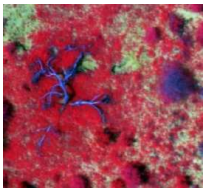
Drone technology accurately maps rangeland condition of dry savannahs

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Nam.Tip

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Global changes ➡ loss of biodiversity

- Drylands
  - Structurally and functionally diverse
  - Compromised by 'unwanted' shifts

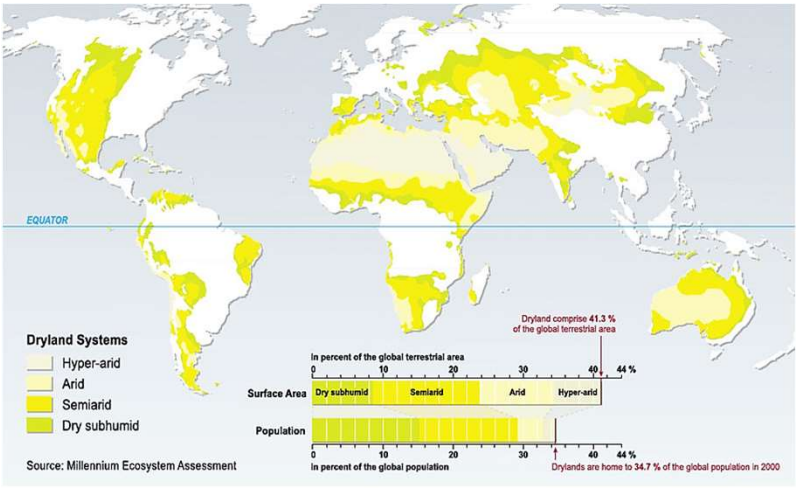

„Healthy" savanna


„Degraded" savanna

2

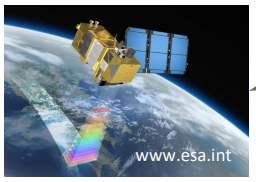
Global changes ➡ loss of biodiversity

- Drylands
  - Structurally and functionally diverse
  - Compromised by 'unwanted' shifts



Monitoring biodiversity

- Cost-effective monitoring
  - Easy with repeatable results
  - Multiple spatial & temporal scales
- Drone technology
  - Complementary tool in ecological research.
  - Limited application in arid savannas



Global

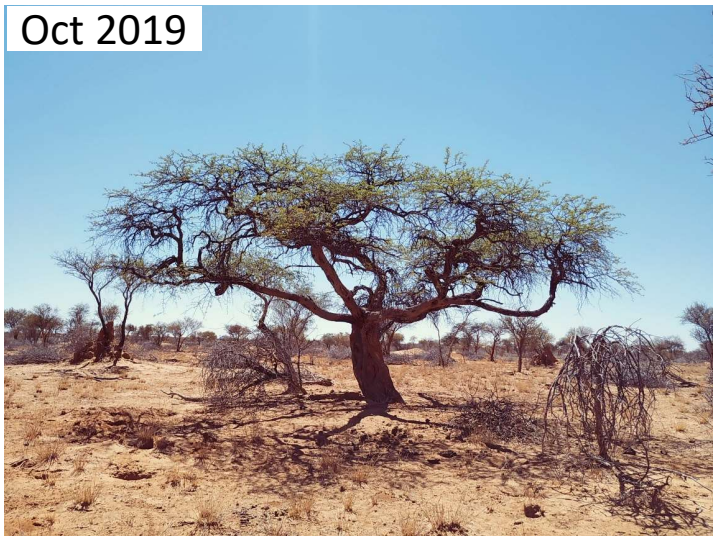
Intermediate

Local

Typical dryland savannah

5

Dry season



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Onset of growing season

7

Peak growing season

8

End of growing season

9

- **Aim:** validate drone-based mapping of rangeland condition with field data.

- **Hypotheses**

1. Significant positive relationship between drone-estimated and field **land cover**.
2. Significant positive relationship between **forage biomass** predicted from drone imagery and measured in field.

