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A workflow for impact indicator of invasive alien species: Fabaceae in South African Savannah Biome

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Photo by Stefan Els

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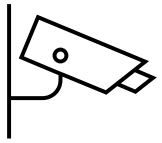
Challenge

The negative impact caused by invasive alien species (IAS) is one of the leading causes of biodiversity loss



Need

Rapid and reliable monitoring information is required to enable appropriate management policies

Objective

Develop a workflow to estimate IAS impacts using indicators that can track impacts over time

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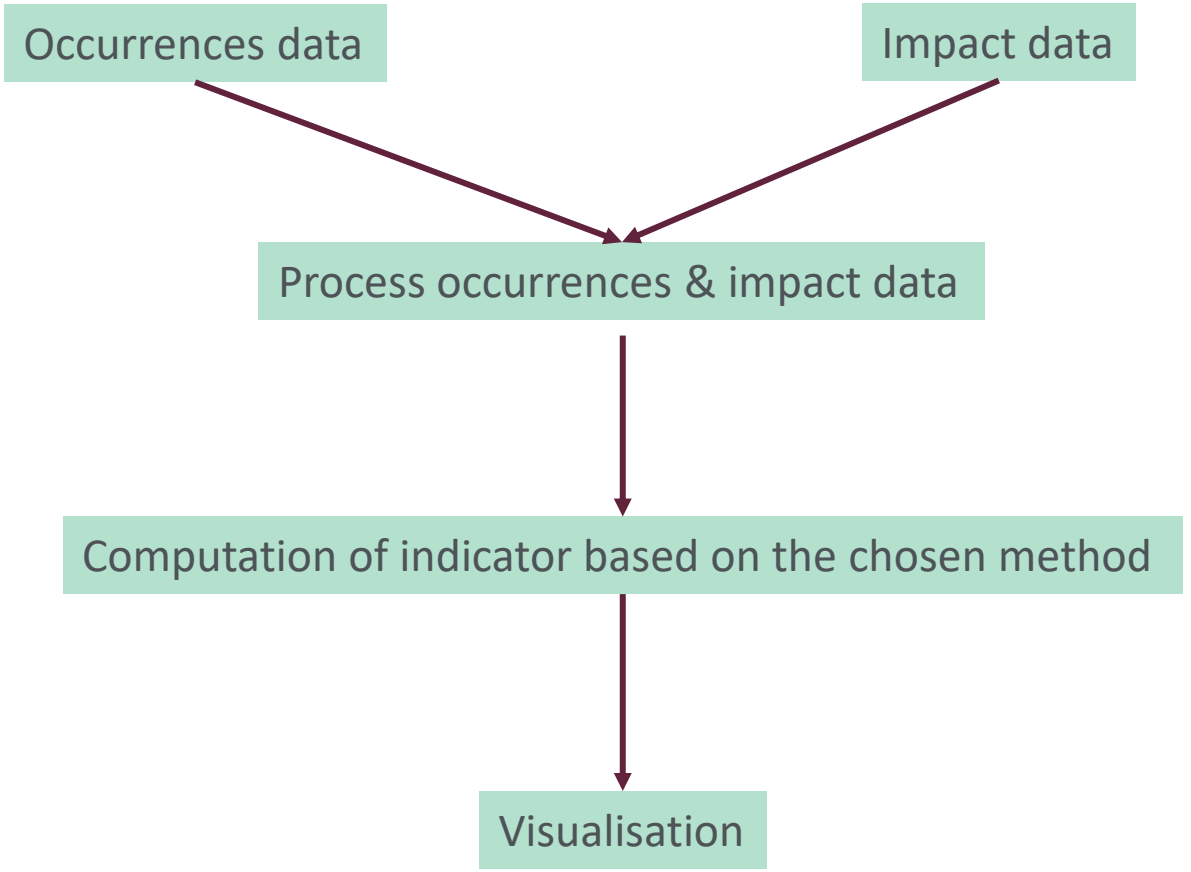
Workflow diagram



An R package to calculate and visualise the impact of invasive alien taxa

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OCCURRENCE DATA:

Global Biodiversity Information Facility (GBIF) occurrence data

GBIF Global Biodiversity Information Facility

SEARCH OCCURRENCES | 3,078,782,893 RESULTS

TABLE GALLERY MAP TAXONOMY METRICS DOWNLOAD

Scientific name	Country or area	Coordinates	Event date	Occurrence s
Tortula muralis Hedw.	Denmark	55.7N, 8.6E	2025 Jan 16	Present
Rubus fruticosus L.	Australia	33.2S, 148.3E	2025 Jan 10	Present
Convolvulus angustissimus subsp. *angustis...*	Australia	35.4S, 149.1E	2025 Jan 08	Present
Phragmites australis (Cav.) Trin. ex Steud.	Denmark	55.6N, 12.2E	2025 Jan 22	Present
Pentanema salicinum (L.) D.Gut.Larr., Santo...	Denmark	55.8N, 12.2E	2025 Jan 25	Present
Pheidole Westwood, 1839	Australia	35.3S, 149.1E	2025 Jan 10	Present
Hypericum perforatum L.	Australia	33.7S, 148.3E	2025 Jan 03	Present
Stigmatium victoriae	Australia	35.4S, 149.0E	2025 Jan 14	Present

