

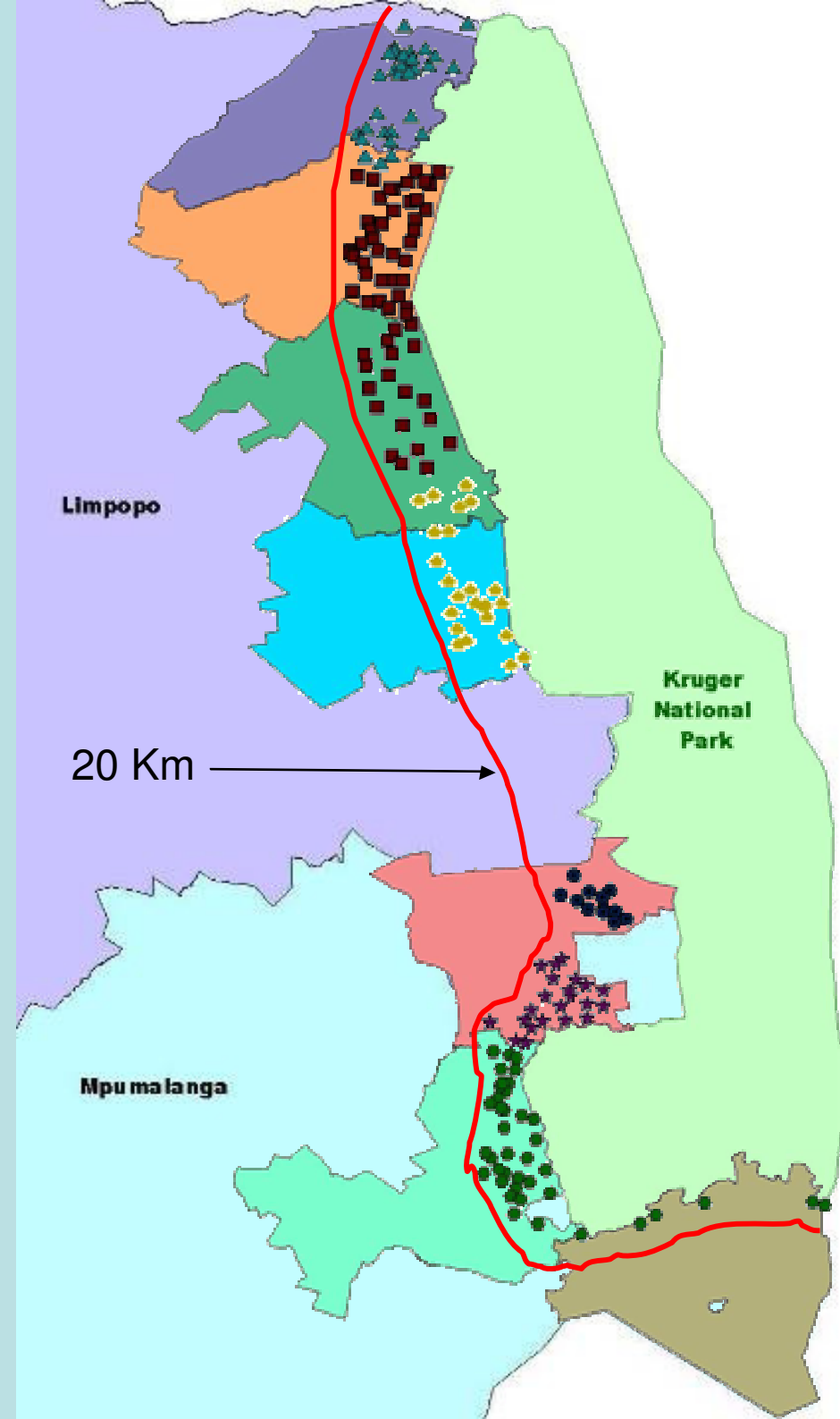
Could fuelwood harvesting be sustainable?

