# Measuring Progress 2: Methodology and Results

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# Structure

- Presentation of the methodology:
  - Change in the definition and shift from nature-based solutions to a broader definition
  - Changes that were adopted based on the feedback from the experts from the 1st Expert Consultation
  - Finalized methodology
  - Concept and process of identifying positive outliers
- Presentation of results
  - Number of relationships investigated
  - Lack of data that hindered the analysis of some indicators
  - A few examples of the results obtained
  - A couple of slides on the positive outlier results
- Q&A

# What we are investigating

The relationship between policy frameworks and progress towards achieving the SDG targets

1. The relationship between actions that countries are taking that have impacts (both positive or negative) on the environment
2. The state of the environment in countries, and the secondary social impacts of the state of the environment

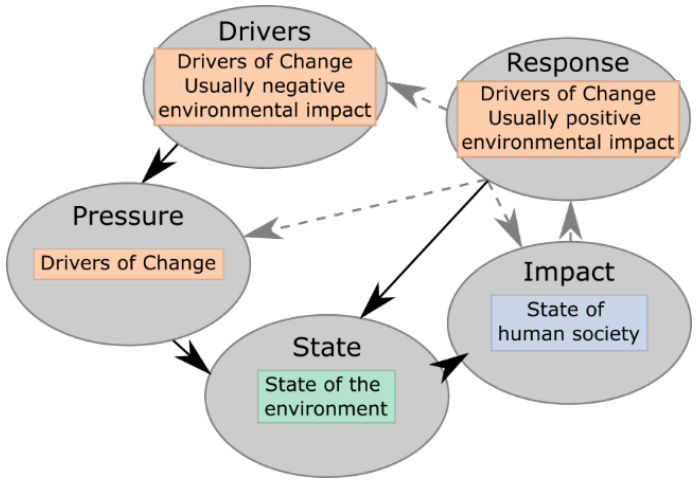
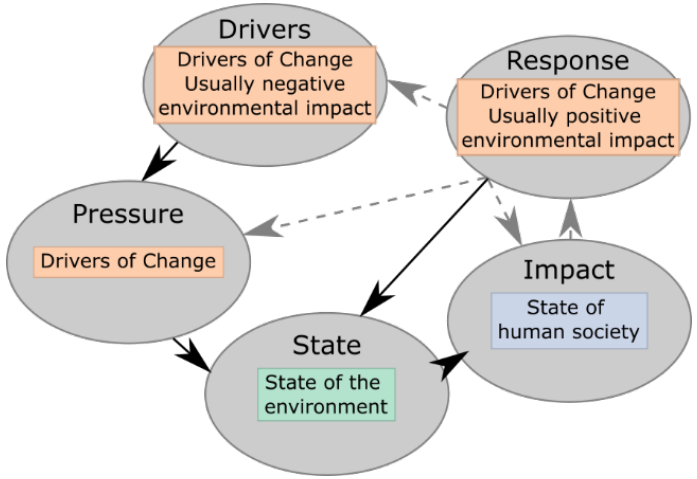



*Figure 1 The DPSIR (Drivers, Pressures, State, Impact, Response) causal framework approach used in this analysis. Relationships that are investigated in this work are indicated with coloured boxes and complete arrows.*

# Changes adopted based on expert feedback

- A broader definition than 'Nature-based Solutions'
- Use of IPBES evidence review1 to identify activities that drive changes in the environment
- Limit to direct drivers, as defined by IPBES, due to complexity of causal chain between drivers and environmental impacts, and secondary social impacts
- Identified relationships to investigate based on scientific evidence and expert consultation

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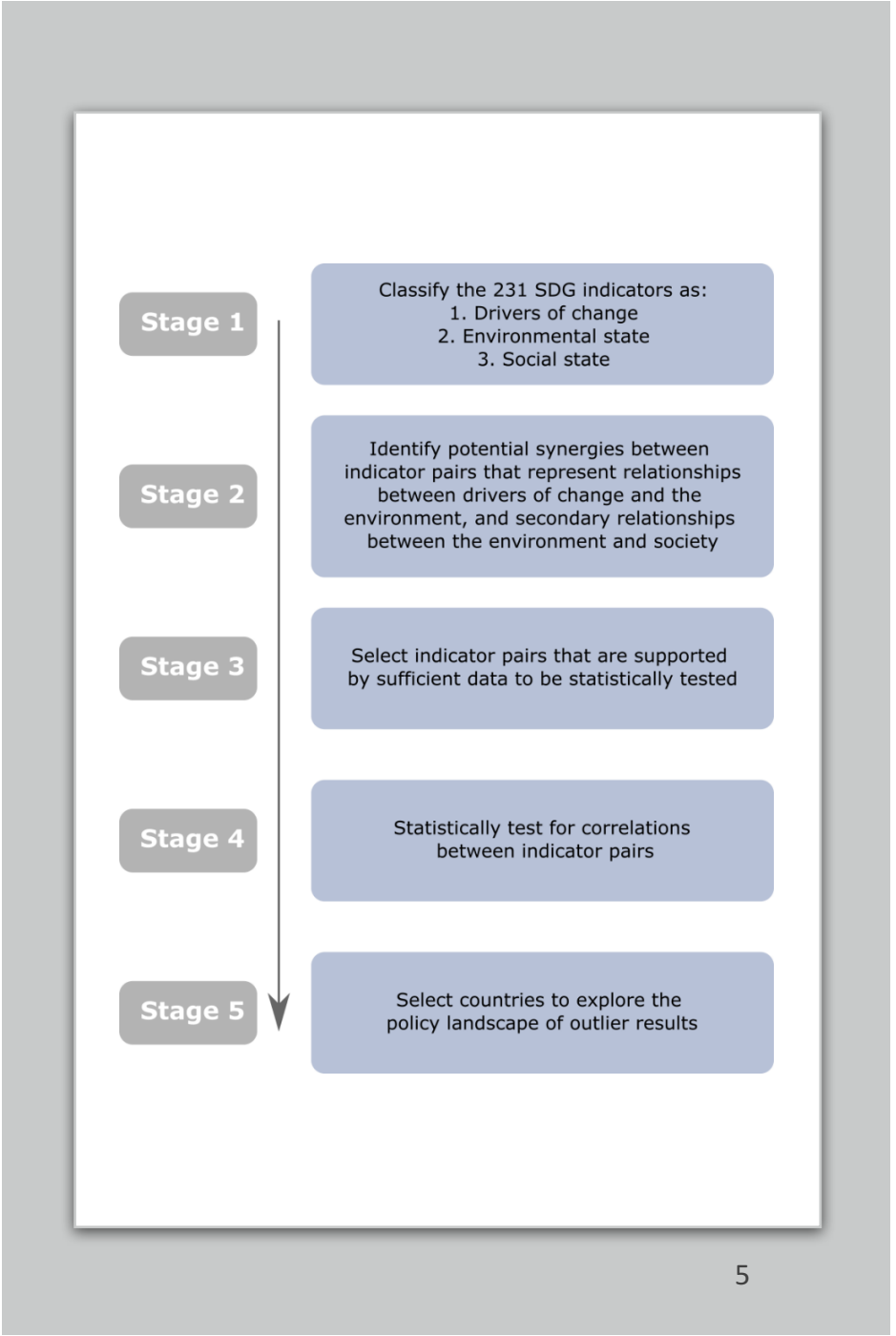
1 IPBES (2019) 'IPBES Global Assessment'

# Finalised methodology

Five stage process used to identify relationships to investigate using the SDG monitoring framework, statistically test for significance of relationships between pairs of SDG indicators, and identify outlier countries that appear to be high achievers.