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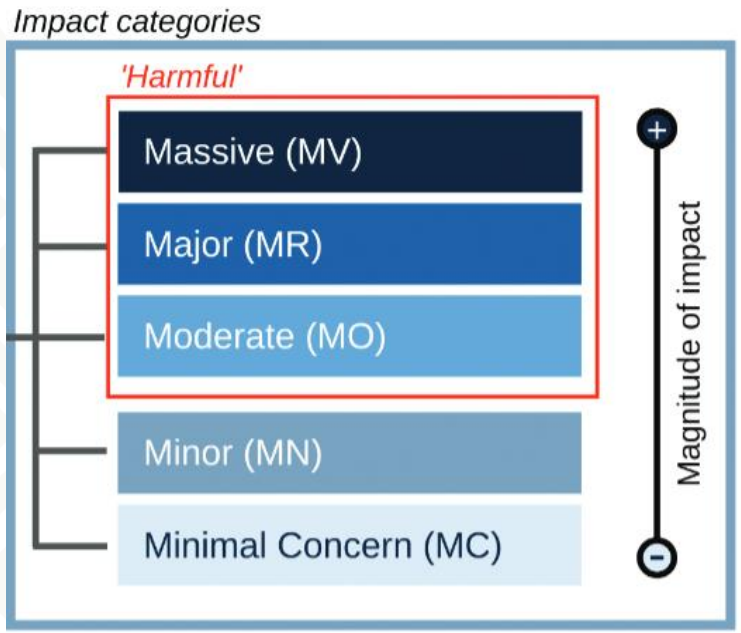
IMPACT DATA

EICAT (Environmental Impact Category of Alien Taxa) impact data



Source

Jansen, C., Kumschick, S. A global impact assessment of Acacia species introduced to South Africa. Biol Invasions 24, 175–187 (2022). https://doi.org/10.1007/s10530-021-02642-0

Examples

```
  head(eicat_acacia,10)
#> # A tibble: 10 × 3
#>    scientific_name   impact_category impact_mechanism
#>    <chr>             <chr>           <chr>
#>  1 Acacia saligna    MC              (1) Competition
#>  2 Acacia saligna    MC              (12) Indirect impacts through interaction …
#>  3 Acacia saligna    MC              (1) Competition
#>  4 Acacia saligna    MC              (1) Competition; (9) Chemical impact on th…
#>  5 Acacia mearnsii   MC              (6) Poisoning/toxicity
#>  6 Acacia longifolia MC              (9) Chemical impact on ecosystems
#>  7 Acacia dealbata   MC              (9) Chemical impact on ecosystems
#>  8 Acacia dealbata   MC              (9) Chemical impact on ecosystems
#>  9 Acacia saligna    MC              (9) Chemical impact on ecosystems
#> 10 Acacia dealbata   MC              (12) Indirect impacts through interaction …
```

