Spatio-temporal transferability of drone models to predict forage supply in drier rangelands

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Fig. 1. Drone mapping of a dryland savannah

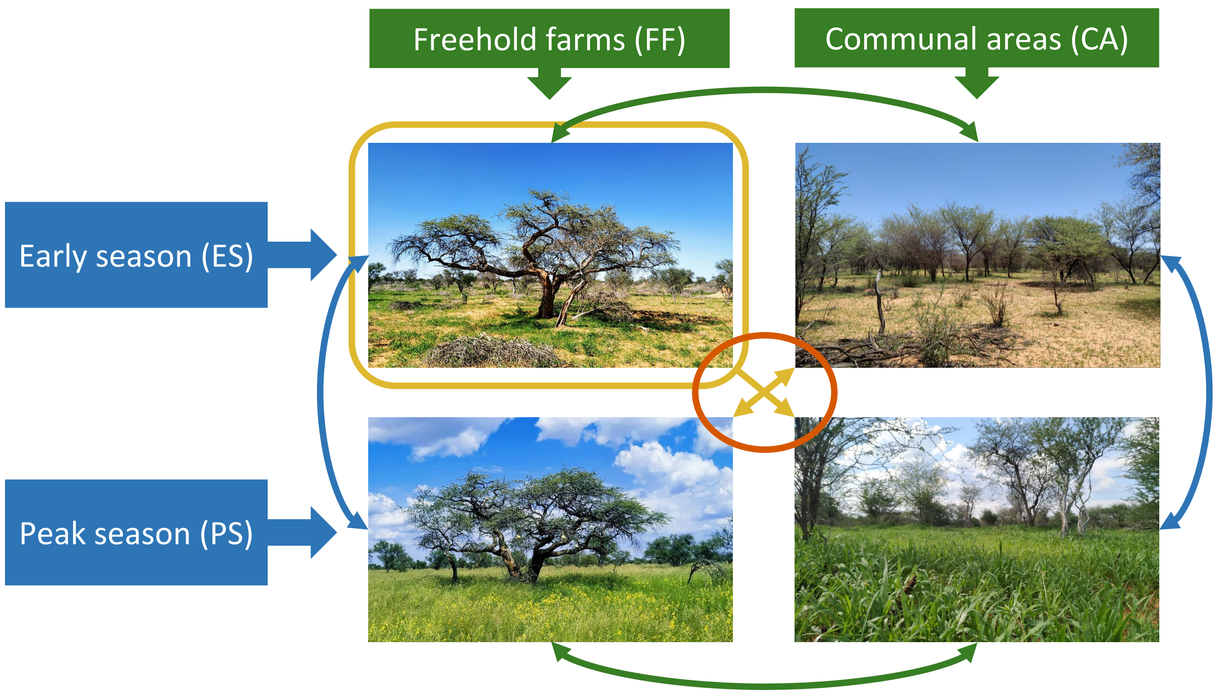
1. Background

- Forage supply in drylands is patchy and limited in both space and time
- **Drone mapping** → timely and accurate forage resource status (Fig. 1)
- But **calibrating drone models** requires field data (costly) that captures system heterogeneity → case-specific models
- **Gap** → transferability of drone prediction models is rarely tested

Research question

How do **land use** and **time of growing season** affect the transfer of drone models for predicting available forage supply in semi-arid rangelands?