Tony Swemmer

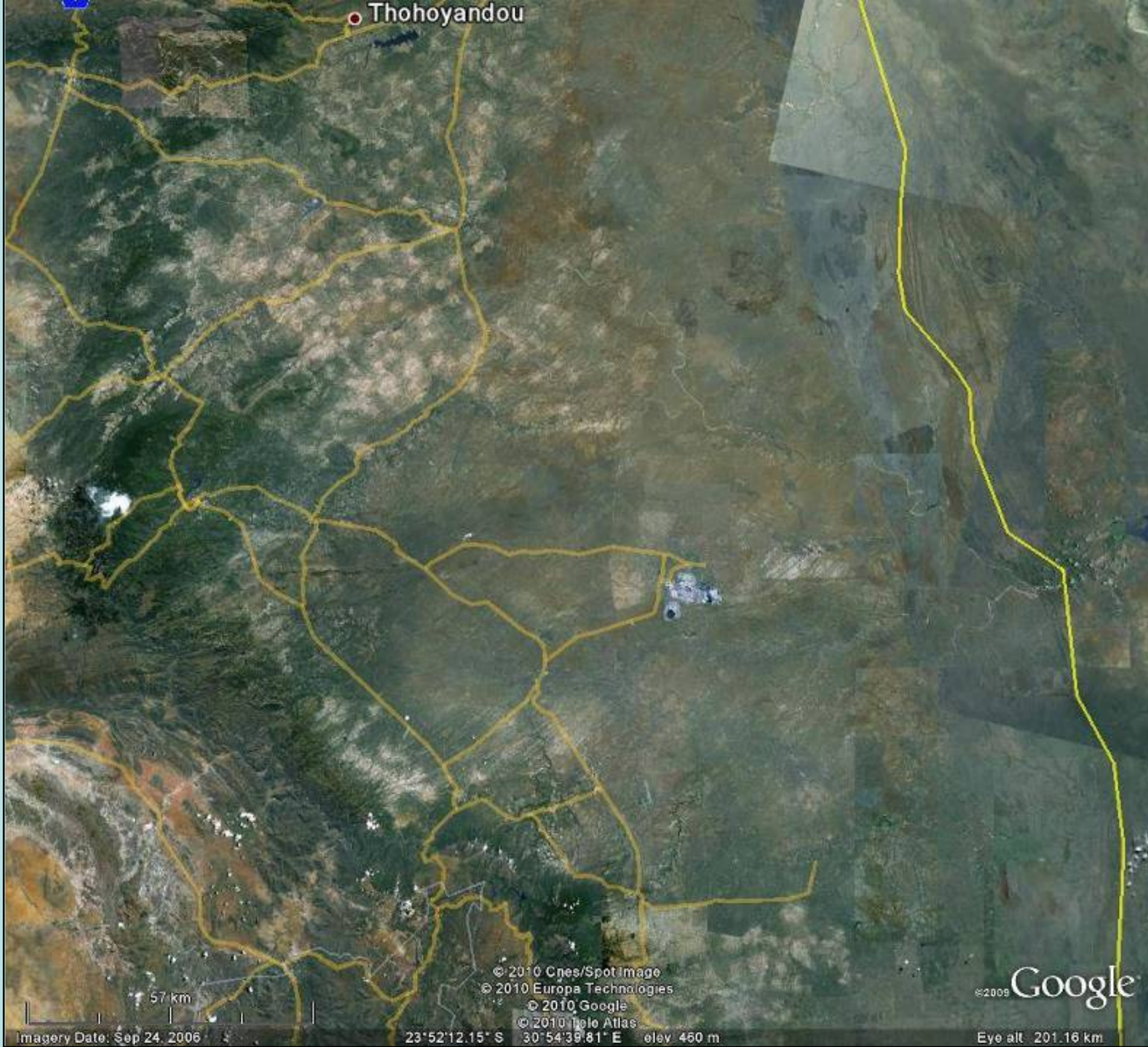


Background

- Fuelwood
 - Widely harvested
 - Significant contribution to rural livelihood
- Declining supply = pressure on KNP



Thohoyandou



57 km

Imagery Date: Sep 24, 2006

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23°52'12.15" S 30°54'39.81" E elev 460 m