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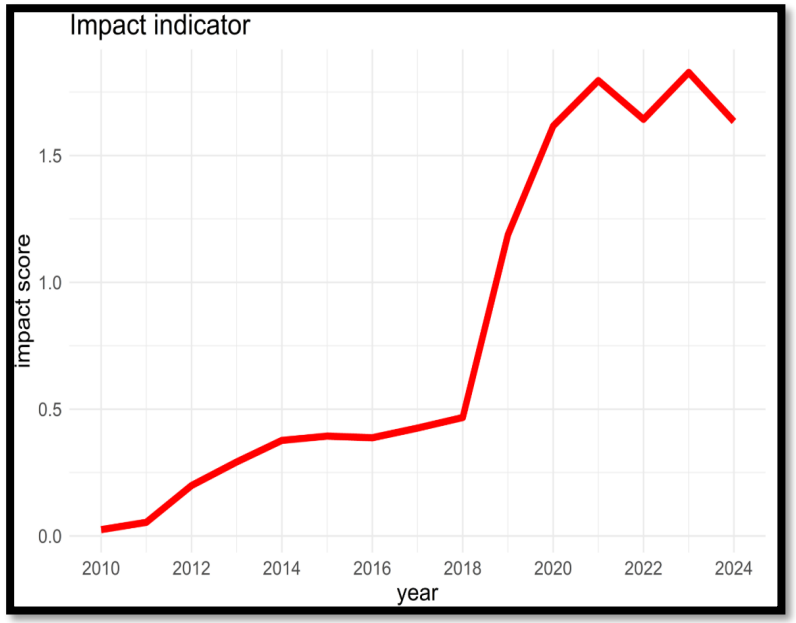
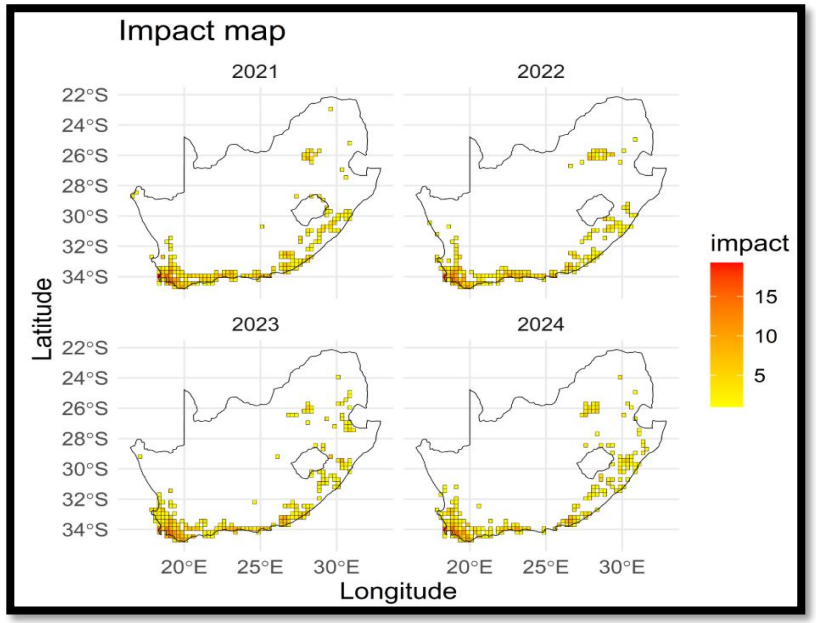
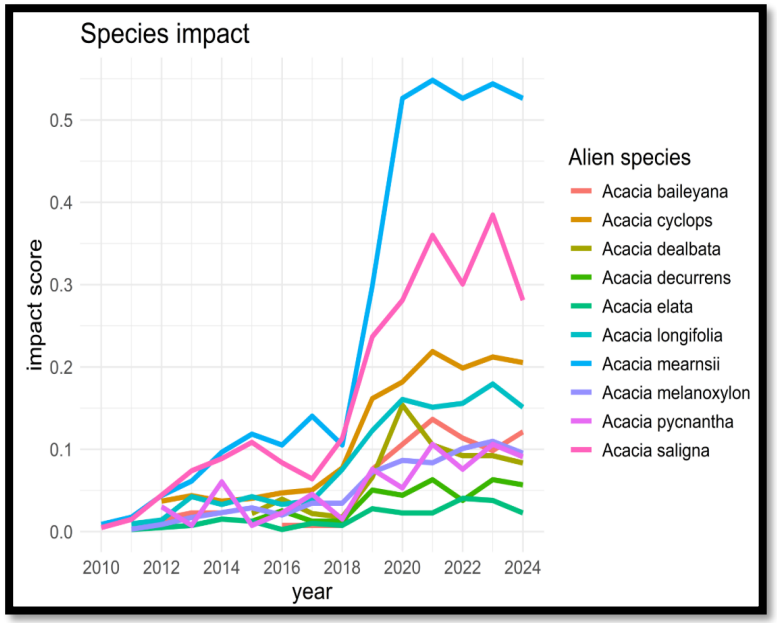