# Finalised methodology: Stage 1

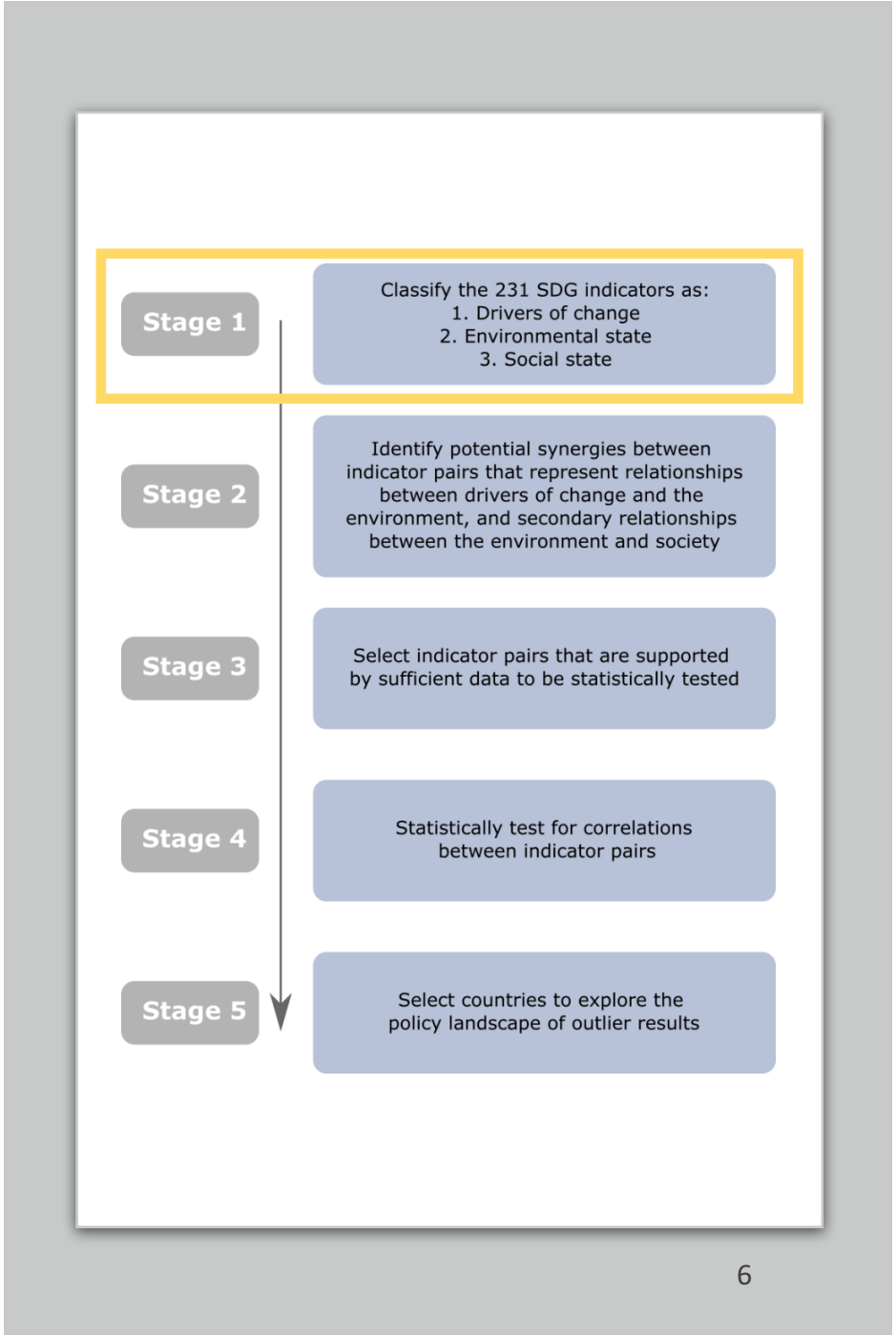
Classify the SDG indicators to include in analysis.

**Drivers of change:** 103 indicators, from 15 Goals, e.g. 8.4.2 Domestic material consumption

**Environmental state:** 12 indicators, from 5 Goals, e.g. 6.3.2 Water quality

**Social state:** 70 indicators, across 14 Goals, e.g. 2.1.1 Undernourishment

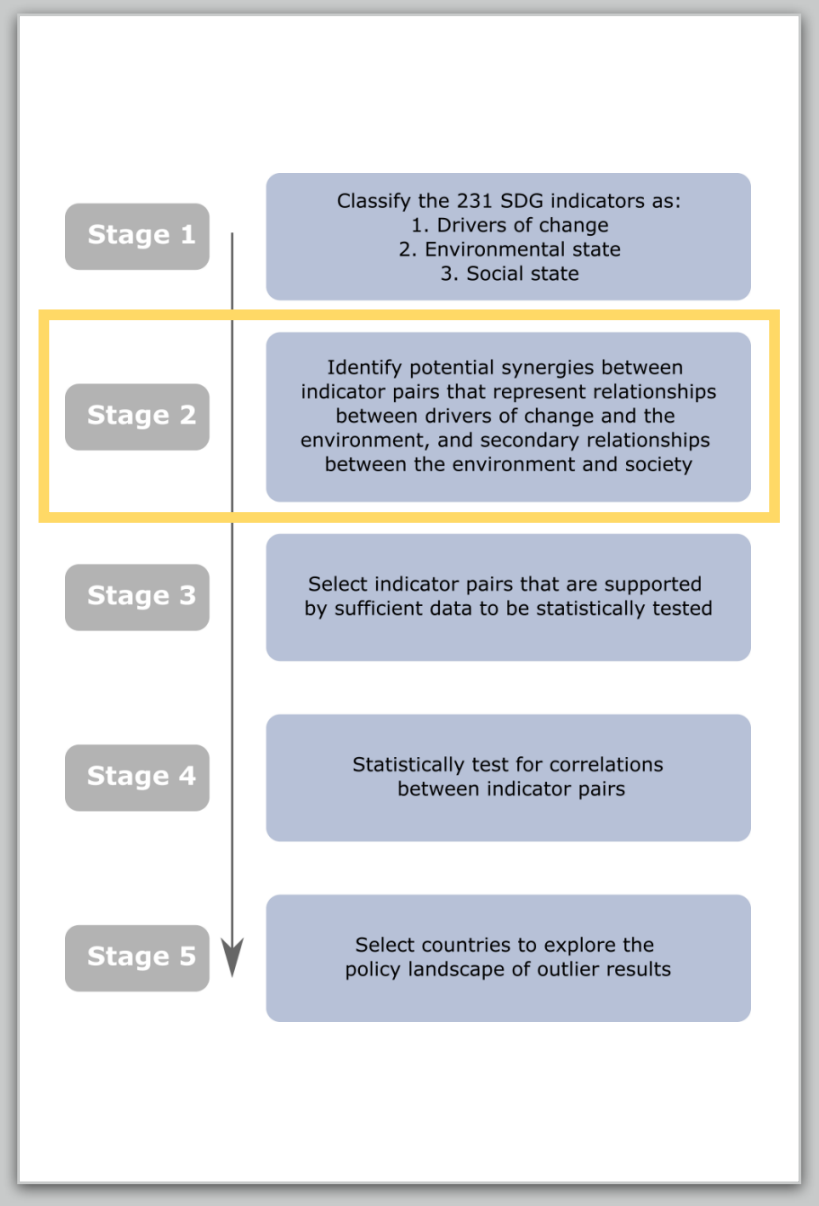
Underlying the SDG indicators are often numerous sub-indicators.