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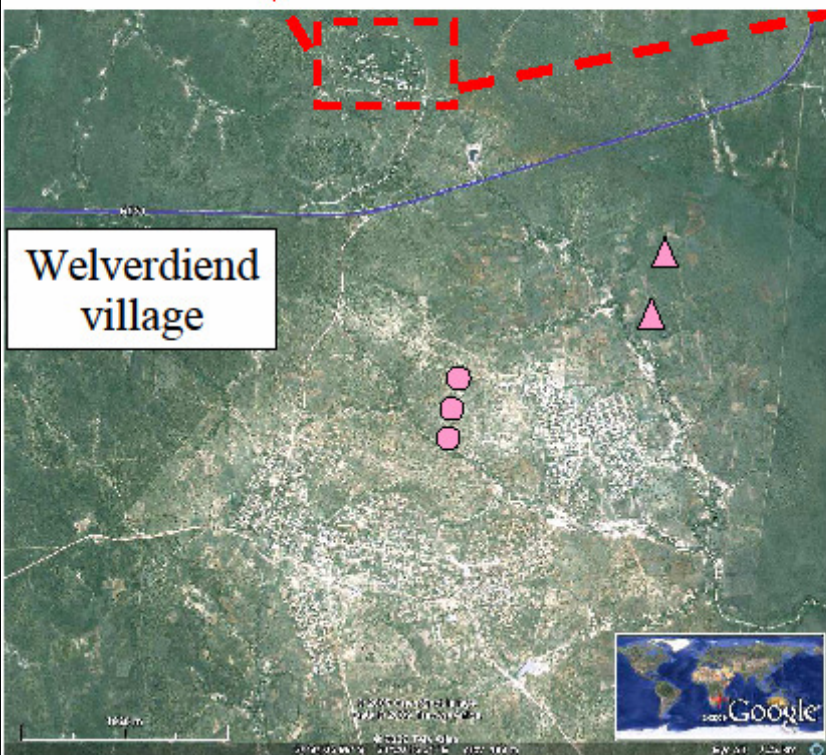
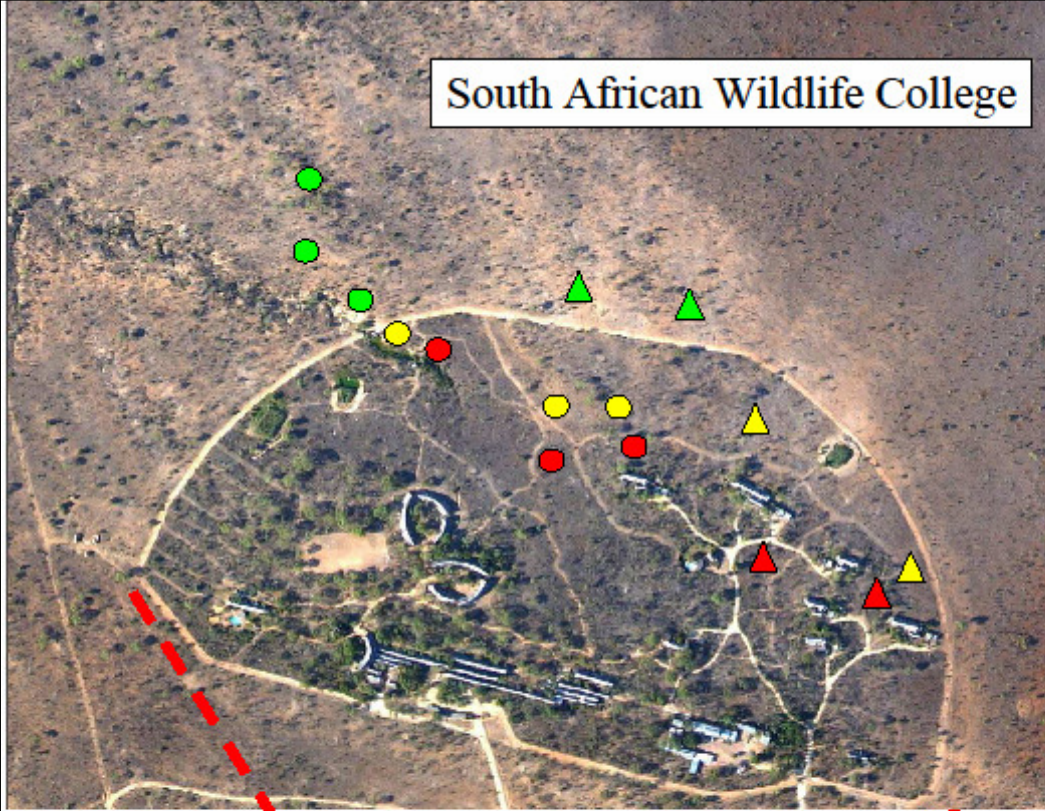
Eye alt 201.16 km

