Background

The collection and dissemination of geographic information by individuals, often non-experts, using web-based tools and technologies

- A powerful form of citizen science

- Increasing recognition of public participation in data collection

- Democratisation of data collection

- Complements traditional data collection

- Addresses large-scale and real-time data needs

Say what?

Volunteered Geographic Information (VGI) → citizen science → participatory GIS → crowdsourced mapping

Defining VGI

Geographic information voluntarily contributed by individuals *Goodchild, 2007*

Key characteristics

- Voluntary contributions: driven by interest, passion, or community need

- Geographic focus: data inherently linked to location

- Diverse data types: observations, photos, maps, environmental readings

- Utilises readily available technology (e.g., smartphones, web platforms)

Benefits

Enhanced data collection

Increased spatial and temporal coverage

Public engagement & education

Addresses data gaps

Real-time data collection

Cost-effective scaling

GPS integration

Multimedia data capture

Automatic data validation ?

Limitations

Data quality and reliability

Spatial heterogeneity

Digital & cultural divide

Ethical considerations

The digital divide

Benefits of online surveys for VGI

– *Wide reach, efficiency, automated data collection, and ease of participation for those with access*

The digital divide limitation

– *Not everyone has access to a smartphone, reliable internet, or the digital literacy required to participate in online VGI initiatives*

– *This can lead to significant biases in data representation, excluding rural, elderly, or low-income populations*

Considerations

Data validation and

quality control

Platform design

Community building

Examples

- Disaster response: mapping damage and needs after natural disasters (e.g., OpenStreetMap in Haiti earthquake)

- Biodiversity mapping: global initiatives like eBird and iNaturalist contributing massive datasets for ecological research