# Finalised methodology: Stage 2

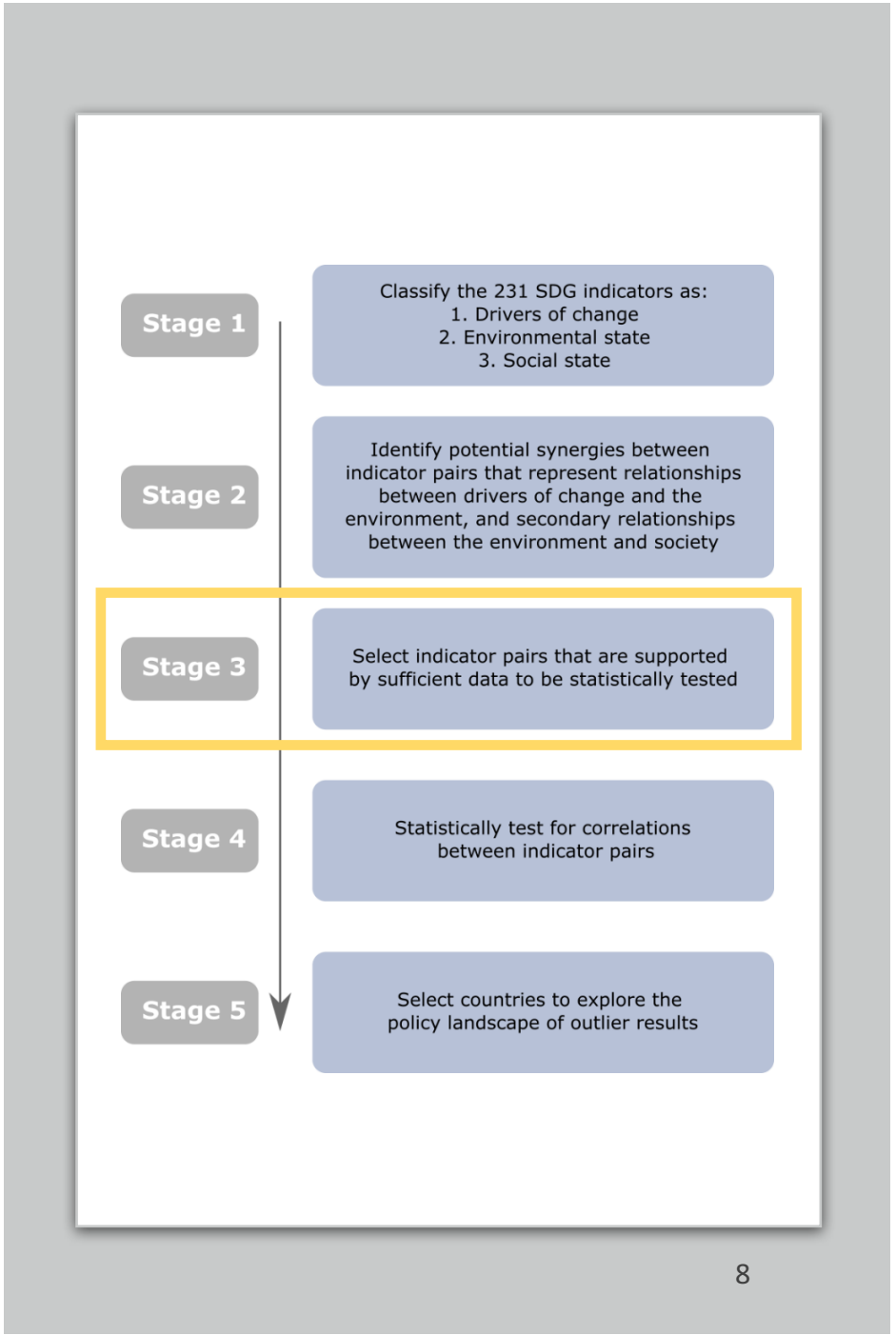
Based on scientific evidence and recommendations from experts, identify potential synergies between pairs of SDG indicators.

Due to complexity of causal relationships, focused only on direct drivers, such as resource use and pollution, rather than indirect drivers such as environmental education and remittances.



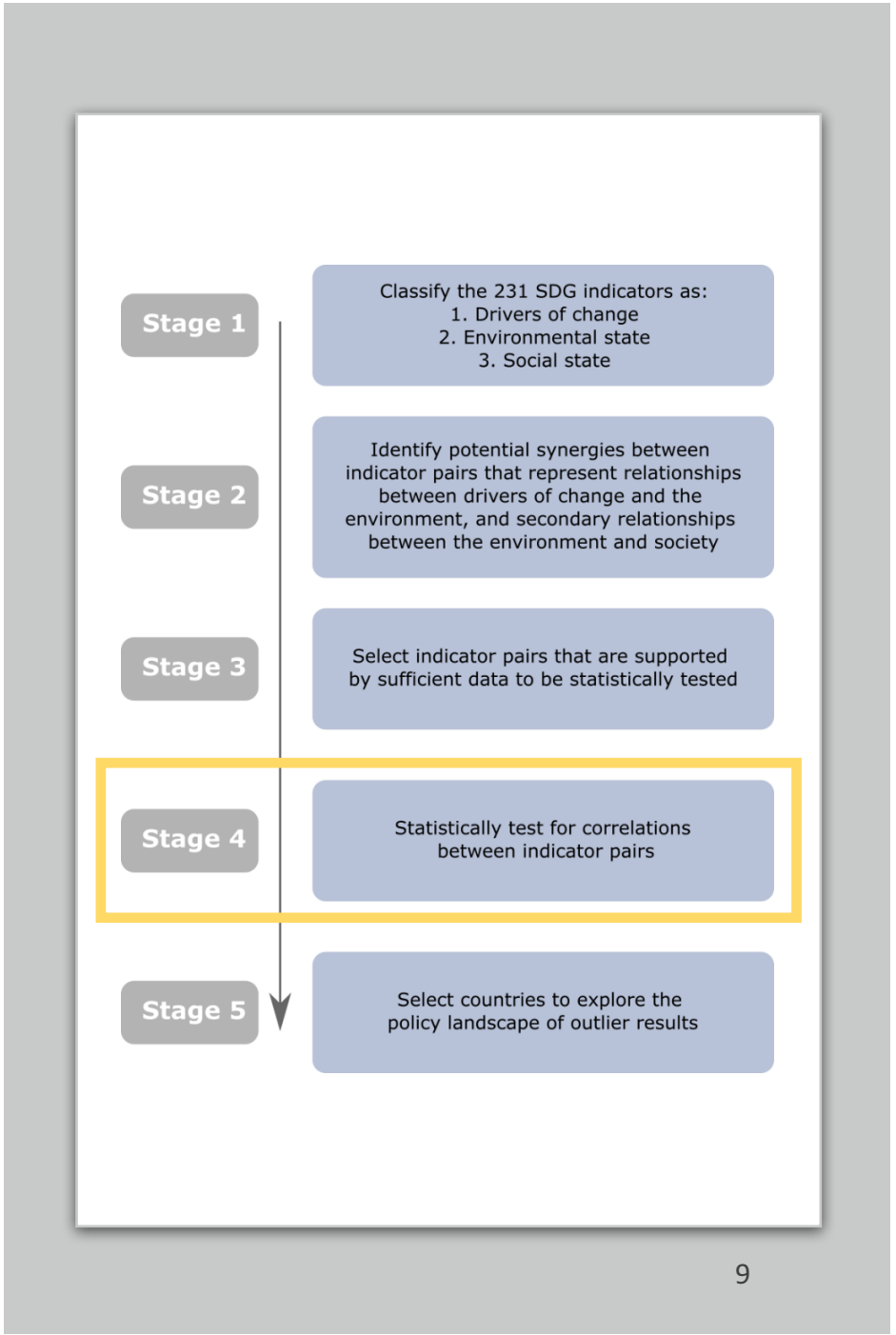
# Finalised methodology: Stage 3

Interpolation used to fill gaps in SDG indicator data. Requires at least two data points. Several indicators either not supported by underlying data, or only have data for a single year. These indicators were excluded from the analysis.



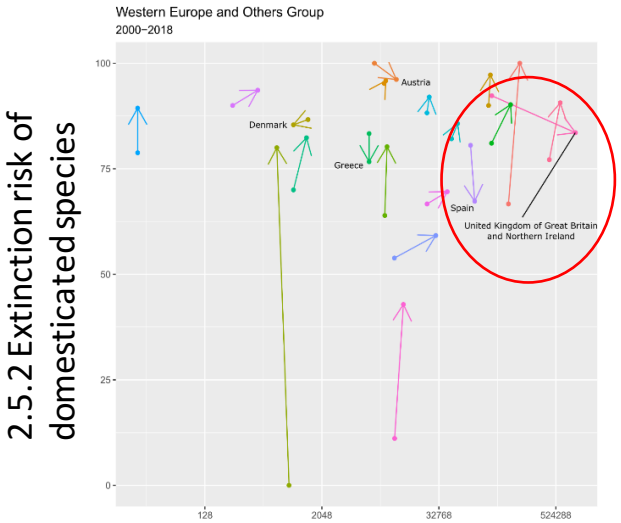
# Finalised methodology: Stage 4

- Pearson's correlation coefficient used to estimate the correlation between pairs of indicators.
- Controlled for confounding factors of population, GDP, and geographical region using a linear regression model.
- Used hypothesis test on the correlation coefficients to assess whether having accounted for the influence of these confounder variables there is still sufficient evidence for a relationship between the variables.
- Set a threshold of $R^2 = 0.2$ as a means of having further confidence in the validity of there being a statistically significant relationship between the indicator pairs.