Basic outputs from the *implndicator* package







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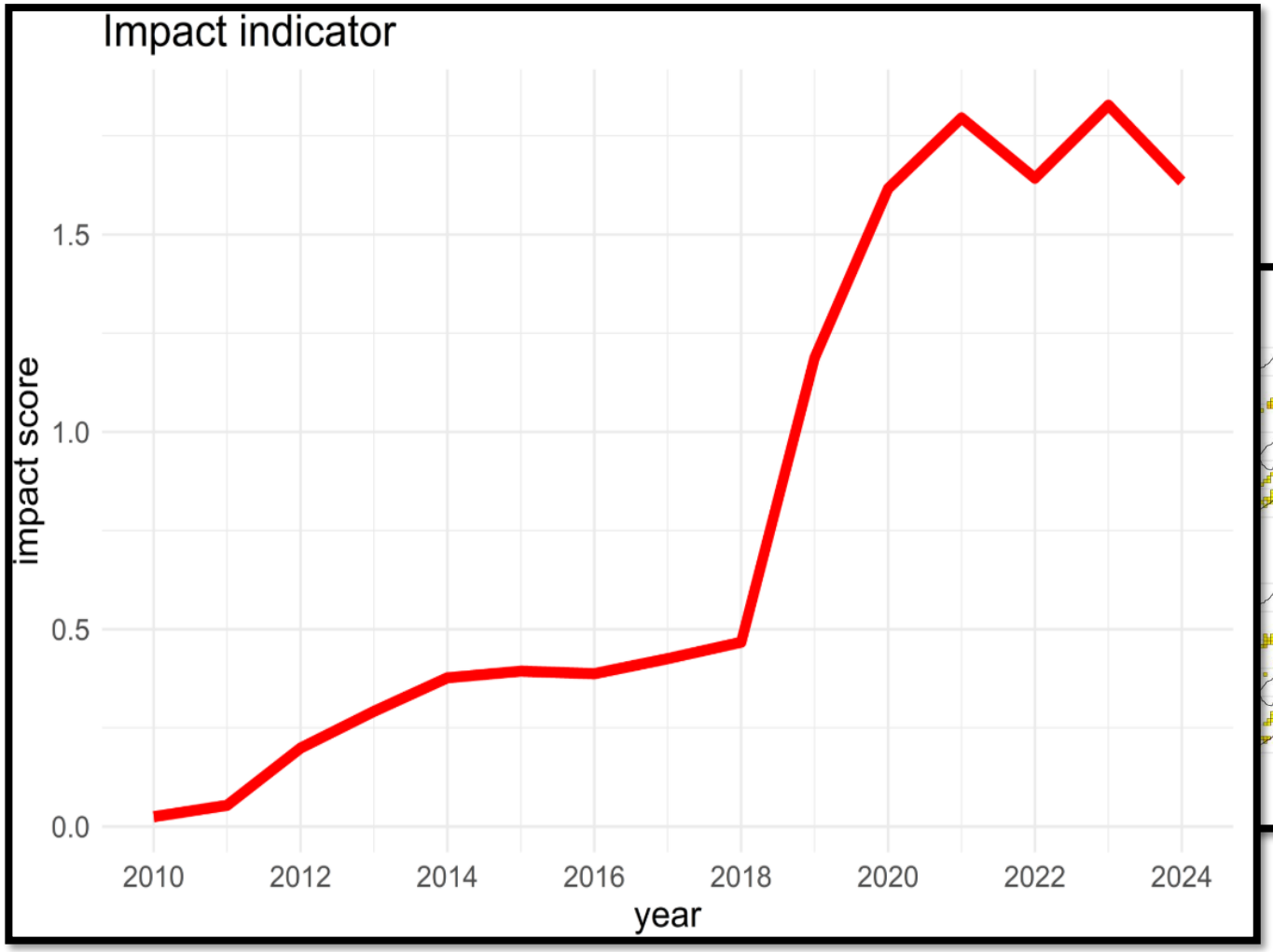