2. How we did



What we predict:
1. Herbaceous biomass
2. Land cover

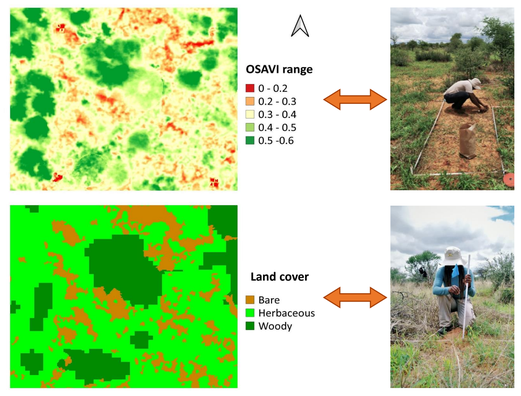


Fig. 2. Drone vs. field data

3. What we found

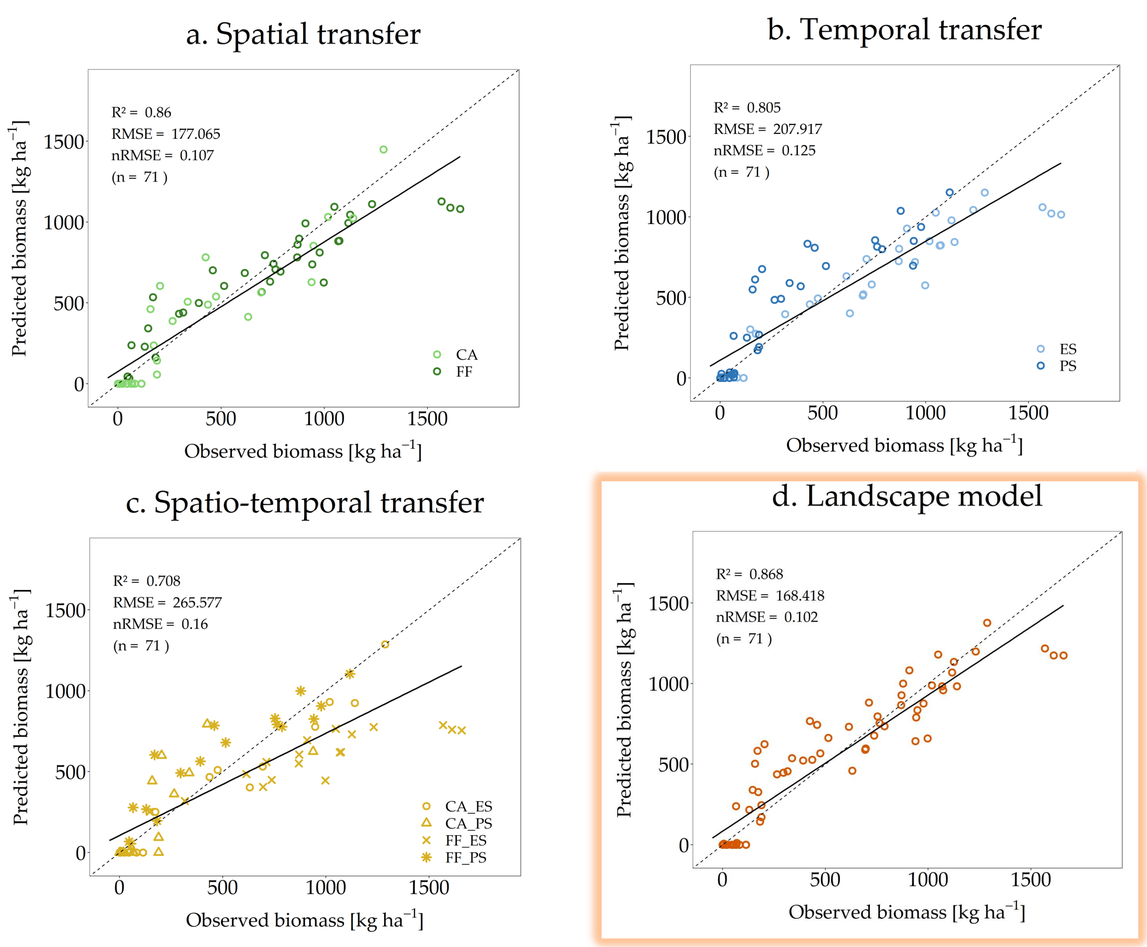


Fig. 3. Transferability when predicting herbaceous biomass

Table 1. Transferability when predicting land cover

Model type	Model transfer	Overall accuracy (%)
1. Spatial	FF to CA	88.9 (± 9.047)
	CA to FF	82.5 (± 9.033)
2. Temporal	ES to PS	80.2 (± 9.470)
	PS to ES	88.0 (± 9.078)
3. Spatio-temporal	FF-ES to rest	90.4 (± 6.087)
	CA-ES to rest	93.9 (± 2.338)
	FF-PS to rest	91.1 (± 6.308)
	CA-PS to rest	91.7 (± 6.419)
4. Landscape	To all scenes	91.7 (± 4.659)

Take home message:

Landscape model yields **robust** & **generalizable** predictions of forage supply across the rangeland system

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