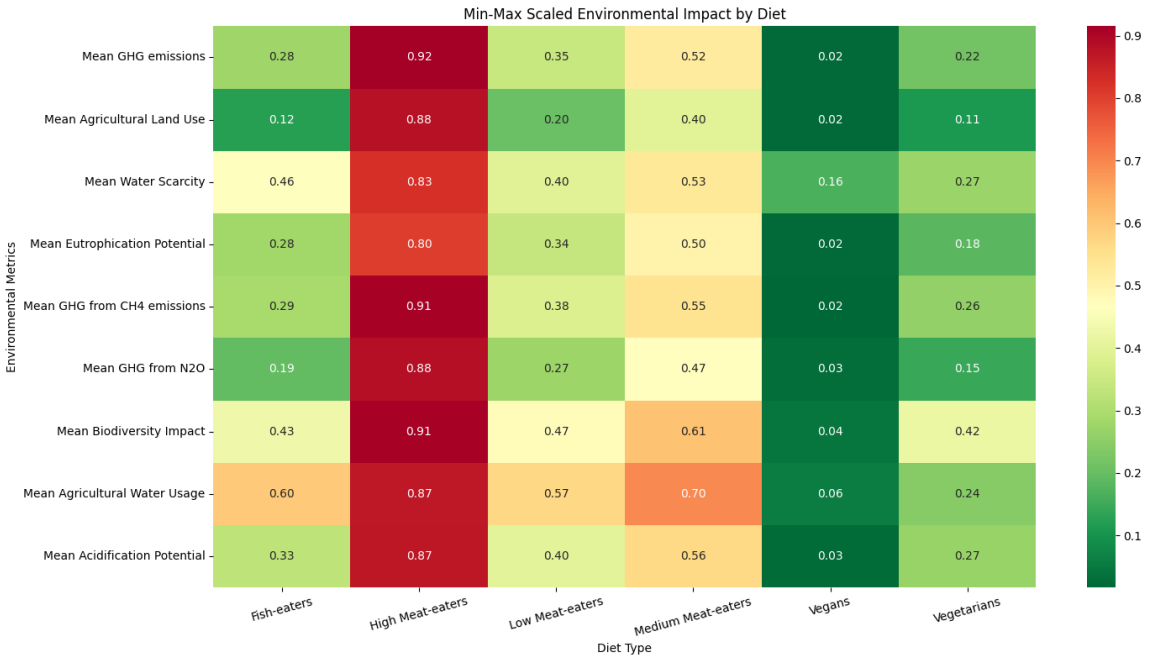
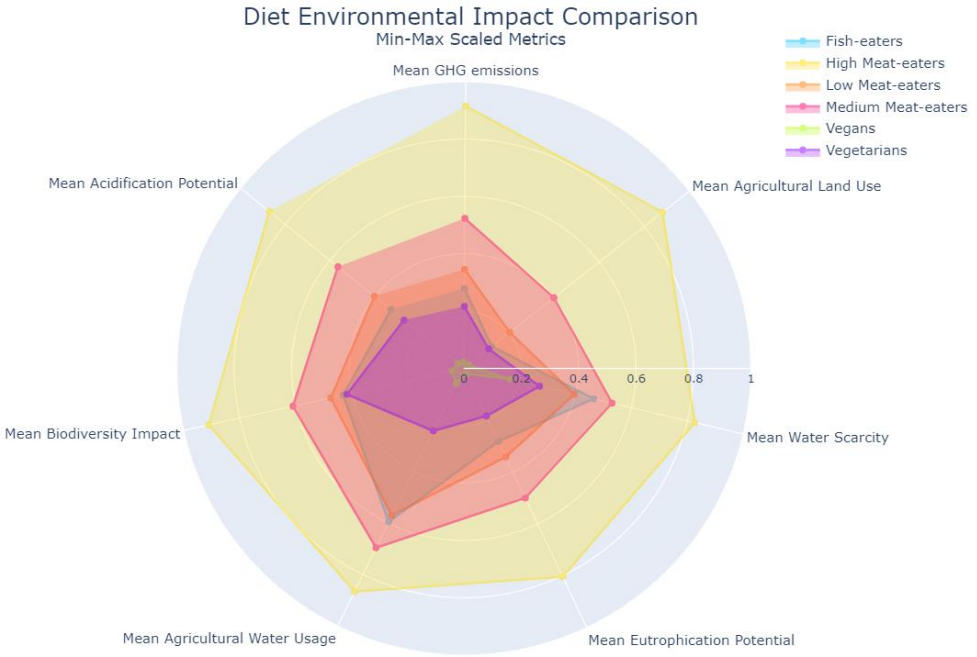

