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# ECONOMIC GROWTH, MATERIAL CONSUMPTION, AND WASTE MANAGEMENT IN ALBANIA: EVIDENCE FOR THE TRANSITION TOWARDS A CIRCULAR ECONOMY, 2019–2025

**Klarida Prendi**
Aleksandër Moisiu University Durrës, Albana
klaridaprendi@yahoo.com

**Arif Murrja, PhD**
Prof. Asoc., Agriculture University of Tirana, Albania
amurrja@ubt.edu.al

**Abstract**

*The study examines two complementary aspects of the circular economy in Albania: the intensity of material resource use in the economic activity and the management of collected waste. In the end, it analyzes resource productivity for the period 2019–2024, domestic material consumption indicators are studied up to 2024, and waste statistics for the period between 2023–2025. Year by year comparisons are completed by an elasticity figure calculated for 2023–2024 period. Resource productivity shifted from 75 ALL/kg in 2019 to 109 ALL/kg in 2023, and to 99 ALL/kg in 2024. In 2024, material consumption increased by 16.9% over a real GDP growth of 4.05%, resulting in an elasticity of approximately 3.93. For 2025, there were about 900,782 tons of managed, which is about, 383 kg per person. Only around 18% of the waste was recycled, while about 77% was dumped in landfills. The data show that it's still difficult to use fewer resources and to send waste to places where it can be reused or recovered instead of landfills. For 2025, it wasn`t calculated how efficiently resources are used because there are not enough data on the total material used.*

*Keywords: Circular economy; domestic material consumption; resource productivity; urban waste; recycling*

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## INTRODUCTION

In a circular model, economic development aims to create value without a commensurate increase in the demand for new materials. This is particularly relevant for economies where infrastructure and construction consume large quantities of physical resources. (OECD, 2024)

Previous research in Albanian`s transition toward circular economy have considered the environmental and resource productivity, using the increased indicators of OECD. (Prendi, L., & Gashi, J., 2023) evaluated Albanian`s progress toward the development of circular economy, emphasizing the developments in resource efficiency and environmental performance. Previous OECD analyses of Albania highlight periods of relative improvement in resource use, while also noting a gap compared to EU performance. Recently published statistics from INSTAT provide an opportunity to assess whether this positive trend has continued throughout 2024. ( (OECD, 2024); (INSTAT, 2024).

The research question is: Has Albania's economic growth been accompanied by a relative or absolute decline in domestic material consumption, particularly during 2024? This study contributes by transparently integrating INSTAT's physical indicators with real GDP growth, and by distinguishing-methodologically-between the monetary productivity of resources and the decoupling test based on real GDP. ( (INSTAT, 2024); (INSTAT_GDP, 2024))

## THEORETICAL FRAMEWORK AND LITERATURE

### Circular economy and material efficiency

The circular economy approach aims to extend the use of materials and products through waste avoidance, repair, reuse, and recycling. Improving recycling, in isolation, does not ensure a reduction in total consumption: an expanding economy may require more raw materials even when a larger share of waste is recovered. (OECD, 2024)

### Relative and absolute detachment

Absolute detachment describes a situation where real GDP is increased while the physical demand for materials is declined. In relative detachment, material consumption continues to rise, but at a slower rate than real output. When the material use is increased faster than GDP, the report worsens. To make this difference, physical changes should be compared with the adjusted inflation-economic index. (OECD, 2024); (Eurostat, 2025)

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## The Albanian context

The OECD evaluation for the circular economy in Albania shows improvements on the material productivity up to the analysed period, emphasising as well structural obstacles. This paper considers the developments up to 2024, for the analyse of the decoupling concept. (OECD, 2024)

## Connection between economic growth, material consumption and transition toward circular economy

The relation between economic growth and consumption of material resources is one of the main points of the literature on the circular economy and sustainable development. According to (UNEP, 2024), continuous growth on natural resource use in global level demonstrates that the expansion of economic activity is connected to material demand. For this reason, the evaluation of circular economy transition requires not only an analyse of the recycling and waste management, but the examination of the method how the material consumption changes in ratio with economic production.

Empirical studies show that improvement of resource efficiency is not necessary accompanied with the absolute reduction of materials consumption. (Haberl, H., et al., 2020), through a systematic review of the empirical literature, shows that relative decoupling between economic growth and material use is more usual than the absolute decoupling. Similarly, (Vadén et al., 2020), by analysing 179 scientific studies, emphasise the absence of the evidences for an absolute decoupling of the general use of the resources from the economic growth nationally and internationally. These findings support the need for the use of physical indicators of the material consumption toward the monetary productivity indicators.