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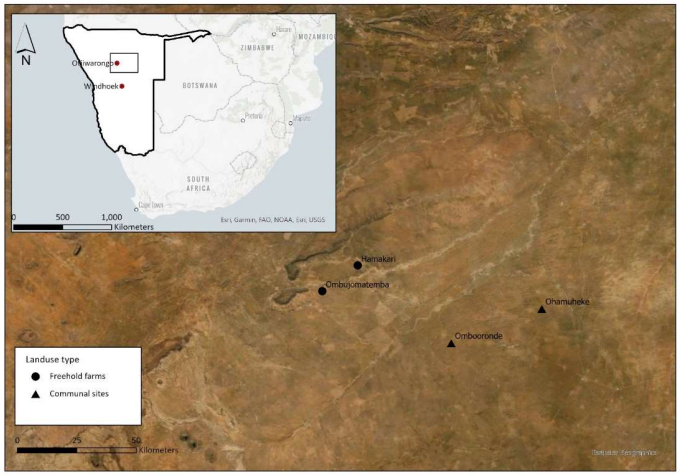
Where we work



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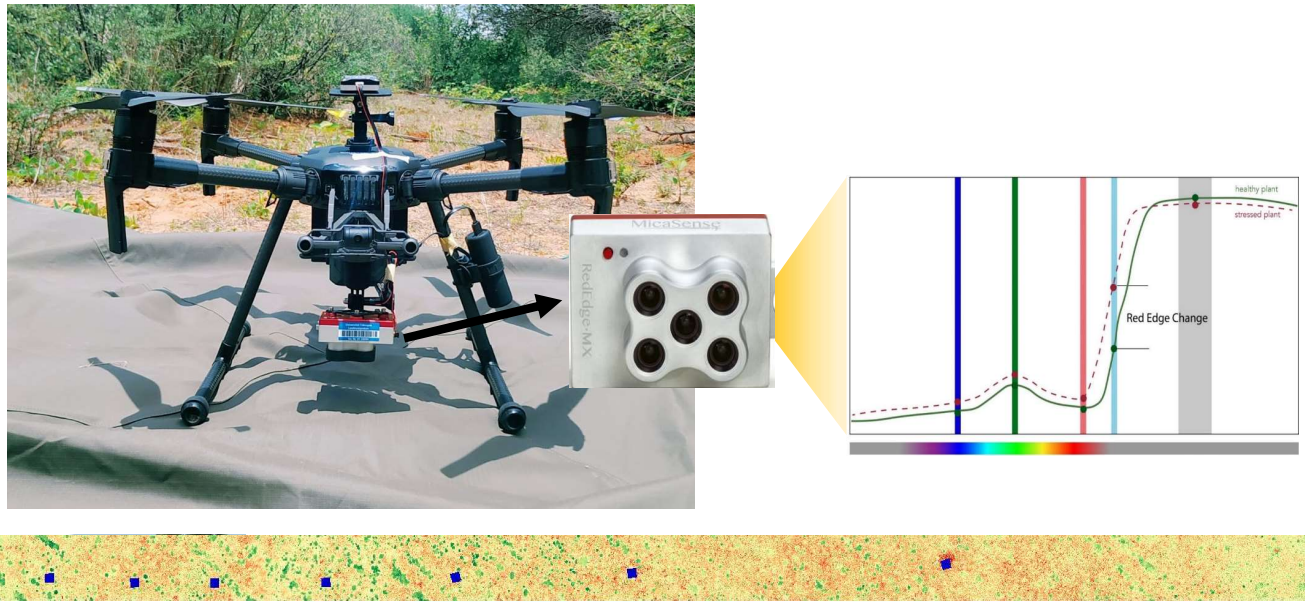
Drone multispectral imagery



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Field data (= ground-truthing)

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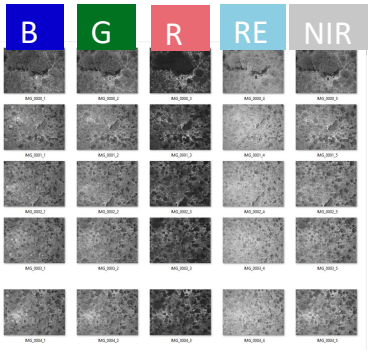
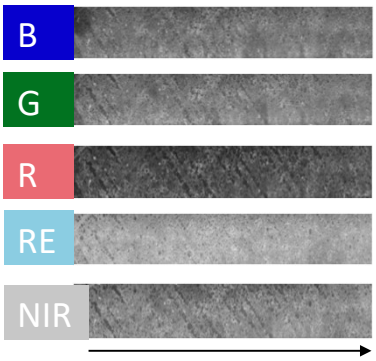
Drone imagery processing

