measured?
3. How can we show that recycled material actually replaces virgin material?

4. Should environmental outcomes be compulsory in circularity assessment?
5. How should water, land and energy impacts be considered?
6. Can a system become more circular while becoming less sustainable?
7. How should rebound effects be detected?
8. How many indicators are enough?
9. Which three indicators would you prioritise for your city, institution or region?
10. What evidence would convince you that a circular economy project produces real improvement?

Position 1. Measure material circularity

One position is that circularity should primarily be assessed by following materials.

Relevant indicators include:

- recycled-content share;
- material recovery rate;
- circular material use rate;
- secondary-material substitution;
- waste generation;
- product lifetime;
- reuse rates.

These indicators are essential because circular economy is fundamentally concerned with maintaining materials in use.

However, they may not show whether the system has actually reduced pollution or resource pressure.

Position 2. Measure environmental outcomes

A second position is that a system should only be considered genuinely circular when resource circulation produces measurable environmental benefits.

Relevant indicators may include:

- reduced greenhouse-gas emissions;
- reduced virgin-material extraction;

- lower land occupation;
- reduced freshwater abstraction;
- lower pollution;
- improved soil condition;
- reduced ecosystem pressure.

According to this view, a recycling activity that increases overall environmental impacts should not be considered successful circularity.

Position 3. Measure both circularity and sustainability

A balanced position is that **circularity and environmental performance should be measured together**.

Circularity indicators answer:

Are materials, products, nutrients or water being kept in use?

Environmental indicators answer:

Does doing so actually reduce total pressure on resources, land, water, climate and ecosystems?

Both are necessary.

Table 3. Suggested framework for demonstrating real circularity

Assessment dimension	Example indicator	What it demonstrates
Virgin resource use	Tonnes of virgin material consumed	Whether dependence on primary resources decreases
Waste prevention	Total waste generated	Whether waste is actually avoided
Product life	Average years of useful service	Whether value is retained longer
Reuse	Share of products or components reused	Whether direct circulation occurs
Recycling	Share of material recovered	Whether materials re-enter production
Substitution	Virgin input actually displaced	Whether secondary material creates real replacement
Final disposal	Waste landfilled or incinerated	Whether residual losses decrease
Water	Freshwater abstraction and reuse quality	Whether water circularity is environmentally beneficial
Land	Land required for extraction, treatment and disposal	Whether land pressure decreases
Climate	Net GHG emissions	Whether climate performance improves

Pollution	Emissions to air, soil and water	Whether burdens are reduced rather than shifted
Economy	Value retained in products and secondary resources	Whether circularity creates durable economic value
Society	Employment, affordability and access	Whether the transition is inclusive

As shown in **Table 3**, a credible circular economy assessment should combine material-flow indicators with environmental outcomes.

Example for discussion: plastic recycling

Suppose a region increases its plastic recycling rate from 20% to 60%.

Is that enough to demonstrate real circularity?

Not necessarily. Additional questions should include:

- Has total plastic consumption increased or decreased?
- Has virgin plastic demand fallen?
- Is recycled polymer actually replacing primary polymer?
- What percentage of collected plastic becomes usable recycled material?
- How much becomes reject waste?
- How much energy and water does recycling require?
- Are microplastics or pollutants released?
- Is material downcycled into a short-lived application?
- Can the product be recycled again?

Only by answering these questions can real circularity be demonstrated.

Central Asia and local context

In Central Asian cities and rural areas, circular economy assessment may need to prioritise indicators particularly relevant to local conditions, including:

- uncontrolled waste disposal
- landfill dependence
- organic waste recovery

- agricultural residue burning
- water abstraction and reuse
- irrigation efficiency
- soil salinity
- nutrient recovery
- plastic leakage
- rural waste collection coverage
- value recovered from local secondary resources.

The most useful indicator set should reflect the dominant local resource losses and environmental pressures.

A balanced conclusion

A strong discussion response should recognise that no single indicator can demonstrate circularity.

A high recycling rate may hide growing consumption.

A high reuse rate may hide quality or contamination problems.

A high level of water reuse may hide salinity accumulation.

A high quantity of biomass recovery may hide soil degradation.

The strongest evidence of real circularity comes from a combination of three types of indicators:

1. **Lower demand for virgin resources.**
2. **Higher retention of products, materials, nutrients and water at useful value.**
3. **Lower absolute environmental pressure and pollution.**

The key principle is:

Real circularity should be demonstrated not by how much material circulates, but by whether circulation reduces virgin-resource demand, prevents waste, preserves value and produces measurable environmental improvement without shifting burdens elsewhere.

Peer response

Reply to at least one classmate in **150–200 words**.

Your response should include:

1. One indicator you agree should be prioritised.
2. One important indicator your classmate may have omitted.
3. One possible rebound or burden-shifting risk.
4. Your own recommendation for the three most important indicators of real circularity.

Expected learning outcome

After completing this discussion, students should understand that meaningful circular economy assessment requires more than measuring recycling or recovery activities.

They should be able to distinguish:

- activities from outcomes;
- relative efficiency from absolute performance;
- circulation from substitution;
- recycling from waste prevention;
- and apparent circularity from genuine environmental improvement.

The final lesson is:

A system should only be considered meaningfully circular when resources remain in useful circulation while total waste, virgin-resource dependence and environmental pressures are demonstrably reduced.