Bushbuckridge area

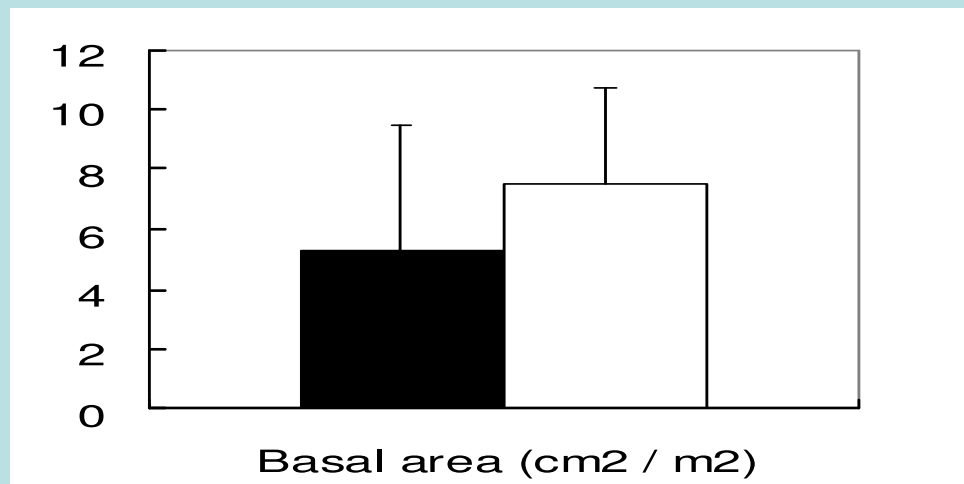
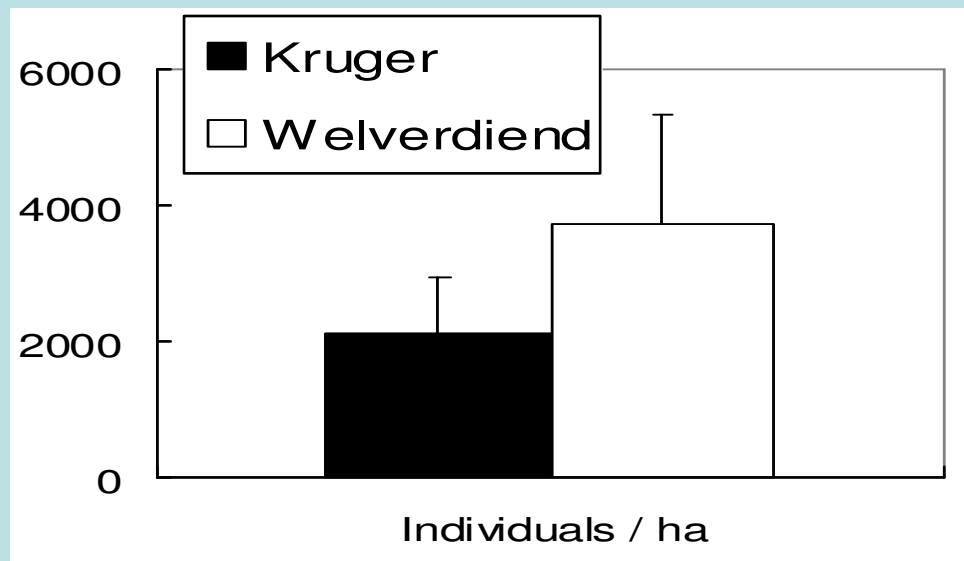
- Prediction of demand exceeding supply (Banks et al. 1996, Rademan 2004)
- **Demand** for fuelwood is high...
 - 14.5 kg / day / household (Shackleton & Shackleton 2004)
 - Driven by social factors
 - Twine (2005):
 - decline of institutional control
 - changes in perception of how much is allowed to be harvested
 - increase in commercial harvesting
 - Price of electricity
- **Supply** is not well understood
 - Comparison with protected areas
 - Reduced canopy cover (Wessels, CAO group)
 - Altered community composition, heights, size class distribution, but no decline of stem density (Higgins 1999)