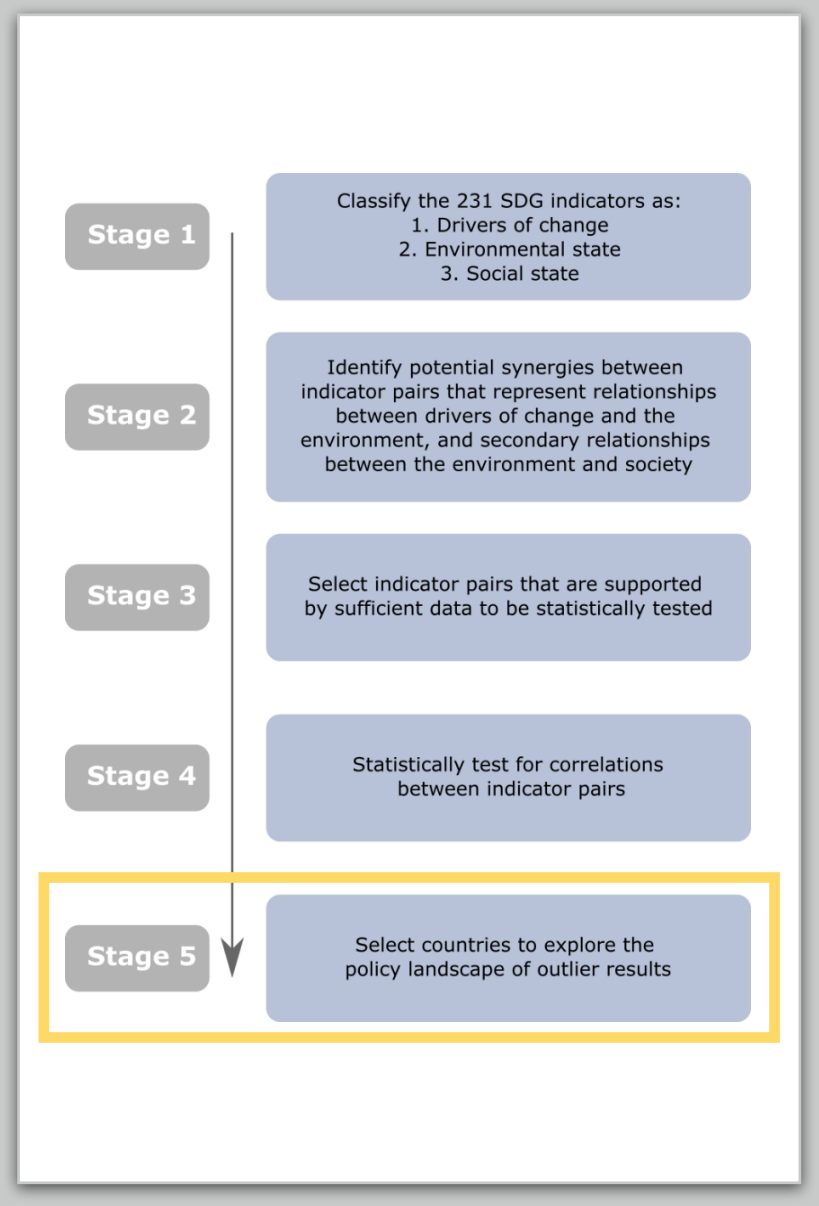
# Finalised methodology: Stage 5

By graphically displaying the data underlying significant indicator pairs, we identify potential outlier countries.




UK is one of few countries with decreasing extinction risk combined with increasing genetic resource conservation

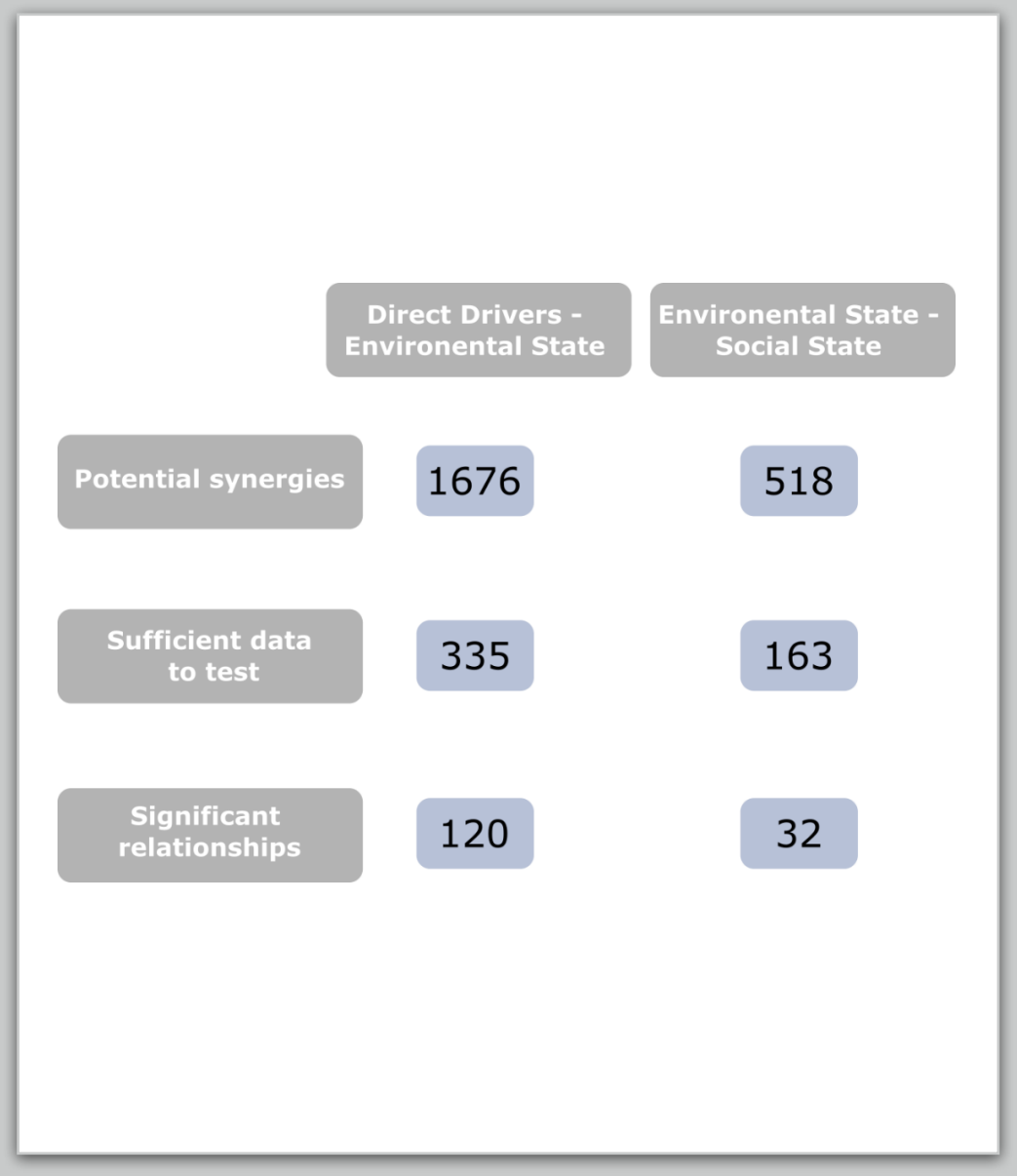
2.5.1 Plant genetic resources conservation