Min-Max Scaled Environmental Impact by Diet
Environmental Metrics
Mean GHG emissions
Mean Agricultural Land Use
Mean Water Scarcity
Mean Eutrophication Potential
Mean GHG from CH4 emissions
Mean GHG from N2O
Mean Biodiversity Impact
Mean Agricultural Water Usage
Mean Acidification Potential
0.28 0.92 0.35 0.52 0.02 0.22
0.12 0.88 0.20 0.40 0.02 0.11
0.46 0.83 0.40 0.53 0.16 0.27
0.28 0.80 0.34 0.50 0.02 0.18
0.29 0.91 0.38 0.55 0.02 0.26
0.19 0.88 0.27 0.47 0.03 0.15
0.43 0.91 0.47 0.61 0.04 0.42
0.60 0.87 0.57 0.70 0.06 0.24
0.33 0.87 0.40 0.56 0.03 0.27
Fish-eaters
High Meat-eaters
Low Meat-eaters
Medium Meat-eaters
Vegans
Vegetarians
Diet Type
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1


Diet Environmental Impact Comparison
Min-Max Scaled Metrics
Fish-eaters
High Meat-eaters
Low Meat-eaters
Medium Meat-eaters
Vegans
Vegetarians
Mean GHG emissions
Mean Agricultural Land Use
Mean Water Scarcity
Mean Eutrophication Potential
Mean Agricultural Water Usage
Mean Biodiversity Impact
Mean Acidification Potential
0
0.2
0.4
0.6
0.8
1


Environmental Impact Hierarchy (Scaled & Aggregated)
Greenhouse Gas
Water Impact
Acidification
Eutrophication
Land Use
Biodiversity
High Meat-eaters
Medium Meat-eaters
Low Meat-eaters
Fish-eaters
Vegetarians
Vegans
Male
Female
Impact Level
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1

Visual Design Type: Treemap

Name of Tool: Python (Plotly Express)

Diet Groups:

- Fish-eaters
- Low Meat-eaters
- High Meat-eaters
- Medium Meat-eaters
- Vegans
- Vegetarians

Variables:

- Environmental Impact Categories: Greenhouse Gas, Land Use, Water Impact, Eutrophication, Biodiversity, Acidification (grouped from raw metrics to simplify analysis).
- Demographics: Gender (Male/Female), Age Group (20-29, 30-39, etc.).
- Why chosen: The grouped environmental categories highlight broader sustainability trends, while demographics reveal patterns across population segments.

Visual Mappings:

- Color: Scaled environmental impact values (0–1 after min-max normalization), using the RdYlGn_r color scale. Red = high impact, Green = low impact.
- Size: Area of rectangles represents the average aggregated impact within each hierarchy level.
- Hierarchy: Category → Type of Diet → Gender → Age Group → Metric (e.g., "Greenhouse Gas → High Meat-eaters → Male → 20-29 → Mean GHG emissions").
- Position: Determined by hierarchy and size (larger impacts appear first in each category).
- Hover Data: Displays exact scaled values (e.g., Scaled Value: 0.85).

Unique Observation:

- High Meat-eaters dominate: Their rectangles are consistently larger and redder across categories like Greenhouse Gas and Land Use, indicating the highest environmental impact.
- Gender disparity: For Fish-eaters, males have larger impacts than females (visible in deeper hierarchy levels).
- Vegan outlier: Vegans show uniformly small, green rectangles in Biodiversity Impact, suggesting minimal harm to ecosystems.
- Age trend: Older age groups (e.g., 60-69) in High Meat-eaters have slightly larger impacts than younger groups (visible when drilling down into the hierarchy).

Data Preparation:

- Since there were 1000 iterations for each grouping done by the simulation, average of those simulations for each metric was calculated and stored in a new file called “Data_CW.csv” (Uploaded to Github)
- Min-Max Scaling: All environmental metrics normalized to 0–1 for fair comparison.
- Metric Categorization: Raw metrics grouped into broader environmental categories (e.g., "Mean GHG emissions" → "Greenhouse Gas").
- Data Aggregation: Values averaged at each hierarchy level (e.g., average impact for "Female Vegans aged 20-29" in Water Impact).
- Data Reshaping: Original data melted to long format for hierarchical plotting.

URL to Source Code: https://github.com/shabbirk53/Research-Methods.git

Video Demo: https://youtu.be/V9plFPiODsk