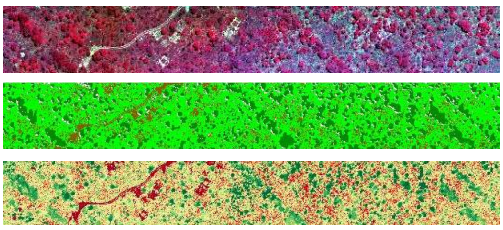
Raw imagery



Reflectance maps



Land cover and vegetation index maps



Transect

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What we found

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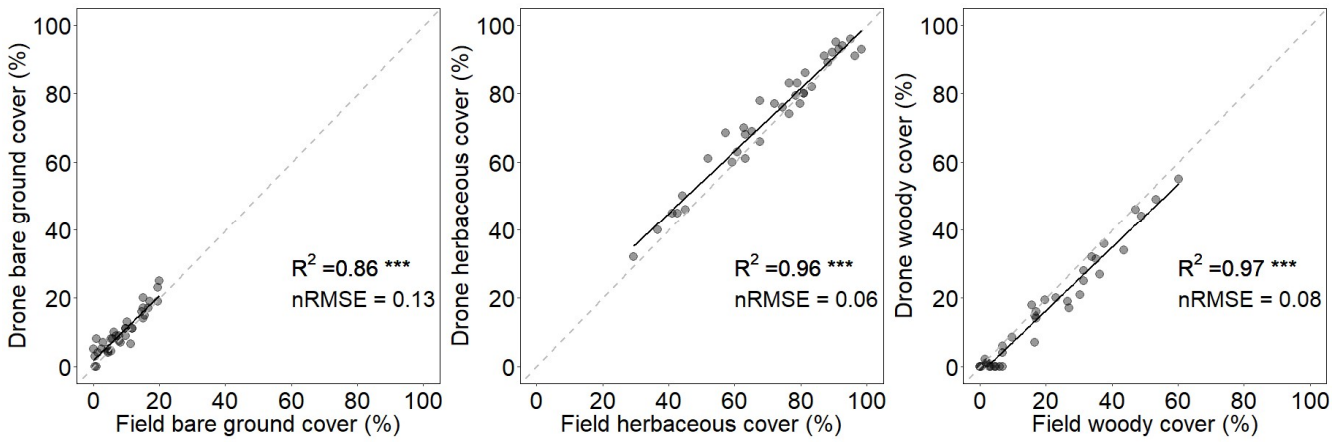
Strong agreement between drone-estimated and field land cover



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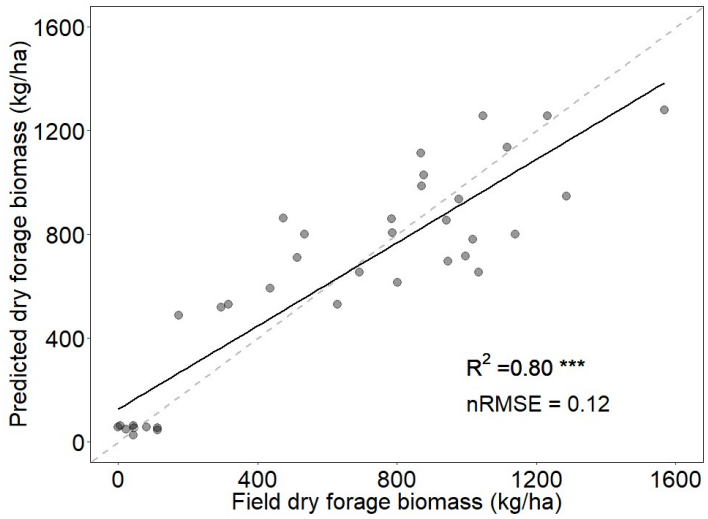
Strong agreement between drone-estimated and field forage biomass



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Take home message

1. **Consensus** between drone and field estimates of land cover & forage biomass
2. Drone-based prediction models can be used for **landscape-level** monitoring
3. Improve climate-adapted rangeland management and ecological research


Photo: N. Hamunyela

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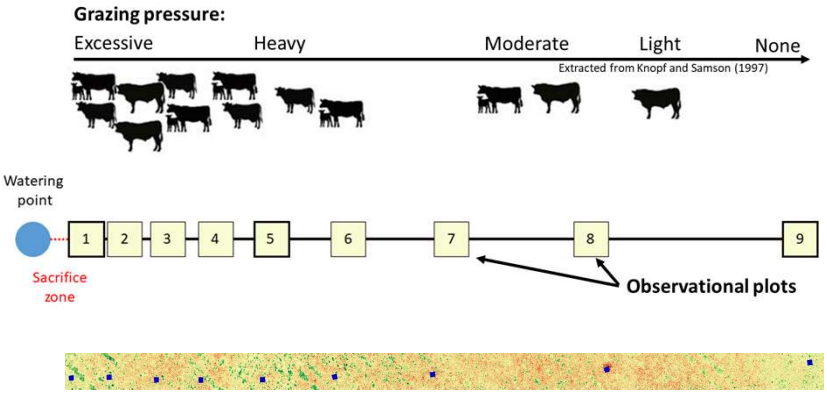
Outlook: Next chapter