Another dimension is connected with the direct relation of material consumption and waste management. (UNEP, 2024), argues that sustainable use of resources requires an intervention in all the phases of economic cycle of the materials, including production, consumption and treatment after the use. In these meaning, improving recycling rates does not constitutes sufficient evidence in itself lowering the pressure of the materials on the economy. The evaluation of the circular performance requires a common analysing of resource consumption and the waste treatment.

In Albanian context, (OECD, 2024), based in the report *A Roadmap towards Circular Economy of Albania*, highlights the necessity for strengthening the monitoring system of the circular economy, toward the indicators that are related with the material consumption, resource productivity and waste generation. In this frame, our actual study aims to contribute in the literature of the transition toward circular economy in Albania, combining resource productivity

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analyse during the 2019-2024 period, the evaluation of the internation consumption elasticity of the materials toward the real economic growth for the period 2023-2024 and the analyse of the indicators of the waste management for the period 2023-2025. This integration enables a full descriptive evaluation of the latest developments, noting the improvements in economic efficiency of the resources from the real reduction of material pressure.

## METHODOLOGY

### Sources, period, and unit of analysis

The study uses national statistics on yearly basis from the INSTST. The resource productivity for the 2019-2024 period and the Domestic Material Consumption (DMC), for the 2024 is based on the “Material Flow Accounts 2024” (INSTAT, 2026). DMC data for the 2022-2023 period are extracted from the “Material Flow Accounts 2023” (INSTAT, 2025). The increase of real GDP for 2024, is based in the relevant publication of INSTAT. Data related to the waste management, quantity per capita and the waste treatment for the 2023-2025 period are extracted from “Urban Solid Waste, 2025” (INSTAT, 2026*). The decoupling test for the materials is applied for 2023–2024 period, while the waste analysis covers 2023-2025, 2025 is excluded from the DMC test due to the lack of published statistics. ( (INSTAT, 2024); (INSTAT, 2026*); (INSTAT, 2025); (INSTAT_GDP, 2024))

Selection of the study period is based on the availability, continuity and comparability of statistical data published from INSTAT. Period 2019-2024 is used to analyse the trends of the resource productivity, enabling the identification of annual changes over six years. (INSTAT, 2026) In order to evaluate the relation between Domestic Material Consumption (DMC) and the real economic growth is taken into consideration the interval 2023-2024, because the study uses comparable data on the change in material consumption and real GDP. Meanwhile, the period 2023-2025 is used o analyse the waste management, in order to include the latest data. (INSTAT, 2026*) Differences between the analysis periods reflect statistical coverage of the relevant indicators and do not imply the existence of 1 time series for all the indexes. For this reason, the analyse has a descriptive character and the evaluation results of the decoupling between economic growth and material consumption for the 2023-2024 period, cannot be generalized for the entire period 2019-2025. (INSTAT, 2025) (INSTAT, 2026)

### Definitions and formulas

Domestic Material Consumption: $DMC_t = DE_t + IMP_t - EXP_t$, where DE is domestic extraction, IMP represents imports, and EXP represents exports, measured in physical units. (Eurostat, 2025); (INSTAT, 2024))

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Resource Productivity: $RP_t = GDP_t / DMC_t$. The indicator reported from INSTAT, is showed in ALL/kg, it`s fluctuations may be affected from the price change when GDP is measured in current prices, that`s why it doesn`t substitute the decoupling analyses, based in the real GDP.(INSTAT, 2026a).

Elasticity of material consumption with respect to real growth: $\varepsilon = \ln(DMC_2/DMC_1) / \ln(GDP_{r2}/GDP_{r1})$. For the 2023–2024 period, the reported 16.9% increase in DMC and the 4.05% real GDP growth are used. Classification: $\varepsilon < 0$, alongside GDP growth, indicates absolute decoupling; $0 < \varepsilon < 1$ indicates relative decoupling; and $\varepsilon > 1$ indicates that material consumption is growing faster than the economy. This serves as a descriptive indicator for a specific annual interval, rather than an econometric estimate. ( (INSTAT, 2024); (INSTAT_GDP, 2024); (OECD, 2024))

