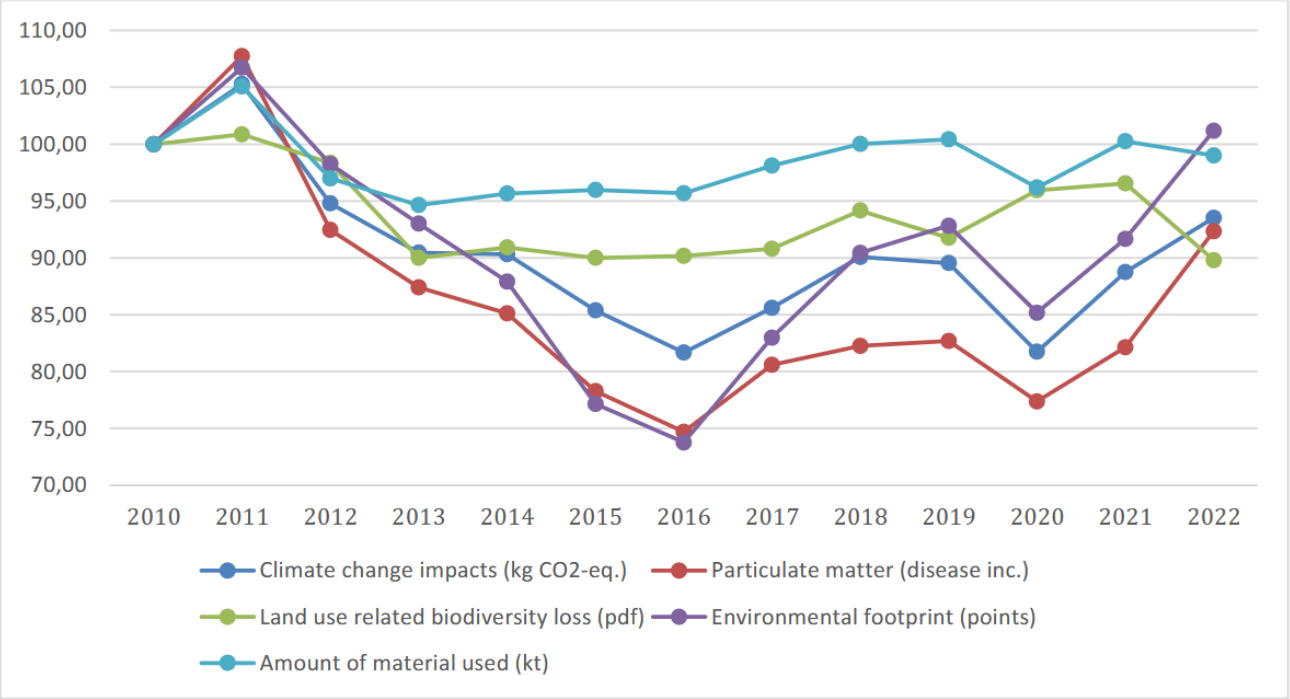
GRAPH ANALYSIS EXERCISE

Historical trend of environmental impacts of raw materials used in the EU-27, 2010-2022. *(EEA data, 2023)*



Question 1: Between 2011 and 2022, which metric had the most significant overall percentage decrease?

A. Climate change impacts (kg CO2-eq.)
B. Particulate matter (disease inc.)
C. Land use related biodiversity loss (pdf)
D. Environmental footprint (points)

Question 2: At the year that the "Environmental footprint (points)" and "Climate change impacts (kg.CO_2 eq.)" metrics intersect, what was the approximate value that they shared at that point?

A. ~80
B. ~90
C. ~85
D. ~95

Question 3: What is the average annual rate of change for the "Amount of material used (kt)" metric between 2010 and 2022?

A. ~0.34 points/year
B. ~0.21 points/year
C. ~0.17 points/year
D. ~0.15 points/year

Question 4: Which metric exhibited the most stability (least variation) over the period from 2010 to 2022?

A. Climate change impacts (kg CO2-eq.)
B. Particulate matter (disease inc.)
C. Land use related biodiversity loss (pdf)
D. Amount of material used (kt)

Question 5: Which metric recorded between 2012- 2016 the greatest improvement?

A. Particulate matter (disease inc.)
B. Environmental footprint (points)
C. Climate change impacts (kg CO2-eq.)
D. Land use related biodiversity loss (pdf)

Question 6: Based on the trends in the graph, if the "Particulate matter (disease inc.)" metric increased by an average of 8% per year from 2022 onward, what would its approximate value be in 2025?

A. 100.4
B. 117.2
C. 108.2
D. 110.6

SOLUTIONS

Question 1:B

Explanation: To answer this, calculate the percentage change for each metric over the given period:

- Climate change impacts: Δ from ~105 to ~93 → [(105 - 93) / 105] * 100 = ~11.4% decrease.
- Particulate matter: Δ from ~107 to ~92 → [(107 - 92) / 107] * 100 = ~14.0% decrease.
- Land use related biodiversity loss: Δ from ~101 to ~90 → [(101 - 90) / 101] * 100 = ~8.9% decrease.
- Environmental footprint: Δ from ~106 to ~102 → [(106 - 102) / 106] * 100 = ~3.8% decrease.

Correct answer: (B) Particulate matter (disease inc.)

Question 2:B

Explanation: From the graph, these two metrics intersect in 2018, both reaching a value of approximately 90. Therefore, the correct answer is (B)

Question 3:C

Explanation: Initial value (2010): ~100 Final value (2022): ~98

Change: 100 - 98 = 2 points over 12 years.

Average annual change = 2 / 12 ≈ 0.167 points/year. Correct answer: **C**

Question 4:D

Explanation: The "Amount of material used (kt)" metric (light blue line) shows minimal variation, remaining consistently around 95-100 throughout the period. In contrast, other metrics exhibit noticeable fluctuations. Thus, the correct answer is D.

Question 5:A

Explanation: The “Particulate matter” metric shows the sharpest decline between 2012 and 2016, decreasing from 98 points in 2012 to 74 points in 2016 (-24 points). So, the right answer is A.

Question 6:B

Explanation: Suppose the “Climate Change Impacts” metric in 2022 is around 93 (based on visual estimation).

An 8% annual increase means applying a growth factor of 1.08 each year. Then, the metric would be

In 2023: 93*1.08=100.4

In 2024: 100.4*1.08=108.8

In 2025: 108.8*1.08=117.2

So, the correct answer is (B) 117.2