An open methodology to create reproducible micronutrient biomarker data analysis

https://micronutrient.support/

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Background

Micronutrient survey biomarker data are essential for estimating the prevalence of micronutrient deficiencies. Inconsistent use of data conventions (units, cut-off, handling of implausible values, use of adjustment methods) can create challenges in the interpretation and comparability of survey results. In this study we aimed to design an efficient and repeatable workflow through an open tool to optimise the processing of micronutrient survey data.

Methods

We used open science tools and principles (R and GitHub) to create a script with standardized units for biomarkers and accounts for implausible values, supported by scientific literature. The script also allows the visualisation of missing and extreme values and quality checks. Adjustments for smoking and altitude for haemoglobin values are included, as well as inflammation adjustment for certain micronutrients with the BRINDA package.

Results

### Figure 1: Overview of the MAPS biomarker tool

Display options
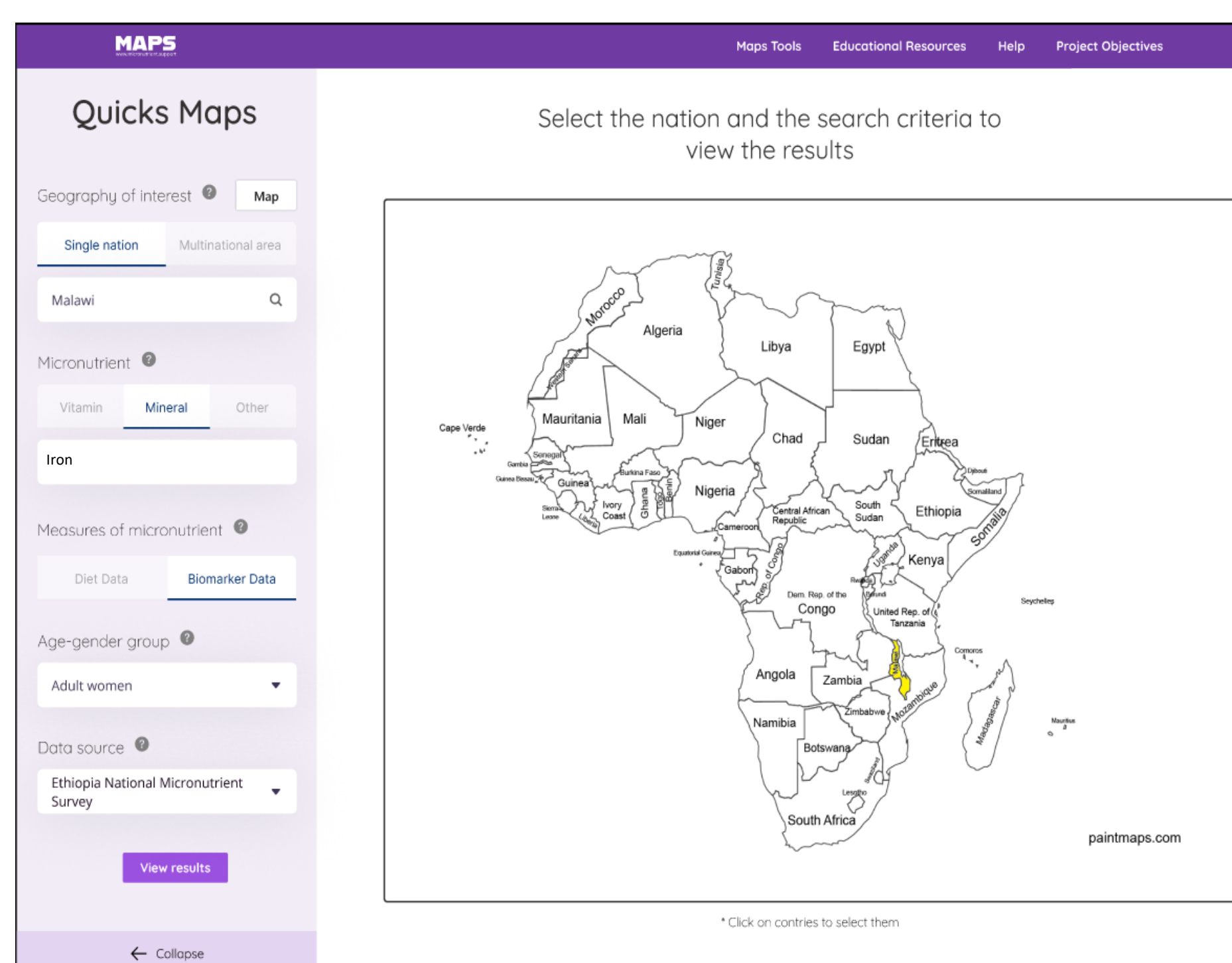
Visualisation of outliers