- Great South African examples

iNaturalist

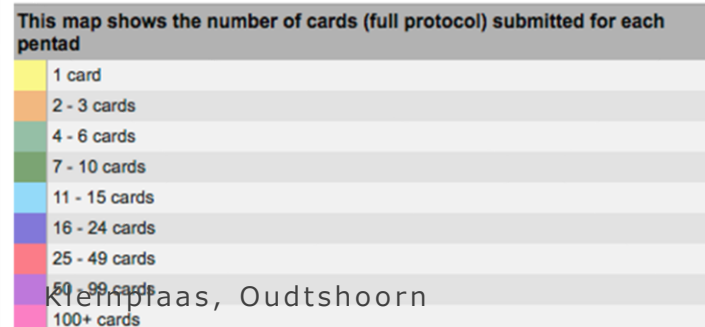
How It Works

Record your observations — Share with fellow naturalists — Discuss your findings

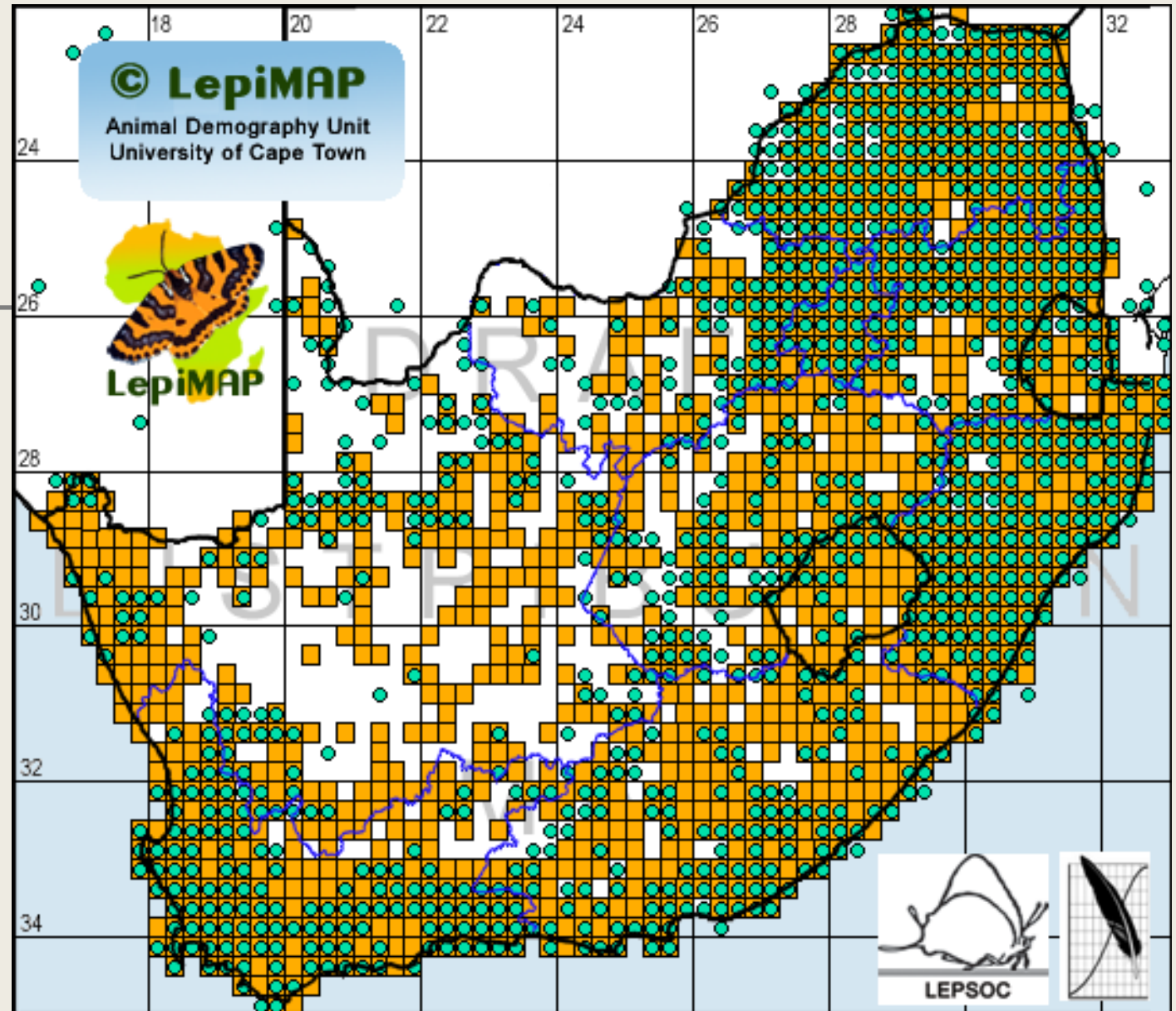# South African Bird Atlas Project 2
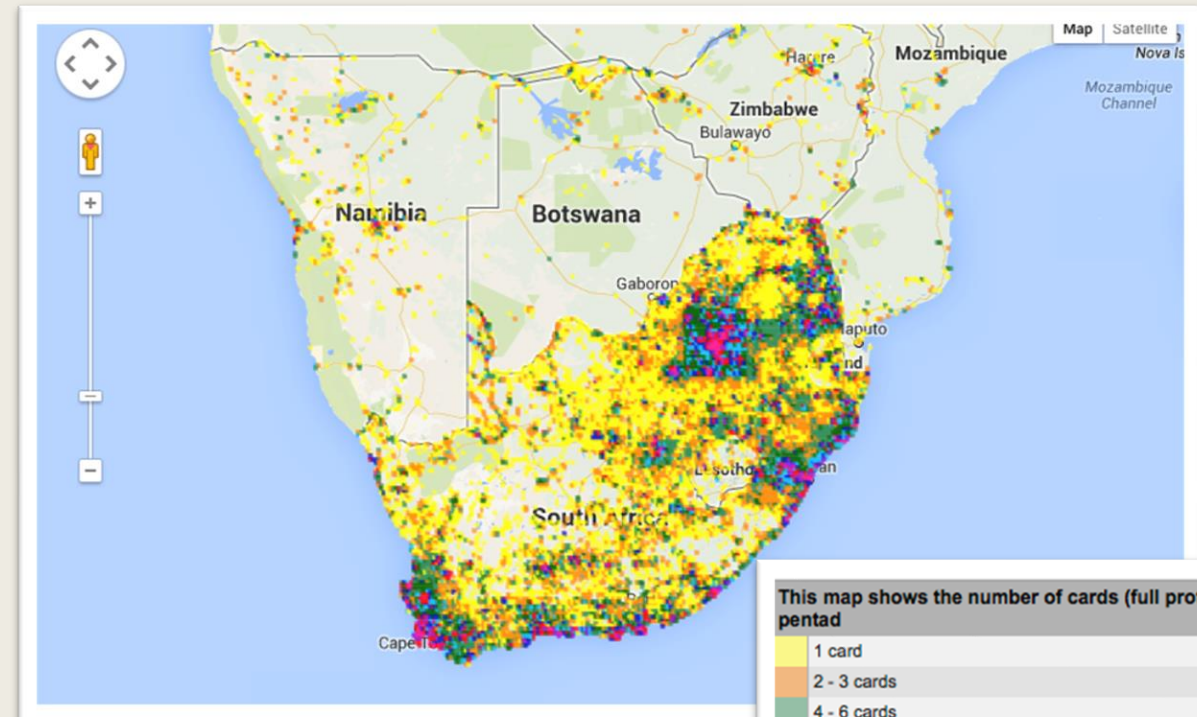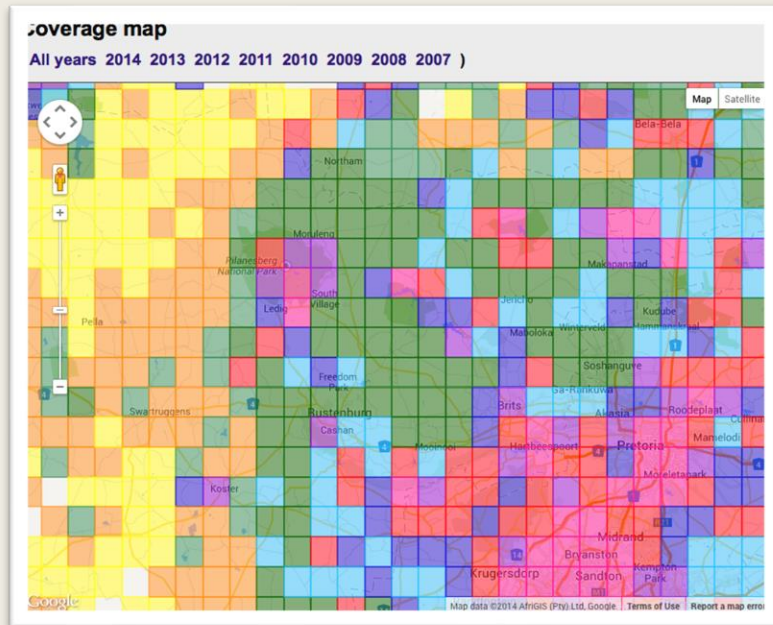
http://sabap2.birdmap.africa/