# Overview of results

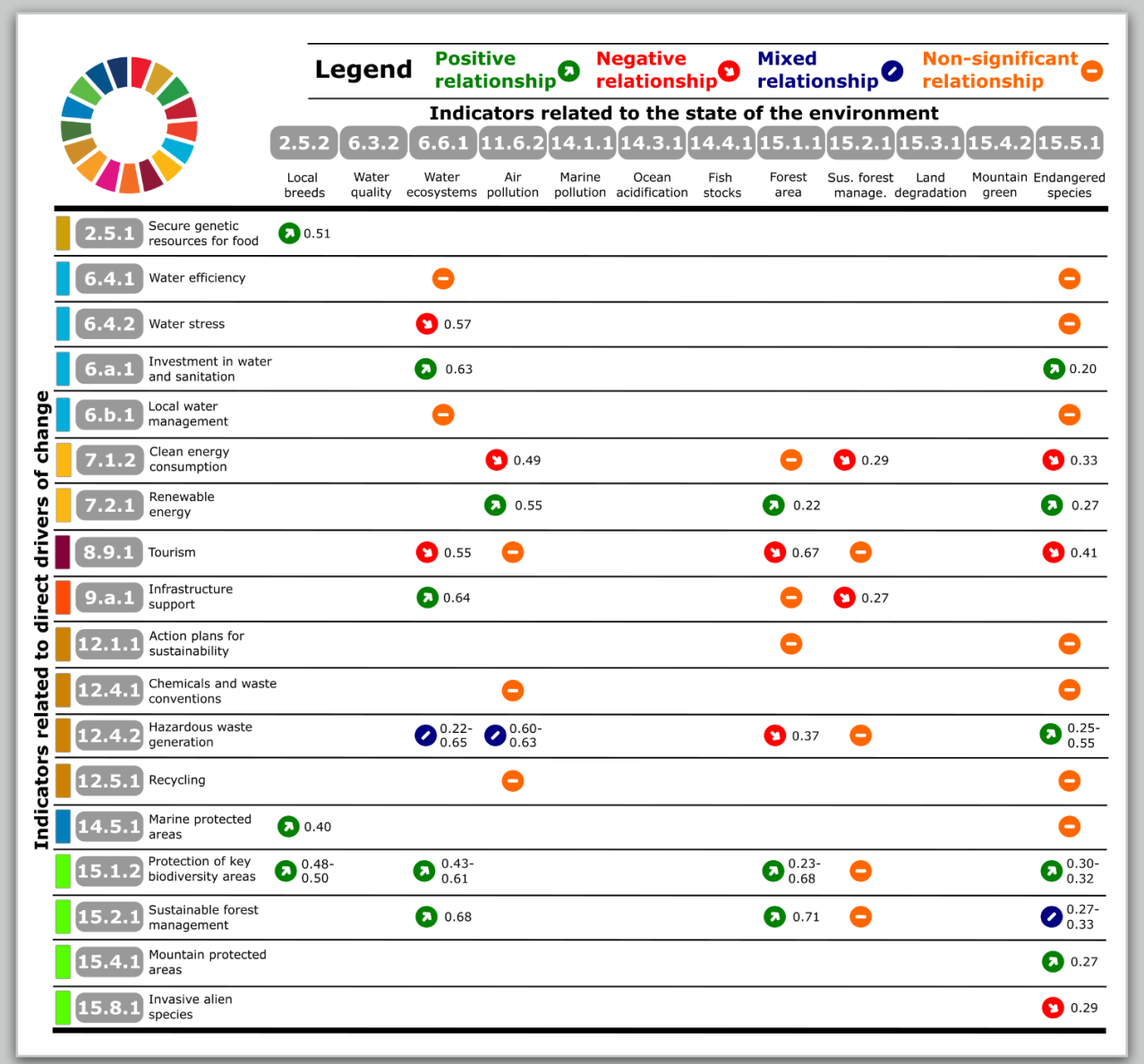
- Total of 498 pairs of indicators/sub-indicators tested using correlation analysis.

- 152 significant relationships found between indicator pairs.



# Drivers of change and the state of the environment

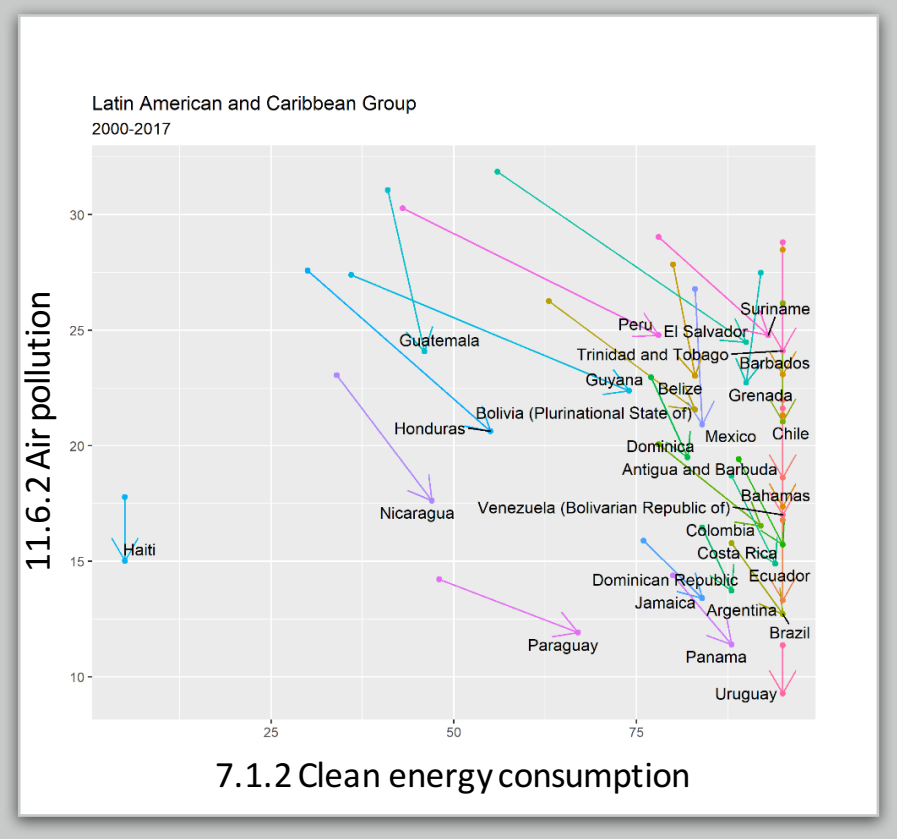
- We investigated potential synergies between 30 indicators across nine SDGs.

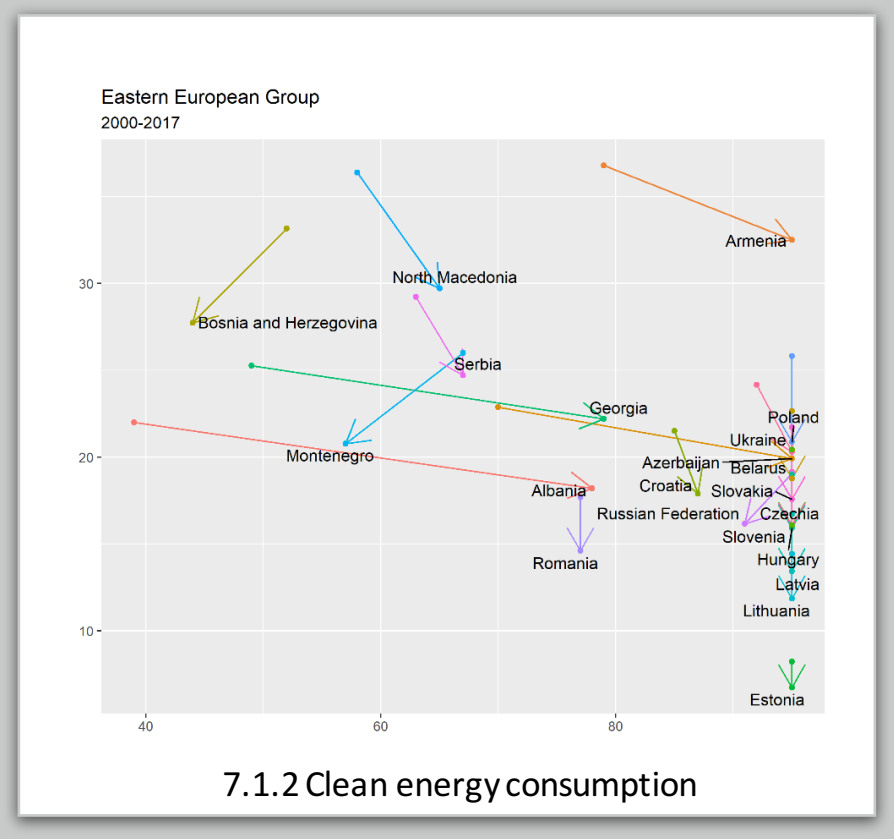



*Blank cells denote indicator pairs which were not tested either due to a lack of data or lack of evidence for potential synergies. $R^2$ model values are provided alongside symbols denoting significant relationships.*

Using the oldest and most recent datapoint for the data underlying the SGD indicators, we can visualize the relationship between significant pairs of indicators for each country.