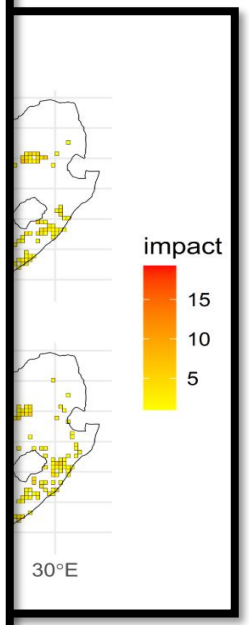

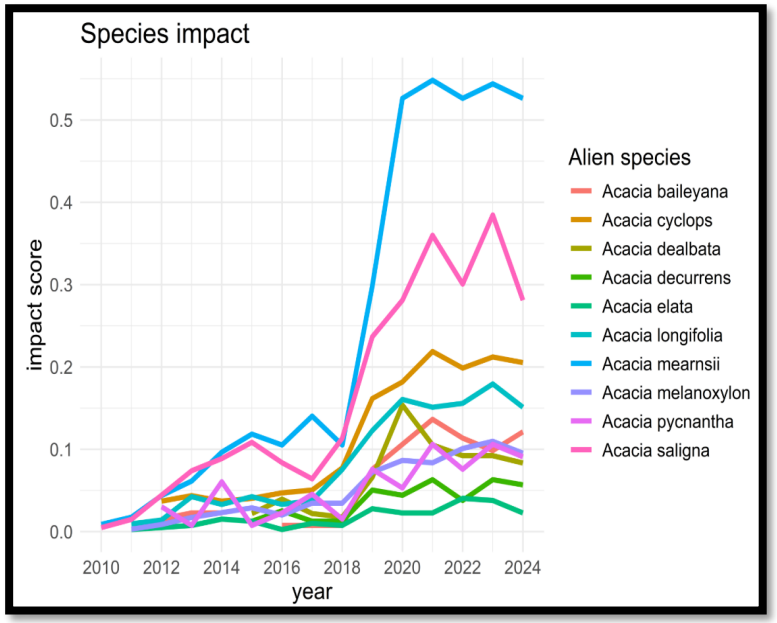

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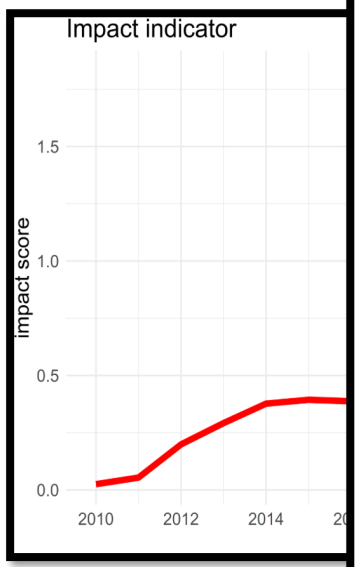

