

# 1 Sustainability-related Datasets

The datasets comprise 110 time series collections spanning various application domains and pattern types, obtained from the FAO database [1]. FAO provides free access to food and agriculture data, including production, trade, consumption, and environmental indicators. Six datasets were selected: GDP (gross domestic product), bioenergy, climate change, fertilizer production, greenhouse gas emissions, and pesticide use. Data were collected for the ten largest global economies in 2024, as identified by the International Monetary Fund [2]: United States, China, India, Germany, Japan, United Kingdom, France, Brazil, Canada, and Italy – in descending order of size. The time series range from 30 to 60 annual observations, representing a data-scarce scenario. Table 1 summarizes the datasets.

Table 1: Macroeconomic and environmental indicators from FAOSTAT

Dataset	Description	Frequency	Coverage	Observations	Pred. Length
Bioenergy (Consumption)	Final energy consumption of various bioenergy fuels by country, measured in terajoules	1Y	1990–2022	33	5
Bioenergy (Production)	Total production of various bioenergy fuels by country, measured in terajoules	1Y	1990–2022	33	5
Climate Change	Mean absolute variation in surface temperature by country, expressed in °C	1Y	1961–2023	63	5
Emissions (CH <sub>4</sub> )	Total amount of methane released into the atmosphere by country, in kilotons	1Y	1961–2021	61	5
Emissions (CO <sub>2</sub> )	Total amount of carbon dioxide released into the atmosphere by country, in kilotons	1Y	1990–2021	32	5
Emissions (N <sub>2</sub> O)	Total amount of nitrous oxide released into the atmosphere by country, in kilotons	1Y	1961–2021	61	5
Fertilizers (K <sub>2</sub> O)	Tonnes of potassium nutrient manufactured into fertilizer products by country	1Y	1961–2022	62	5
Fertilizers (N)	Tonnes of nitrogen nutrient manufactured into fertilizer products by country	1Y	1961–2022	62	5
Fertilizers (P <sub>2</sub> O <sub>5</sub> )	Tonnes of phosphorus nutrient manufactured into fertilizer products by country	1Y	1961–2022	62	5
GDP	Total value of all goods and services produced within a country, expressed in dollars	1Y	1970–2023	54	5
Pesticides	Agricultural use of pesticides and related chemicals by country, measured in tonnes	1Y	1990–2022	33	5

# 2 M-competition Datasets

## References

[1] FAO. Food and agriculture data. <https://www.fao.org/faostat>, 2025.

[2] IMF, International Monetary Fund. World Economic Outlook-Steady but Slow: Resilience amid Divergence. Technical report, International Monetary Fund, Washington, USA, 2024. <https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD>.