# Quantitative Analysis of Determining Environmental Damage Caused by the Garments Industry of Bangladesh

## The Variables

In order to quantify the impact of the garments industry of Bangladesh on the environment, following the models explored by [Mamun et al., 2022](https://www.mdpi.com/2673-7248/2/4/29/htm) and [Khuky, Hook, Chin, & Bin Saari, 2022](https://doi.org/10.46488/NEPT.2022.v21i03.051); we assessed the following indicators with a data range of 1984 – 2019 (in some cases, 1984 – 2014) –

1. RMG Export Volume in millions USD
2. CO2 emissions
   1. Emissions from manufacturing and construction industries (% of total fuel combustion)
   2. CO2 intensity (kg per kg of oil equivalent energy use)
   3. Total emissions (in kilotons)
   4. Total emissions (metric tons per capita)
   5. Total emissions (kg per 2017 PPP $ of GDP)
3. Ecological Footprint
   1. Total Ecological Footprint (in Global hectares)
   2. Ecological Footprint per Capita (in Global hectares)
4. Fossil Fuel Consumption (% of total fuel consumption)
5. Energy Usage
   1. Usage Measured in kg of oil equivalent per capita
   2. Usage Per $1000 GDP Measured in kg of oil Equivalent per capita
6. Total Greenhouse Gas Emissions (Kilotons of CO2 equivalent)

## The Tests and Set of Hypotheses

Based on the data, we conducted Pearson correlation tests with the RMG export value being the independent variable and the rest of the indicators being dependent variables, each of the indicators representing the environmental impact of the garments industry in their respective pairings. The hypotheses chosen for each pair of variables in the Pearson Correlation Test were the following –

H0: ρ = 0 (i.e., the population correlation coefficient is 0; there is no association.)

H1: ρ ≠ 0 (i.e., the population correlation coefficient is not 0; a nonzero correlation could exist.)

## The Results

Through the Pearson Correlation Tests conducted in IBM SPSS, we observed the following results –

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | RMG Export Total | Ecological Footprint Total | Ecological Footprint Per Capita | Energy use (kg of oil equivalent per capita) | CO2 emissions from manufacturing industries and construction (% of total fuel combustion) | CO2 intensity (kg per kg of oil equivalent energy use) | Fossil fuel energy consumption (% of total) | Total greenhouse gas emissions (kt of CO2 equivalent) | Energy use (kg of oil equivalent) per $1,000 GDP (constant 2017 PPP) | CO2 emissions (kt) | CO2 emissions (kg per 2017 PPP $ of GDP) | CO2 emissions (metric tons per capita) |
| RMG Export Total | Pearson Correlation | 1 | **.973\*\*** | **.977\*\*** | **.968\*\*** | 0.076 | **.919\*\*** | **.860\*\*** | **.979\*\*** | **-.916\*\*** | **.988\*\*** | **.849\*\*** | **.985\*\*** |
| Sig. (2-tailed) |  | 0.000 | 0.000 | 0.000 | 0.685 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| N | 35 | 35 | 35 | 31 | 31 | 31 | 31 | 29 | 25 | 29 | 29 | 29 |
| **Note: Correlations in bold and marked with asterisks represent correlations significant at an alpha level of 0.01 or 1%** | | | | | | | | | | | | | |

Table 1 - Pearson Correlation Test Results

Based on the results seen here, we can establish that there is a strong positive linear and statistically significant correlation between the increase in RMG exports over the years and a significant majority of the environmental indicators chosen to represent the ecological and environmental impact of the garments industry in Bangladesh. Only the CO2 emissions from the manufacturing and construction industries show a really weak positive correlation with RMG exports of Bangladesh. At the same time, only the energy usage per $1000 GDP of growth shows a really strong negative correlation with the total RMG exports of Bangladesh. This is also represented by the p value which represents the statistical significance for the hypotheses chosen, where we can see that most of the p values are less that 0.01, representing a statistically significant correlation between the pair of variables.

# References

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