- Drone-based indicators of land degradation: a space-for-time approach



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Outlook: Collaboration

- Upscale **forage quality and quantity** from field hyperspectral data to drone imagery for landscape monitoring

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Acknowledgements

- My Supervisors
  - Prof. Tielbörger and Prof. Knox
- Assistance with data collection
  - U. Kapi, J. Amutenya, M. Shilongo, A. Sem, and S. Iyambo

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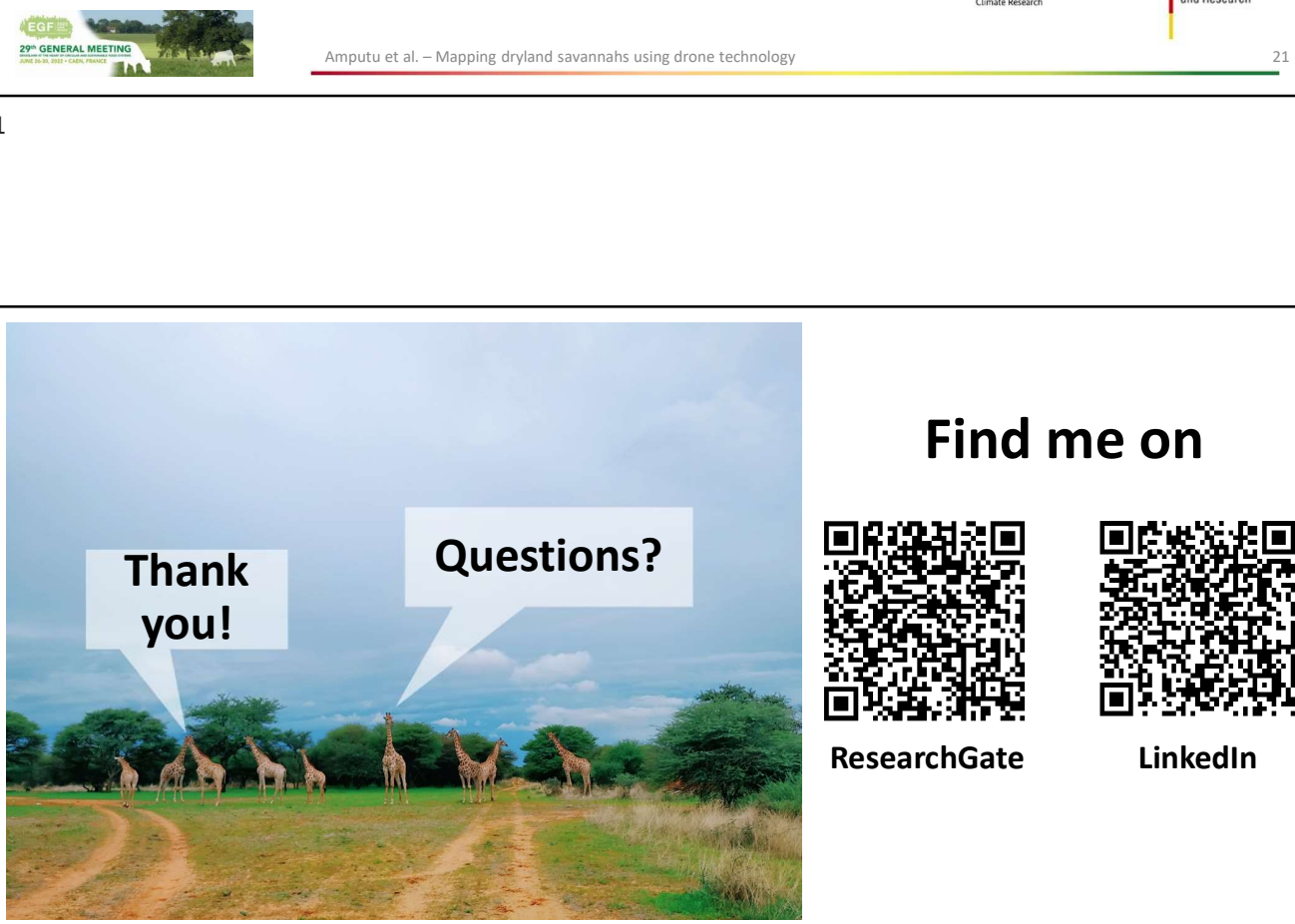

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