**Methodological limitations**

The data are national aggregates and do not allow for the identification of the behavior of individual enterprises or sectors. The DMC indicator measures the apparent consumption of materials within the territory, rather than the material footprint of final consumption calculated in terms of raw material equivalents. Resource productivity values are rounded; the 2024 GDP figure is based on the 2025 semi-final release and may be subject to subsequent revision. No inferential statistical tests were conducted on the six productivity observations. ( (INSTAT, 2024); (INSTAT, 2026*); (Eurostat, 2025))

## RESULTS

### Resource productivity, 2019–2024

Table 1 Resource productivity, 2019–2024

| Year | Productivity (ALL/kg) | Annual change (%) |
|---|---|---|
| 2019 | 75 | — |
| 2020 | 85 | +13,3 |
| 2021 | 92 | +8,2 |
| 2022 | 100 | +8,7 |
| 2023 | 109 | +9,0 |
| 2024 | 99 | −9,2 |

Source: (INSTAT, 2024)

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INSTAT series shows an increase of GDP report toward materials up to 2023, followed from a pitfall in the next year. The decrease from 109 to 99 ALL/kg represents a decrease up to 9.2%, meanwhile the comparison with the 2019 shows that the 2024 figure still remains 1/3 higher. As a result, this is recent deterioration, and not a return to the starting point. (INSTAT, 2024)

**Dynamics of domestic material consumption**

Table 2 Dynamics of domestic material consumption

| The Indicator | 2022 | 2023 | 2024 |
|---|---|---|---|
| Total DMC (million tonnes) | 21,367 | 21,710 | 25,4 |
| Annual change in DMC (%) | — | +1,6* | +16,9** |
| DMC per resident | — | rreth 9,0 | 10,7 |
| Domestic extraction (million tonnes) | — | — | 23,1 |
| Imports of materials (million tonnes) | — | — | 6,3 |
| Exports of materials (million tonnes) | — | — | 4,0 |

Source: (INSTAT, 2025); (INSTAT, 2024)).

From 2022 to 2023, DMC has changes very slightly, while in 2024, the extension was significantly higher. Non-metallic materials make up to 52% of the material consumption in the same year, while the biomass makes up approximately 30-31%. This composition emphasizes the importance of the efficiency in construction material use and the products with biological basis, although this does not specifies the cause of this increase.( (INSTAT, 2025); INSTAT, 2026a)

**Separation Test for 2023–2024**

Table 3 Separation Test for 2023–2024

| The Indicator | Value | Source / status |
|---|---|---|
| DMC Growth, 2024 | 16,9% | INSTAT (2026) |
| Real GDP growth, 2024 | 4,05% | INSTAT (2025), semi-final estimate |
| Elasticity ε | 3,93 | Author's calculation |
| Distribution | Material intensification | ε > 1, no discontinuity |

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The elasticity is ε = ln(1.169) / ln(1.0405) ≈ 3.93. This means that, during 2024, material consumption was increased faster than the real economic output. Based on the decoupling criteria, there is no evidence of relative or absolute decoupling during this period, on the contrary, the data show an intensification of the materials use per unit of real growth. (INSTAT, 2026a; INSTAT, 2025c)

This result should not be generalized for the entire 2019-2024 period, as it is not compiled as a complete time series for real GDP and DMC for each year specifically. The decrease of the productivity is reported by INSTAT for 2024, and it aligns with the direction of this result, though it relies on monetary indicator. (INSTAT, 2026a; (INSTAT_GDP, 2024))

**Dependence on imports and material pressures**

According to material accounts for 2024, imports accounts 21.3% of direct material inputs; for fossil materials, this ratio was 51.8%, while for metallic minerals, it was 41.0%. These differences connect the circular use of resources with the exposure to external supply, although the study does not measure directly the benefits of substitution or recovery. (INSTAT, 2026)

**Urban Waste Management, 2023-2025**

INSTAT statistics on waste shows that the managed quantity is increased from 844,157 tons in 2023 to 900,782 tons in 2025. Between 2024 and 2025, the increase was approximately 4.5%. Simultaneously, the per capita indicator was increased from 351 to 383 kg/year. This trend reflects a higher volume reported on the managed waste. (INSTAT, 2026*)