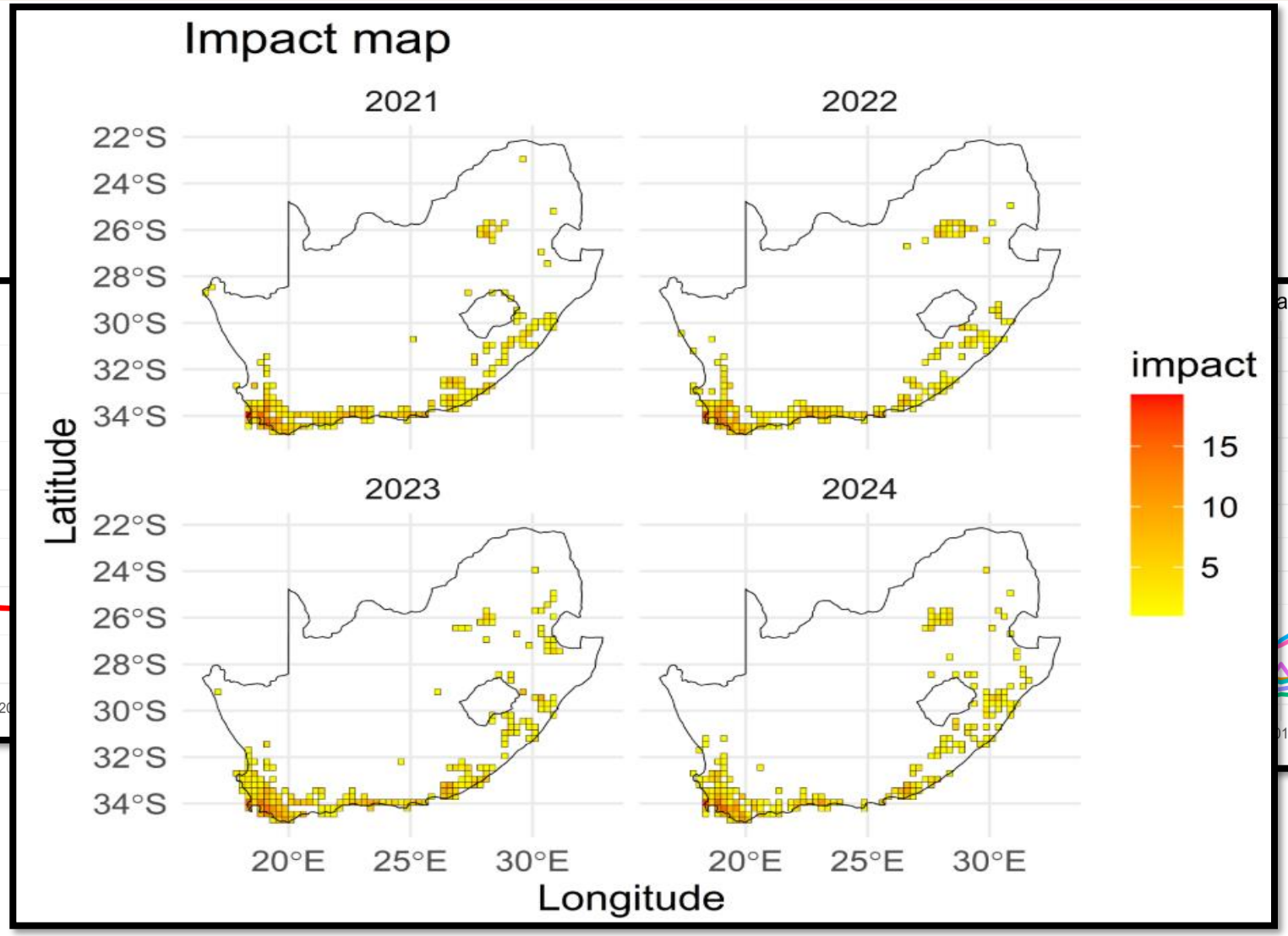

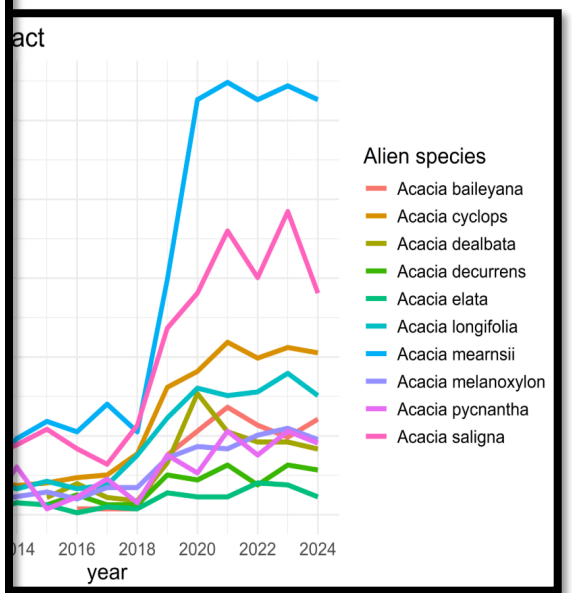

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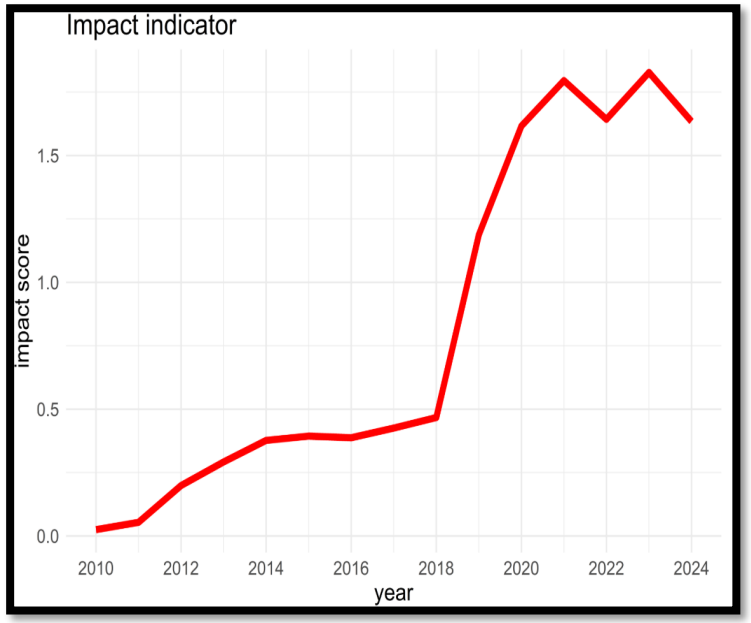