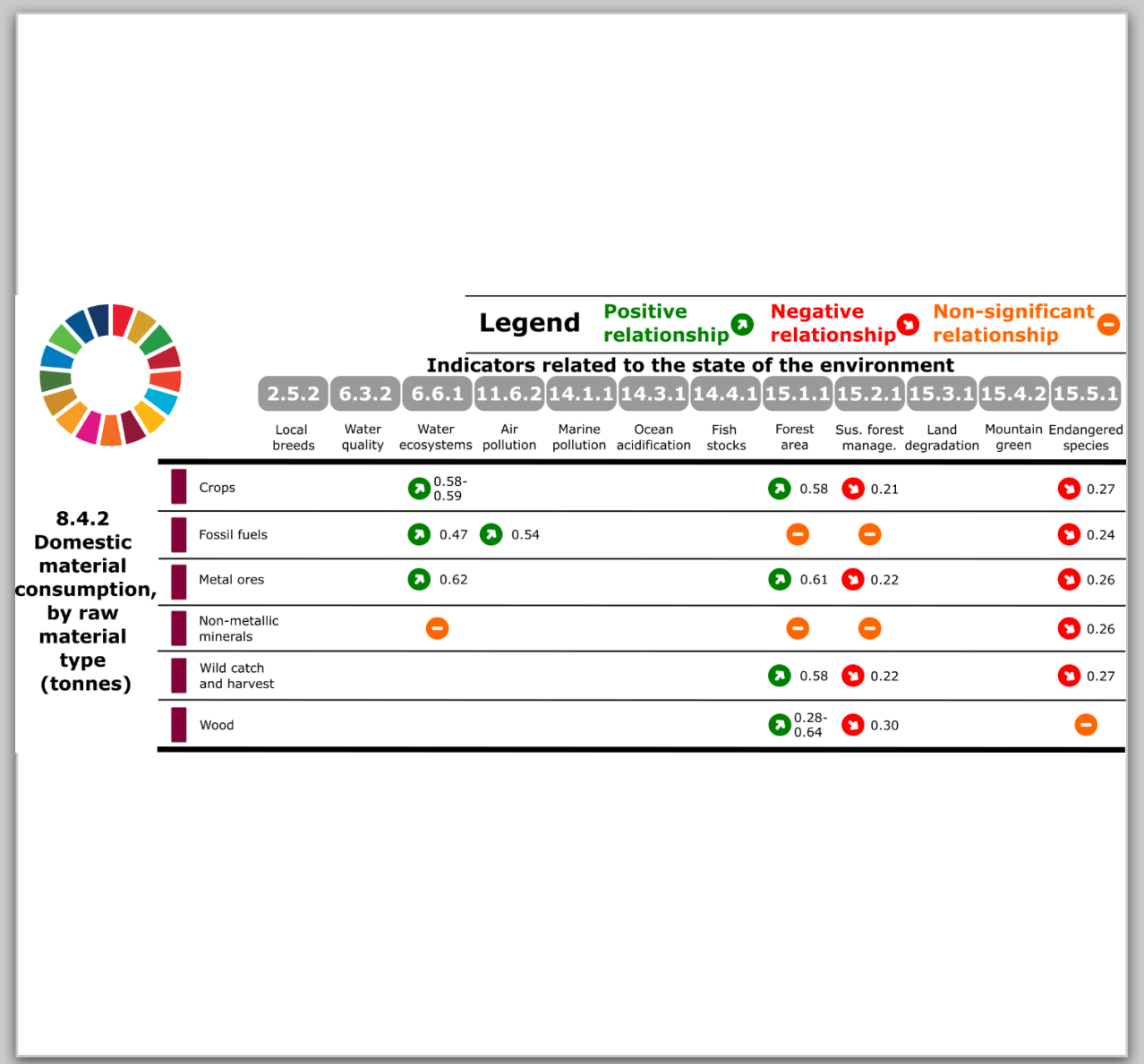
We can see that air pollution is improving in most countries, and most countries, but not all, are increasing their consumption of clean energy at the same time.



# Domestic material consumption

- We looked into the individual product types that underlie indicator 8.4.2 on domestic material consumption.
- We chose this indicator, over material consumption, as it better captures use of domestic natural resources.

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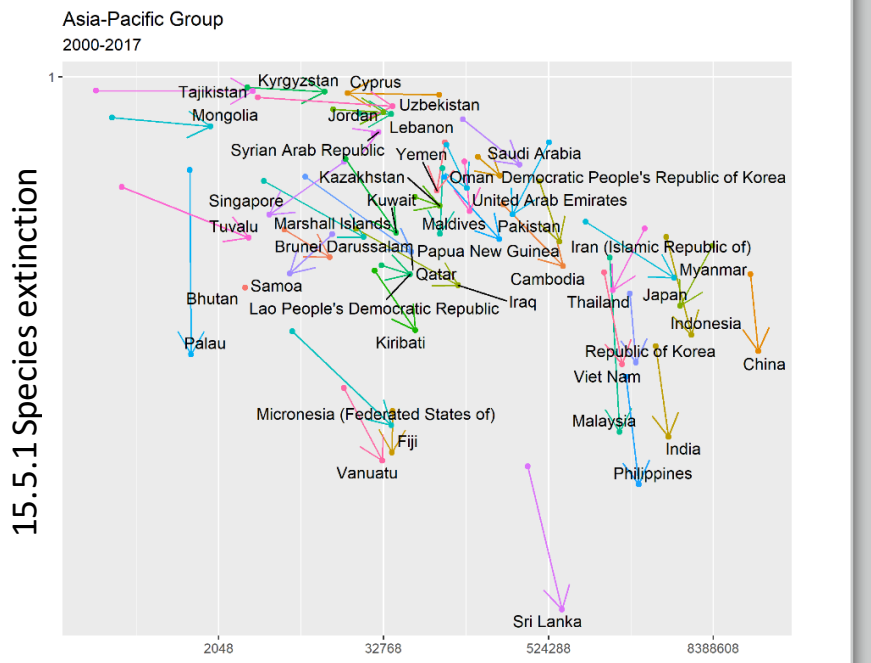
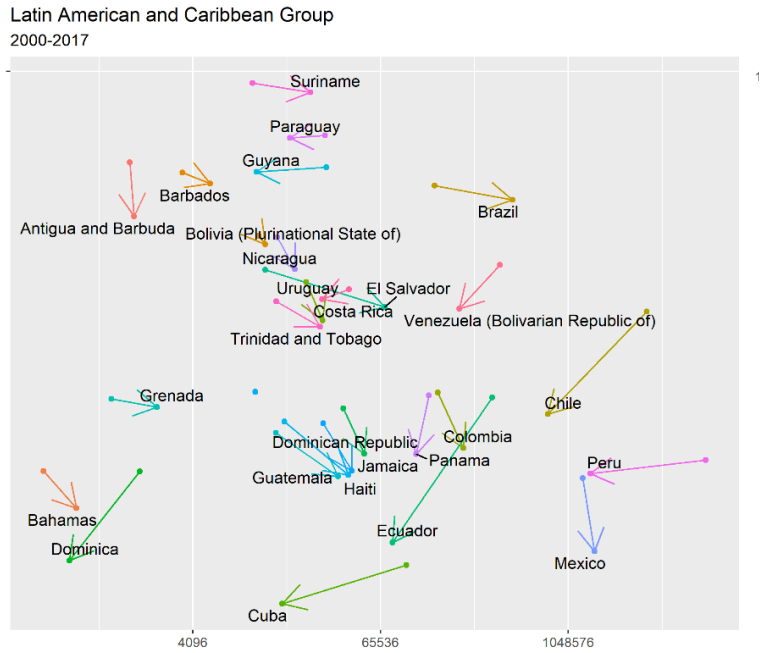
Domestic material consumption gives an idea of how countries are consuming domestic natural resources. However, there will be limited correlation in countries that import a large share of natural resources.