Coverage map

All years 2014 2013 2012 2011 2010 2009 2008 2007)

This map shows the number of cards (full protocol) submitted for each pentad

1 card
2 - 3 cards
4 - 6 cards
7 - 10 cards
11 - 15 cards
16 - 24 cards
25 - 49 cards
50 - 99 cards
Kleinplaas, Oudtshoorn
100+ cards

LepiMAP

Kleinplaas, Oudtshoorn

VGI tools

Advantages

- Rapid deployment and scaling

- Anonymity can encourage participation

Disadvantages

- Excludes those without internet or digital literacy

- May not capture nuanced, local knowledge

Kleinplaas, Oudtshoorn

VGI and helicopter (parachute) science

An unfortunate series of events

Smit et al. 2025

Opportunities to circumvent helicopter science

Fostering collaborative research (participatory approaches)

Increased local capacity and expertise (co-creation of knowledge)

Alignment with local needs (ethical mediation)

Mutual benefits

Ethical mediation

Navigating cultural sensibilities

The concept of "ethical mediation"

Informed consent

Positionality

Hiari & Razem 2025

How does this affect VGI?

Develop consent processes that are culturally appropriate and allow for flexibility

Focus on genuine respect for local values rather than just institutional protection
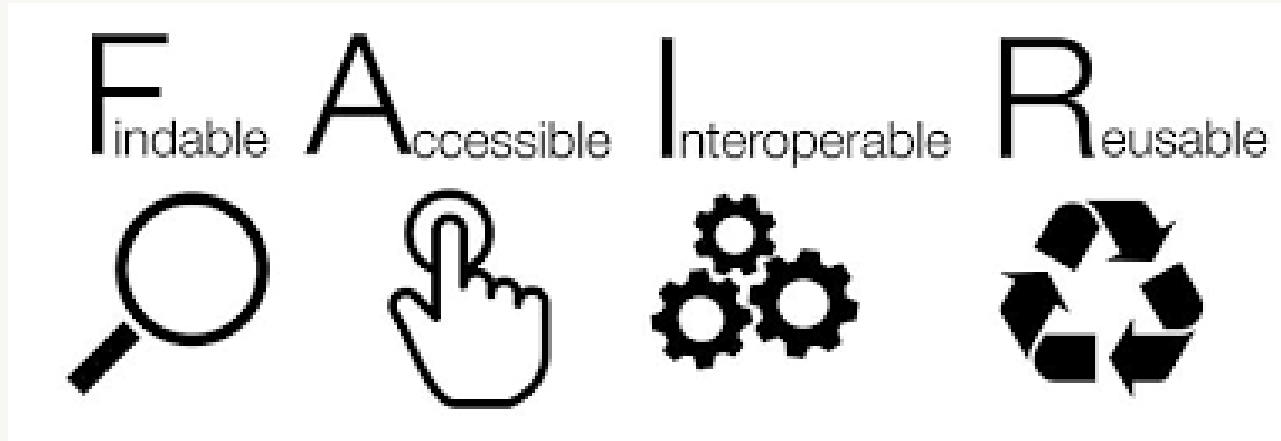
Considerations

TECHNICAL

Data quality and accuracy

Metadata documentation

Interoperability standards

Privacy and security

Long-term data preservation

SOCIAL

Community consent processes

Cultural protocols

Benefit-sharing agreements

Capacity building programs

Ongoing relationship maintenance

Link to FAIR data use principles

Open data access and platforms

Importance of open access for VGI

Facilitates broader scientific collaboration and interdisciplinary research

Examples of open access VGI platforms

Maximizes the reach and impact of VGI data

Democratises access to geographic data

Ensures transparency and accountability

Global Biodiversity Information Facility (GBIF), OpenStreetMap (data and tools)

challenges: ensuring data quality and long-term stewardship

What to do?

Strategies to mitigate limitations

– *Combining online methods with offline data collection (e.g., paper forms, community workshops)*

– *Establishing community hubs with shared devices and Internet access*

– *Partnering with local organizations to provide support and training*

– *Combine digital and analogue methods, provide community training, and ensure inclusive engagement strategies*

Key takeaways

01
Geographic information is powerful but must be used ethically and inclusively

02
Stakeholder engagement prevents "helicopter science" and improves research quality

03
Digital divides require careful consideration in research design

04
Cultural mediation is essential for successful international research

Looking forward

01

VGI offers immense potential to revolutionize scientific data collection and analysis

02

Requires a continued focus on data quality, ethical engagement, and inclusivity

03

By fostering genuine partnerships and addressing the digital divide, VGI can play a crucial role in shaping more equitable, collaborative, and impactful scientific research

Thank you!