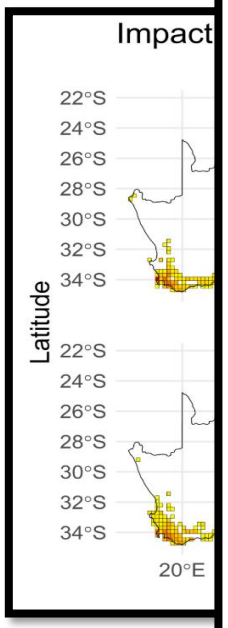

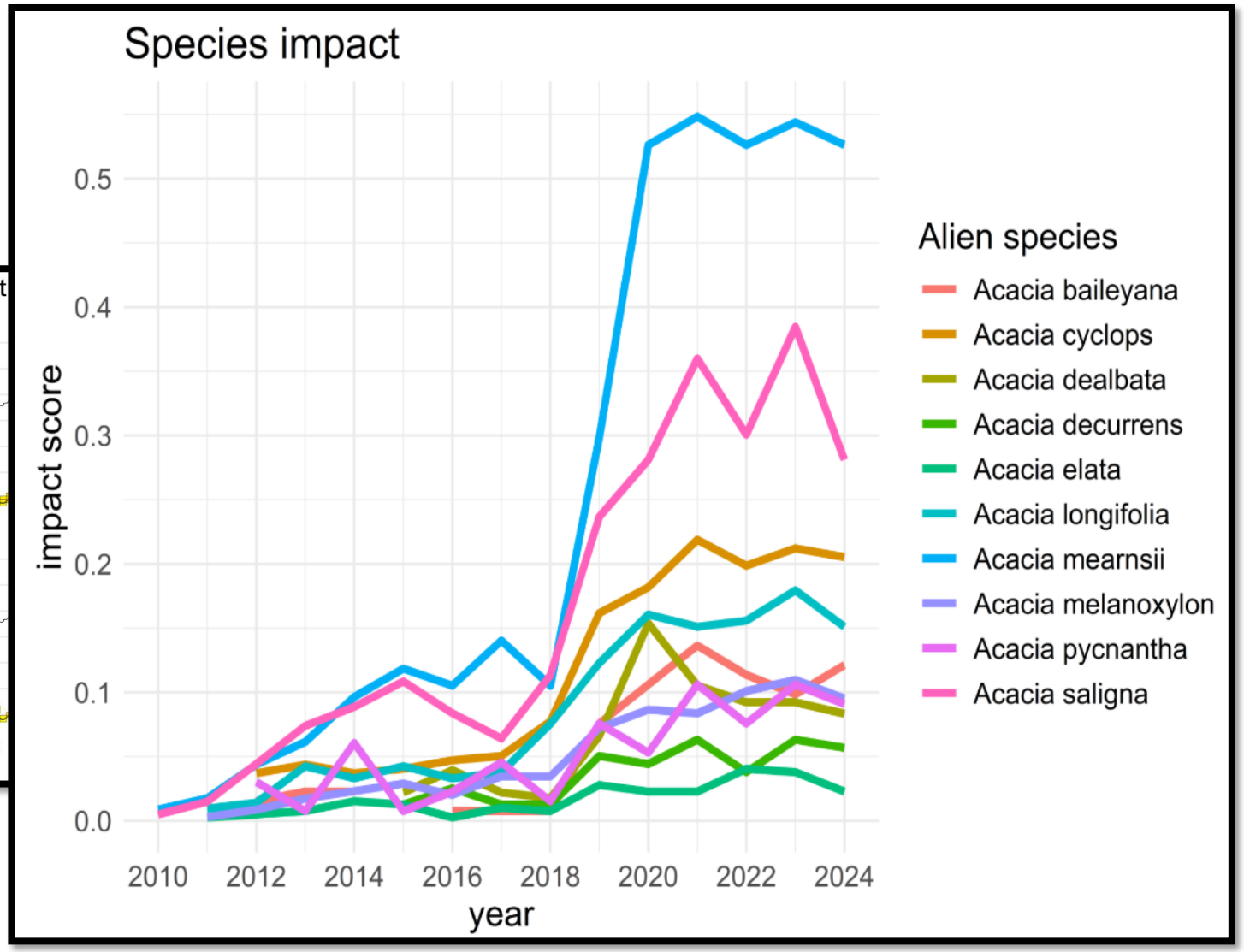

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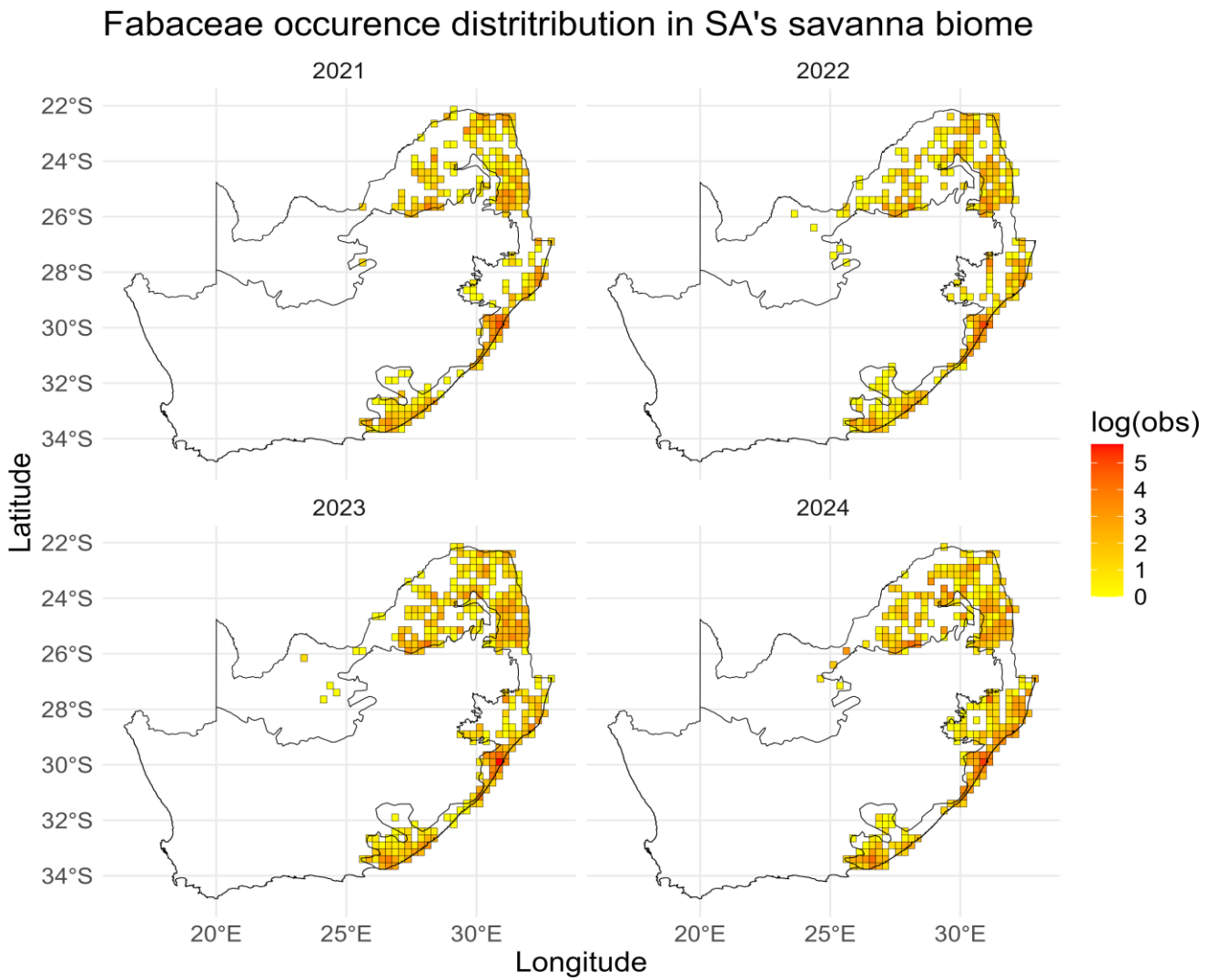
Use case:

Impact indicator of invasive Fabaceae in South African Savanna Biome



Number of occurrences: 12,715
Species: 542
Cells: 434 (Quarter degree)