Table 4 Waste managed in Albania, 2023-2025

| Year | Total (ton) | Total (kg/inhabitant) | Urban (kg/inhabitant) | Non-urban (kg/inhabitant) |
|---|---|---|---|---|
| 2023 | 844.157 | 351 | 315 | 36 |
| 2024 | 862.241 | 360 | 322 | 38 |
| 2025 | 900.782 | 383 | 341 | 42 |

Source: INSTAT (2026b)

**Recycling, landfill, and circular readiness**

According to 2025 statistics, around 18% of managed waste is recycled, while 77% is handled via landfill disposal. For 2024, INSTAT data shows a recycling rate of 18.8% and a landfill disposal rate of 76.3%. Meanwhile the 2025 figures are presented as rounded values, they do not allow an accurate assessment of the percentage change. When applied to the 2025

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total, these figures result approximately 162,000 tons recycled and 694,000 tons sent to landfills. (INSTAT, 2025); (INSTAT, 2026*)

Table 5 Comparison of waste treatment, 2024-2025

| The Indicator | 2024 | 2025 |
|---|---|---|
| Recycling (%) | 18,8 | about 18 |
| Landfill (%) | 76,3 | about 77 |
| Population coverage with services (%) | It is not used here | 90,3 |

Source: (INSTAT, 2025) (INSTAT, 2026*)The values for 2025 are rounded.

**Joint interpretation of the two sets of indicators**

The two categories of indicators cover different stages of the material cycle: DMC describes the net input of materials into the economy, while the statistics of waste describe a part of the flows after its use. Due to differences in scope and definition, the recycling ratio of DMC is not calculated as an official indicator for the material flow. Taken together, they emphasize the need for policies that reduce the demand for new materials while simultaneously improving the recovery of materials after use. ( (INSTAT, 2024); (INSTAT, 2026*); (OECD, 2024))

**DISCUSSION**

The data show that the improvement in resource productivity reported up to 2023 stopped in 2024. This makes it uncertain whether the observed progress can be considered a sustained trend. While the OECD had identified improvements, new evidence suggests the need to monitor further fluctuations. ( (OECD, 2024); (INSTAT, 2024))

From the perspective of the circular economy, the increased material intensity in 2024 shows the need for a closer monitoring of the non-metallic materials, construction material flows, the use of biomass, and dependence on imports of energy materials. An economy may increase its recycling activities while still experiencing an overall rise in total material consumption. Therefore, indicators for recycling and material consumption should be analyzed together, rather than being used as substitutes of each-other. (OECD, 2024); (INSTAT, 2024); (INSTAT, 2026*)

One possible explanation for the increase in Domestic Material Consumption (DMC) is the intensification of the activities that require higher quantities of materials, although, to verify this hypothesis, will be needed detailed data divided by material type, information on real

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investments in construction sector, and a sectorial decomposition of these changes. (INSTAT, 2024)

## IMPLICATIONS FOR PUBLIC POLICY

Firstly, the objectives of the circular economy transition should be accompanied by annual indicators for the Domestic Material Consumption (DMC), real resource productivity, and the material trace rather than relying solely on the quantities of recycled waste. Secondly, monitoring non-metallic materials and construction materials as well can support the standards for reuse design, public procurement based on life-cycle criteria, and markets for secondary materials. Thirdly, high dependence on imports for specific categories justifies feasibility studies for the recovery and efficient use of materials. Fourth, publication of the harmonized datasets, that can be accessed and downloaded would facilitate econometric analyses. (OECD, 2024); (INSTAT, 2024); (INSTAT, 2026*)

## CONCLUSIONS

The analyzed indicators present two challenges. In 2024, material consumption increased by 16.9% and the real GDP by 4.05%, resulting in an elasticity of 3.93, this does not align with material decoupling. In 2025, was recorded an increase in the volume of managed waste, both in total and per capita, with recycling accounting approximately 18% and landfilling about 77%. These findings do not demonstrate a causal impact of policies and cannot substitute for a comprehensive, multi-year analysis. ( (INSTAT, 2024); (INSTAT, 2026*); (INSTAT_GDP, 2024))

The contribution of this article lies in its clear analysis of a recent trend, in difference between monetary and physical indicators, and the connection of these findings to circular economy policy priorities. Future studies should use longer time series for real GDP and Domestic Material Consumption (DMC), incorporate a breakdown by material type, and conduct an analysis of material intensity by sector to determine whether the developments observed in 2024 were temporary or structural. (OECD, 2024) (INSTAT, 2024); (INSTAT, 2026*)

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