

README

OVERVIEW

This repository contains all the code needed to replicate the analysis in the paper: **“Rethinking trade for the ecological transition: Quantifying the trade drivers of planetary boundaries”**.

The package has **two main parts**:

Part 1: Generating the Outputs (Run on Server)

The original authors ran the following R scripts on a cloud-based server using **RStudio 2.1.19** on **Onyxia - SSP Cloud Datalab**:

- Generating Matrices - Original Code.R
- Input-Output Analysis - Original Code.R

These scripts created the .rds datasets stored in the Outputs/ folder.

Important Note: These scripts were originally executed on a cloud server due to the high computational requirements. Users replicating this part locally should: - Download the dataset from [GLORIA](#) - Place the files as instructed in the DATA AVAILABILITY section below - Be aware that the “0 - Loading data and basic matrices” section may require adjustments for local environments

Part 2: Creating Figures using Flourish/RStudio

If you do not have access to the computational resources needed for Part 1, you can skip that step. The resulting datasets from Part 1 are already included in the Outputs/ folder.

These processed datasets are used to generate figures either via direct R plotting (for Annex) or by uploading the data into [Flourish](#), a free online data visualization tool used to recreate the paper’s figures.

Each figure corresponds to a specific section in the R script that prepares the required data.

Steps:

1. Open the R Project and restore the environment using `renv::restore()`.
2. Run the script `Create_figures.R`. This will generate all the inputs needed to recreate the figures.
3. Visit [Flourish](#) and log in or create a free account.
4. Click **“New Visualization”**.
5. Select a template corresponding to each figure:
 - **Figure 1:** Bar chart (stacked %)
 - **Figure 2:** Column chart (grouped)

- **Figure 3:** Sankey diagram (series)
 - **Figure 4:** Radar chart (series)
6. Go to the “**Data**” tab in the Flourish editor.
 - For **Figures 1 and 2:** Copy-paste the data generated in R directly into the in-built spreadsheet.
 - For **Figures 3 and 4:** Upload the .csv files from Outputs/Sankey and Outputs/Radar folders, which are created by running the R code.
 7. Manually adjust colors, labels, and formatting in Flourish to match the original paper’s visuals.

Note: While formatting may slightly vary from the paper, these changes do not affect the core reproducibility of the results.

INSTRUCTIONS FOR REPLICATORS

1. Request and download the GLORIA dataset.
2. Place the required files in your local R project directory (see below).
3. Run the R scripts starting from the Flourish figure generation sections if you do not have access to the original server.
4. Use the outputs in Flourish to manually recreate the figures.

DATA AVAILABILITY

You can obtain the dataset for free by registering at: <https://ielab.info/resources/gloria>.

- The authors used **Release 57**, which is no longer available.
- The current release is **Release 59**.
- Versions 58 and 59 mainly include metadata and do not alter core values significantly.
- Users must download the dataset directly due to usage terms.

Required Files

Once approved, download the following from GLORIA’s Google Drive: -
 GLORIA_ReadMe_xxx.xlsx - GLORIA_MRIOs_59_2021.zip from the folder:
 GLORIA_MRIO_Loop059_part_I_MRIOdatabase

Unzip the contents and place everything in your R working directory.

REQUIREMENTS

- R and RStudio (latest version)
- High memory and computational capacity (matrix operations are intensive)

Note: The authors ran the original code using **RStudio 2.1.19 on Onyxia Cloud**. The code was not fully tested locally due to computational limits.

CODE DESCRIPTION

There are two main code files: 1. Generating Matrices - Original Code.R: Generates base matrices. 2. Input-Output Analysis - Original Code.R: Produces analysis results and prepares data for visualization. 3. Create figure.R: Produces needed inputs to create the figures from the intermediate dataset. You can skip steps 1 and 2.

FOLDER STRUCTURE

```
README.md
Generating Matrices - Original Code.R
Input-Output Analysis - Original Code.R
Create figures.R
Final Manuscript.pdf
ANNEX A.pdf
Outputs/
```