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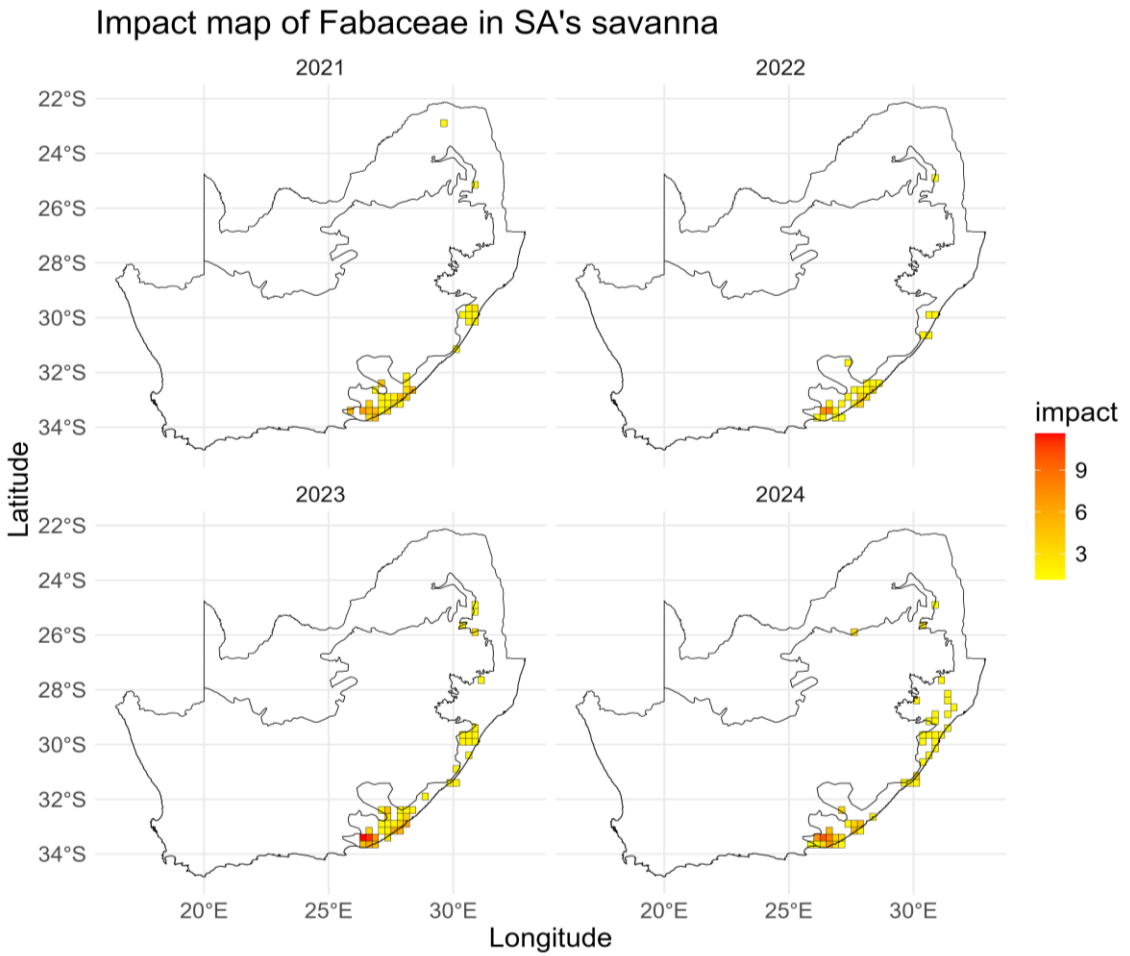
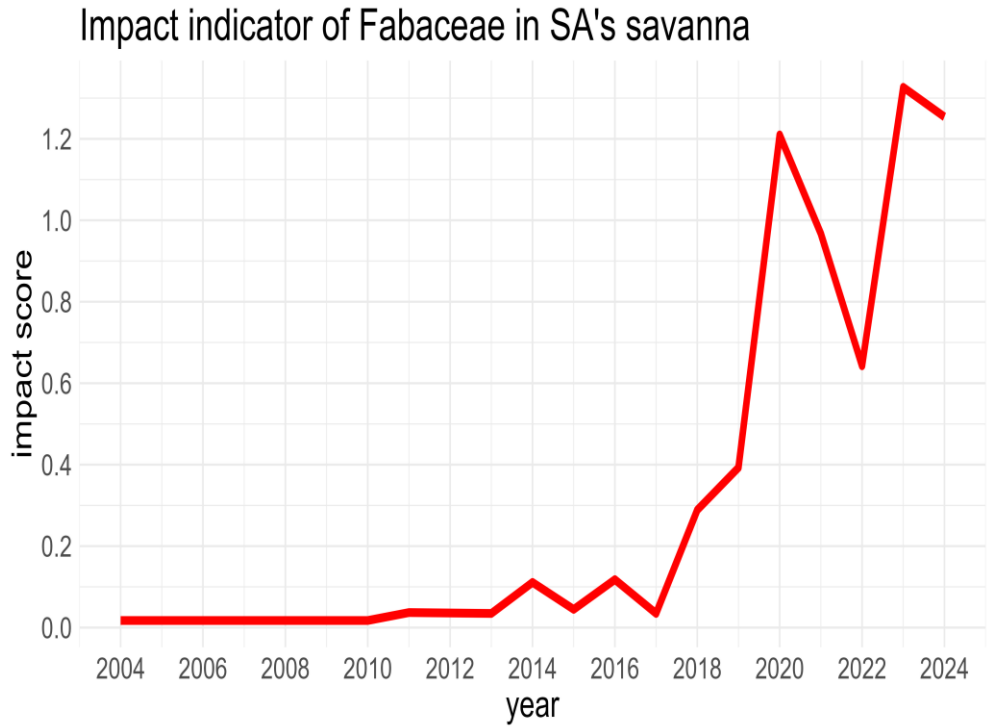
Output of Fabaceae in South African Savanna





HIGHLIGHTS

- There is a data gap in EICAT-assessed alien species in the South African Savanna Biome
- There are ongoing global efforts to assess the impact of IAS using EICAT

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Resources

- Development: https://github.com/b-cubed-eu/impIndicator
- GBIF: https://www.gbif.org/what-is-gbif
- EICAT: https://iucn.org/resources/conservation-tool/environmental-impact-classification-alien-taxa

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Thank you
Enkosi
Dankie

Mukhtar Muhammed Yahaya

Photo by Stefan Els