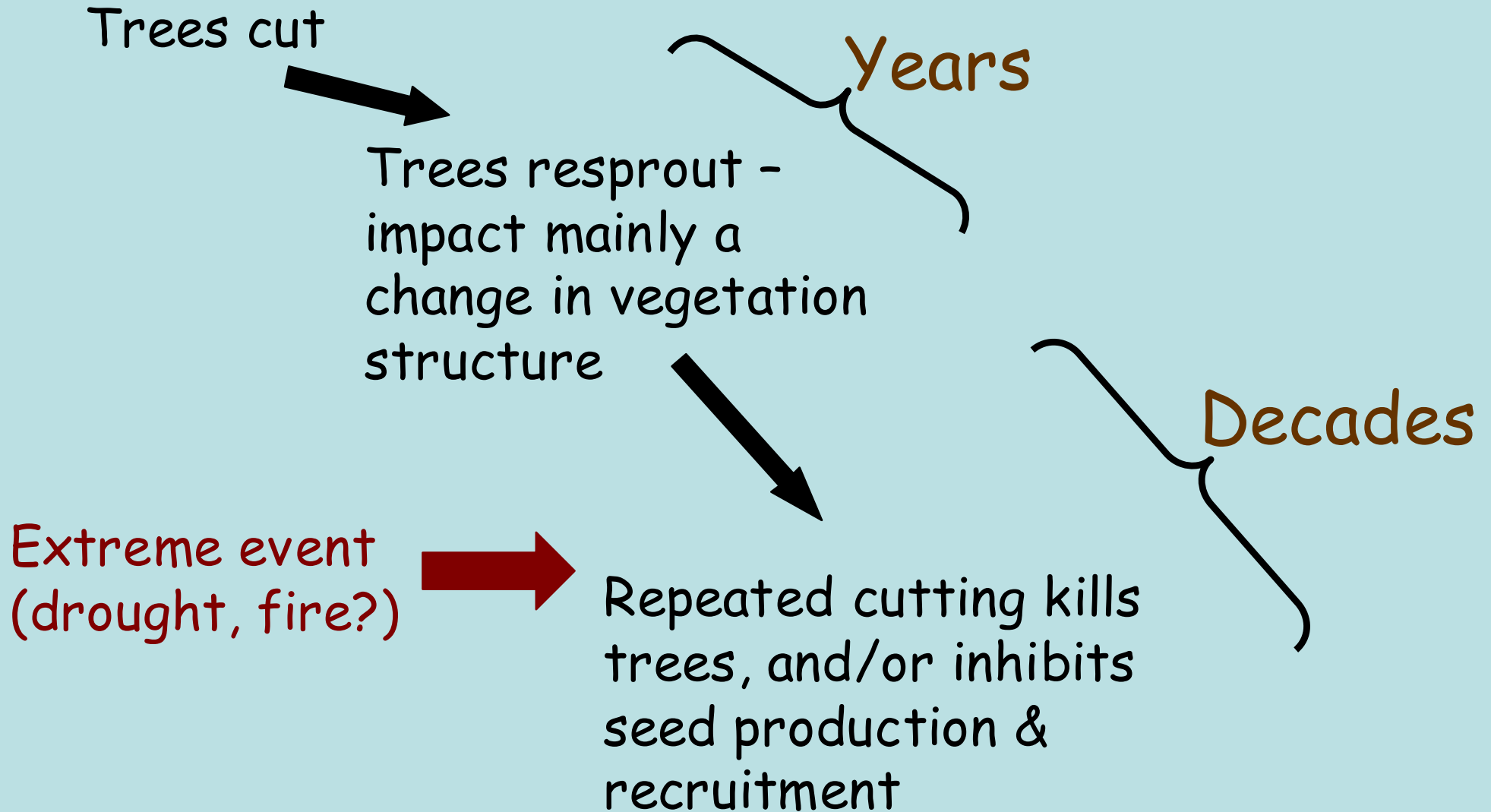
South African Wildlife College



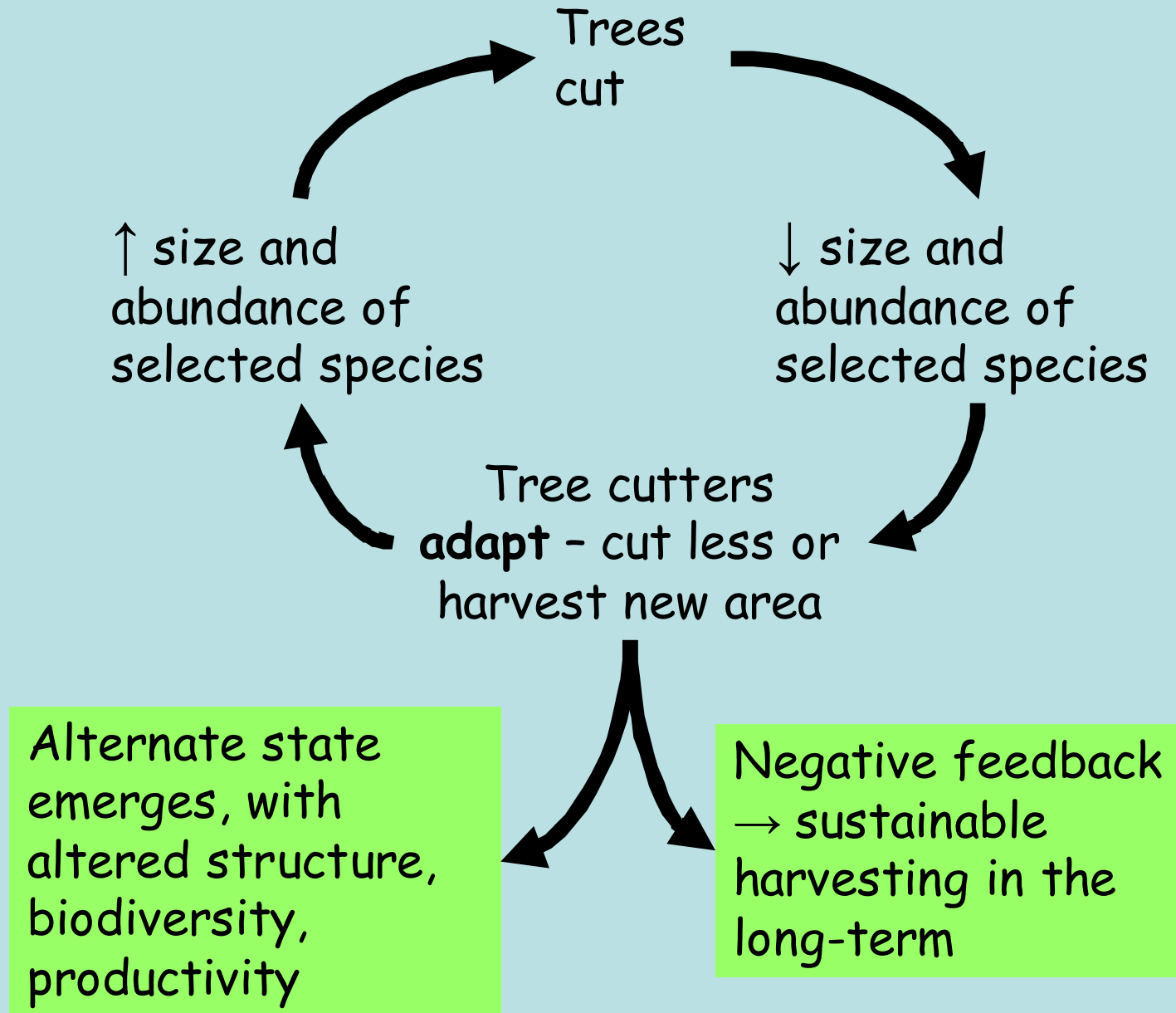
- Rural area:**
 ▲ ●
- Conserved area:**
 ▲ ● Open to wildlife, fires infrequent
 ▲ ● No herbivory, annual fires
 ▲ ● No herbivory, no fire
- Soil types**
 ▲ ○ Gabbro-derived
 ○ Granite-derived



Hypothesis 1: delayed response



Hypothesis 2: sustainable



Potential evidence for sustainability

- No continuous decline of tree size (long term)
- Harvesters abandon areas before trees die
- Trees populations remain resilient to extreme events