Table 1: Biomarker used in the tool, thresholds and adjustment methods

Biomarker	Threshold	Adjustment
Serum Ferritin	Deficiency and Excess	Inflammation (CRP, AGP)
Soluble Transferrin receptors	Defined by the user	Inflammation (CRP, AGP)
Haemoglobin	Mild anemia Moderate anaemia Severe anaemia	Altitude Smoking
Serum Zinc	Deficiency (Accounts for fasting status and timing of blood sampling)	Inflammation (CRP, AGP)
Serum Folate	Anemia Elevated homocysteine	
Red Blood Cell Folate	Risk of neural tube defects	
Serum Vitamin B12	Inadequacy Deficiency Severe depletion	
Serum Selenium	Enzymatic activities Keshan disease	
Serum Retinol	Deficiency	Inflammation
Serum Retinol Binding Protein	Deficiency	Inflammation

Way of working
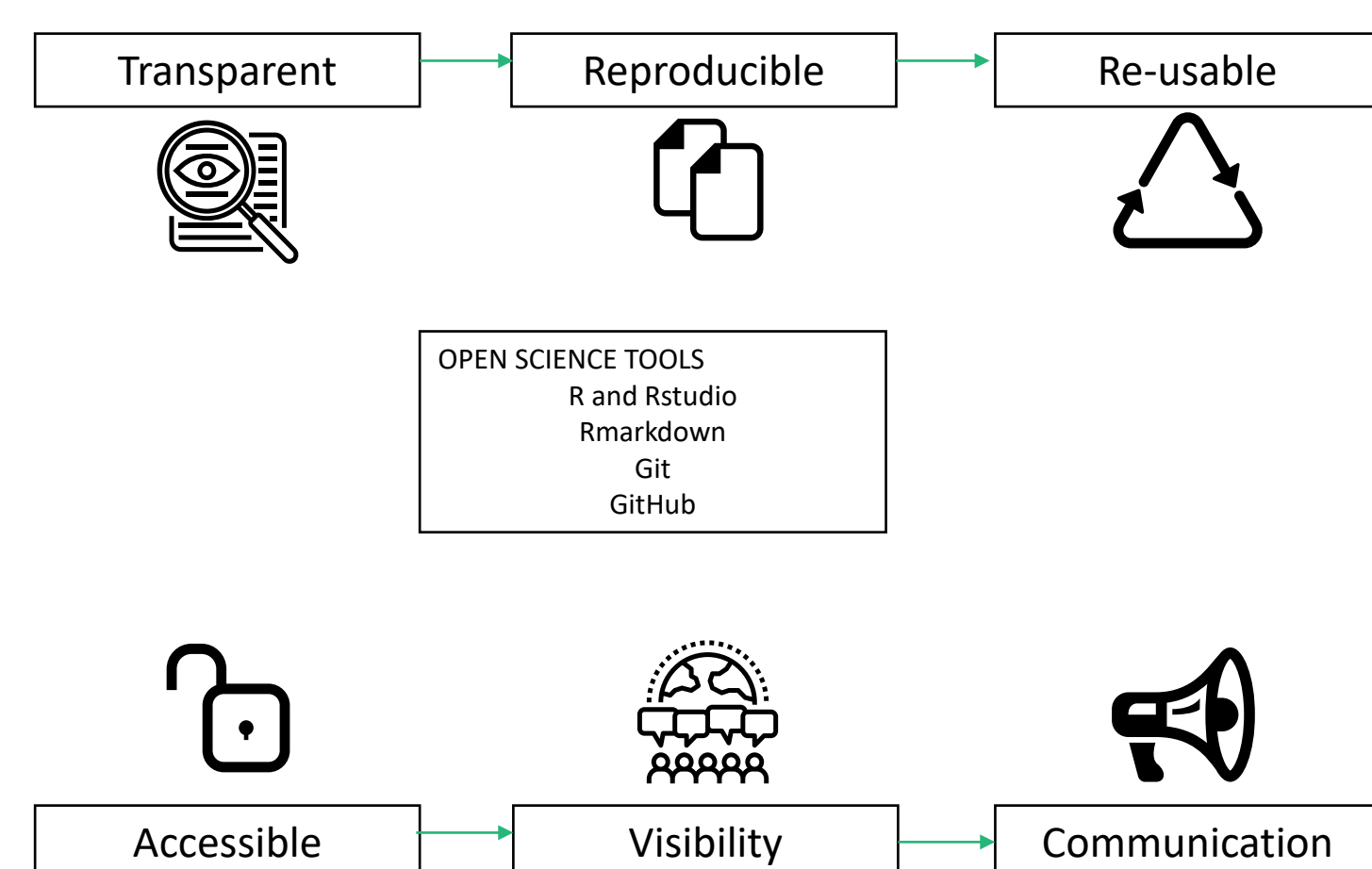
From Lucia Segovia de la Revilla

This work is part of the Micronutrient Action Policy Support (MAPS) project, that aims to produce the best estimate of micronutrient deficiency at sub-national level. INV-002855

Please visit: https://micronutrient.support/

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