In most cases, species extinction risks are increasing, while the consumption of wild catch and harvest resources is generally increasing, with a few exceptions.




8.4.2 Domestic material consumption:

Wild catch and harvest

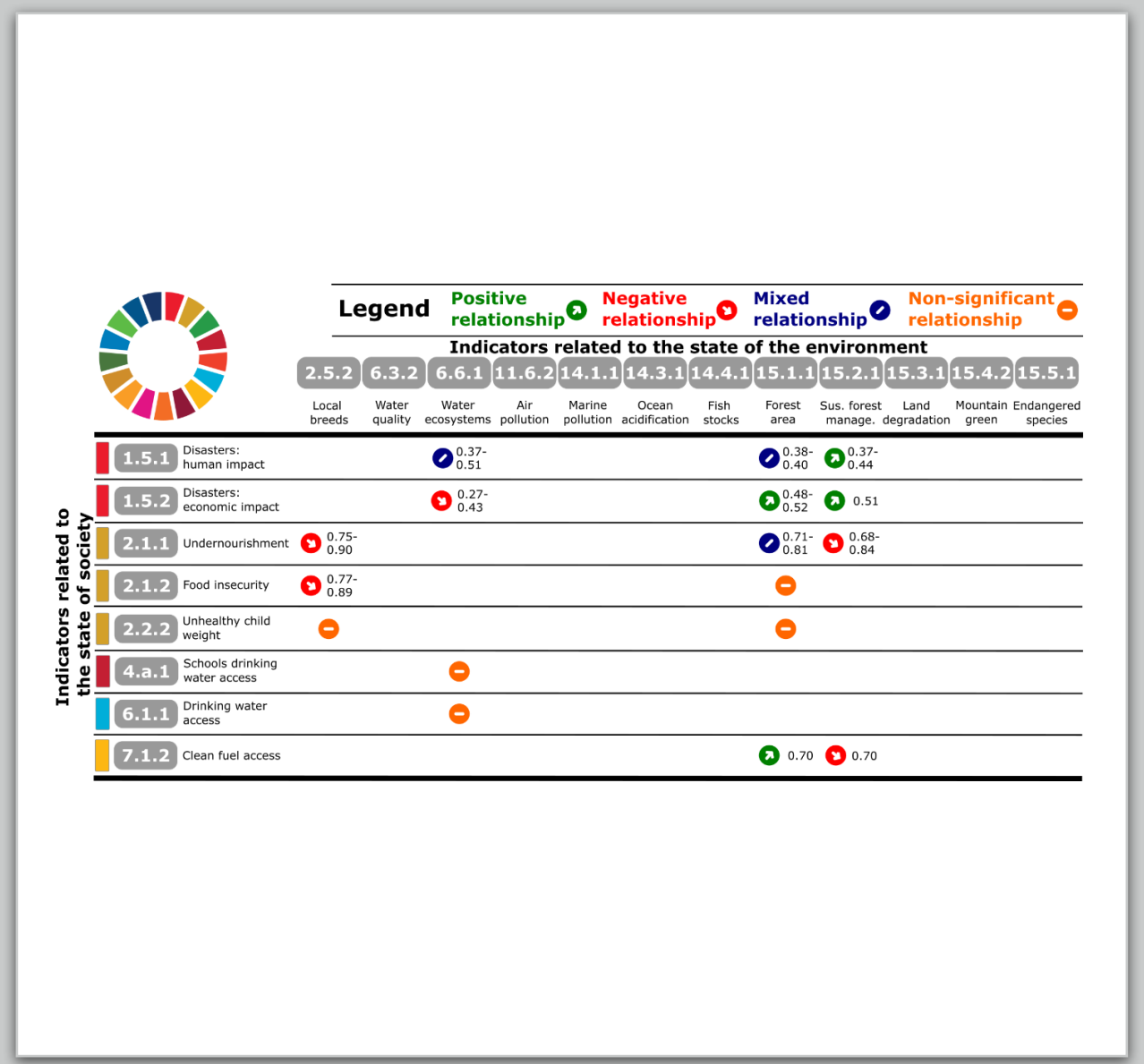



8.4.2 Domestic material consumption:

Wild catch and harvest

# State of the environment and society

- We investigated potential synergies between 20 indicators across eight SDGs.

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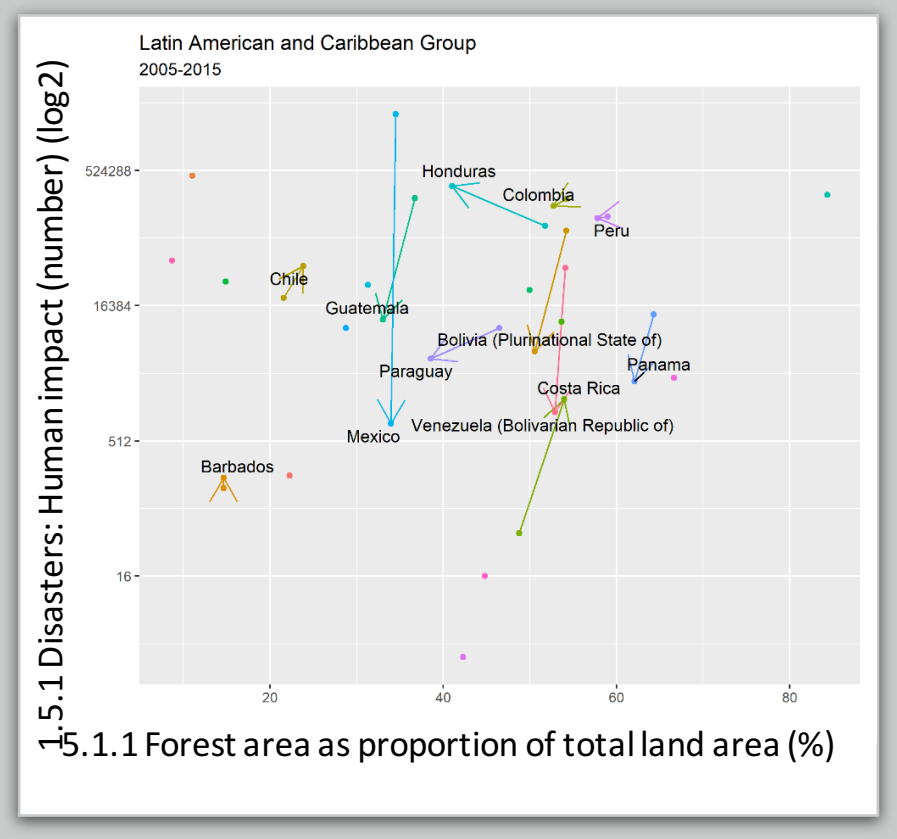
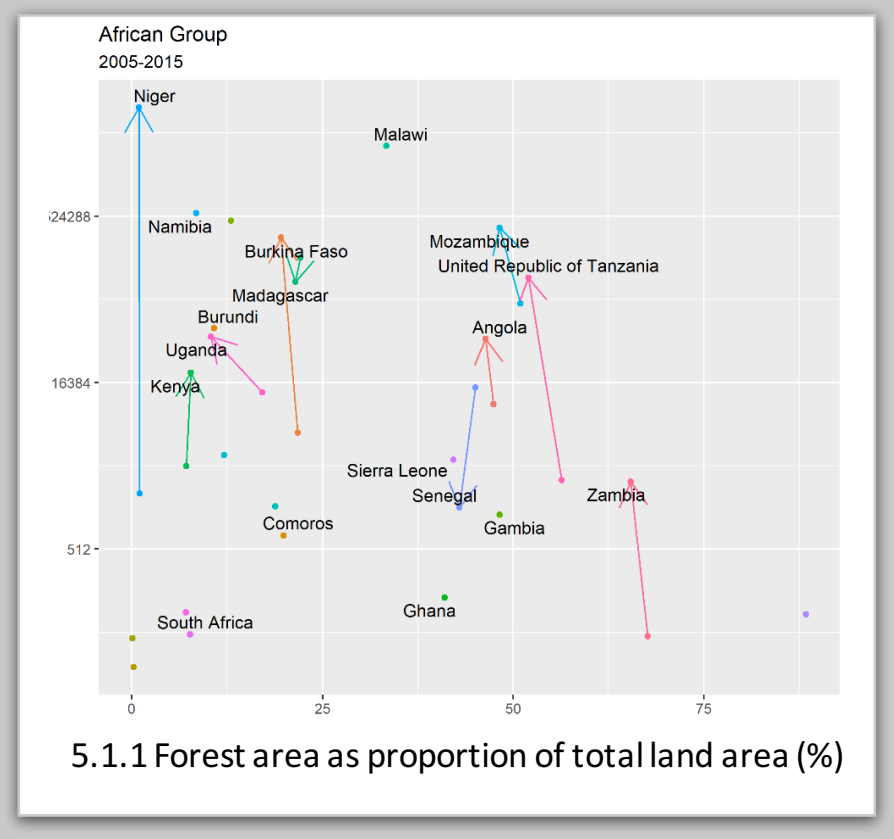
The causal chains between the state of the environment and the state of society are highly complex in some cases.

The relationship between the impact of disasters and the state of the environment, such as forests and water ecosystems, produced mixed results depending on the sub-indicators used.



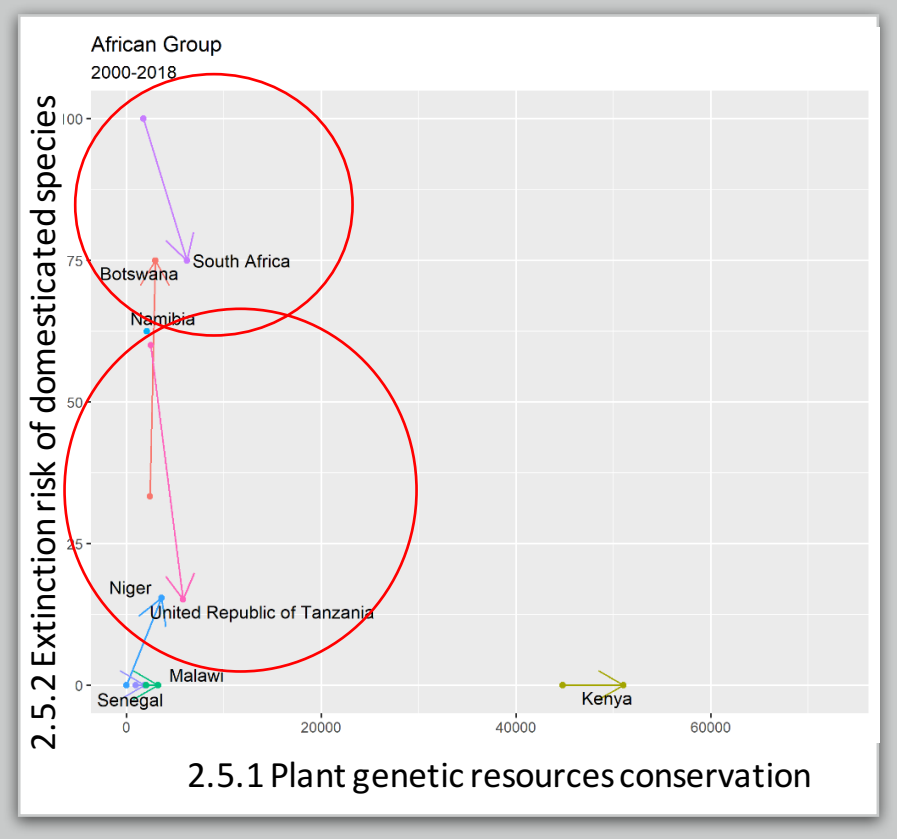
# Outlier countries

Based on visual assessment of the data underlying significant indicator pairs, we identify a number of potential outlier countries.

- Conservation of plant genetic resources (2.5.1) and extinction risk of domestic species (2.5.2) in the **United Kingdom, Ukraine, Bulgaria, South Africa,** and **United Republic of Tanzania**.
- Investment in water and sanitation (6.a.1) and water body extent (6.6.1) in **Brazil** and **Azerbaijan**.
- Infrastructure support (9.a.1) and water body extent (6.6.1) in **China** and **Brazil**.
- Protection of Key Biodiversity Areas (15.1.2) and water ecosystem extent (6.6.1) in **China** and **Brazil**.
- Protection of Key Biodiversity Areas (15.1.2) and species extinction risk (15.5.1) in **Poland, Belarus** and **Serbia**.
- Protection of Key Biodiversity Areas (15.1.2) and forest area (15.1.1) in **Gabon, Dominican Republic, Cuba, Bhutan, Vietnam, China, most of the Eastern European group of Member States, Greece, France** and **Italy**.
- Sustainable forest management (15.2.1) and forest area (15.1.1) in **China**.
- Forest protection (15.2.1) and species extinction risk (15.5.1) in **Belarus**.

Using graphical display of the underlying data, we can identify countries that seem to be outperforming other countries in terms of drivers of change, the state of the environment, and the state of society.

This is a subjective process, and the input of experts is required to understand the context underlying this data.

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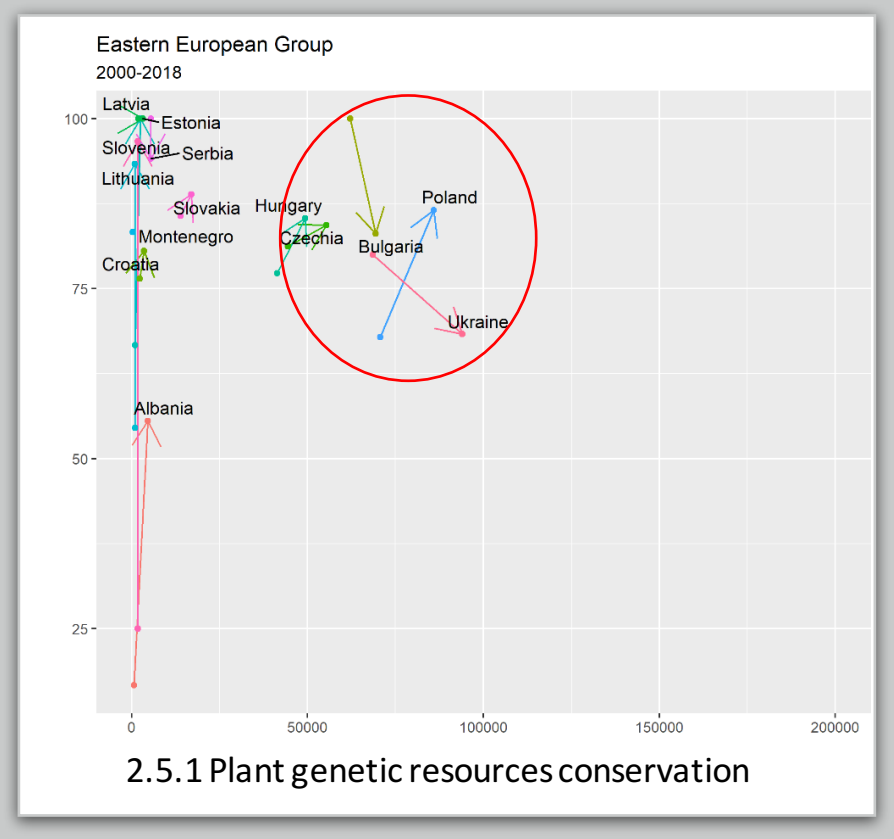


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