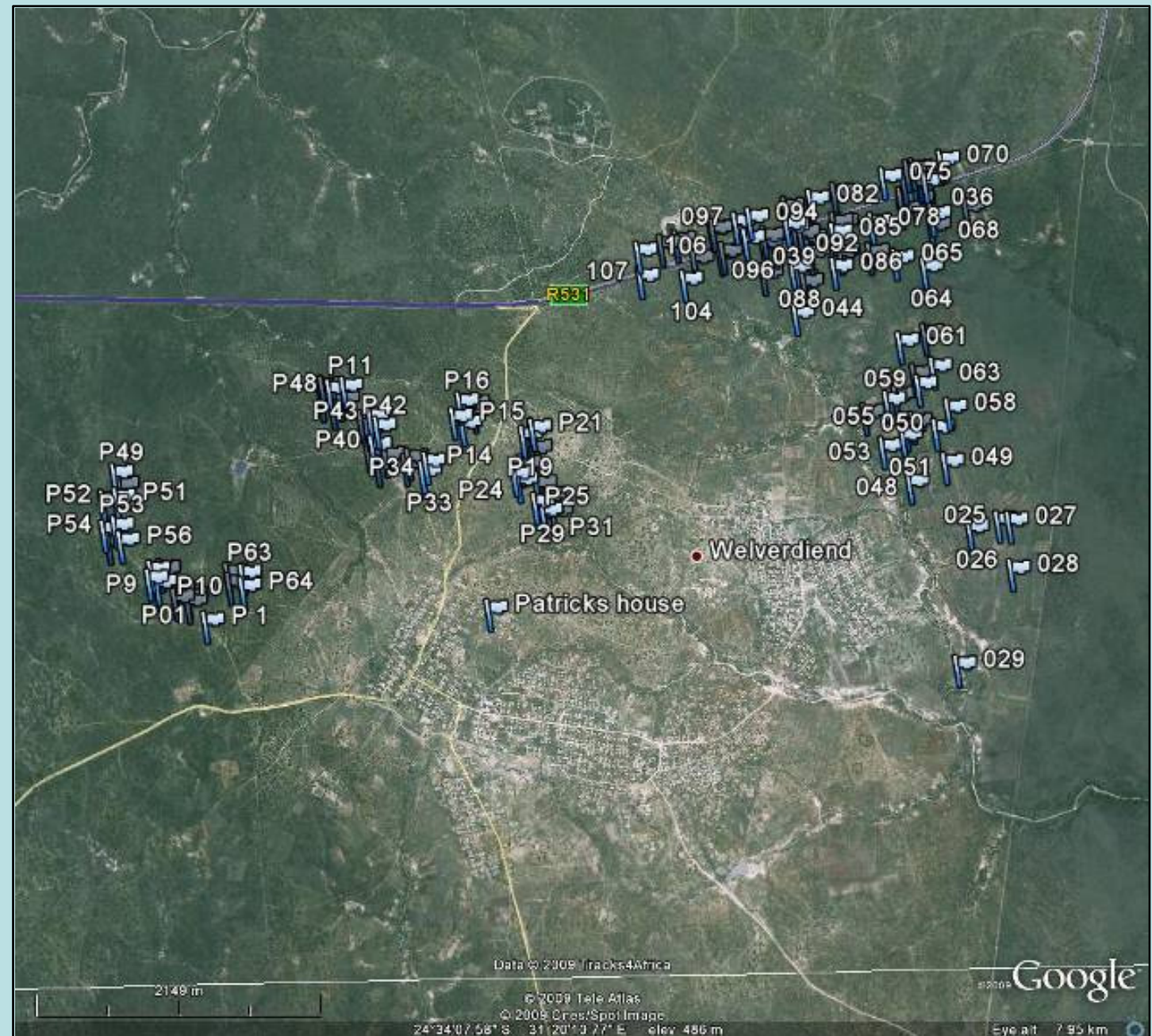


Potential evidence for sustainability

- No continuous decline of tree size (long term)
 - Permanent monitoring plots
- Harvesters abandon areas before trees die
 - GPS tracking of where trees are harvested
 - Species preferred versus available
 - Permanent monitoring plots
- Trees remain resilient to extreme events
 - Annual sampling of marked trees + seedling counts

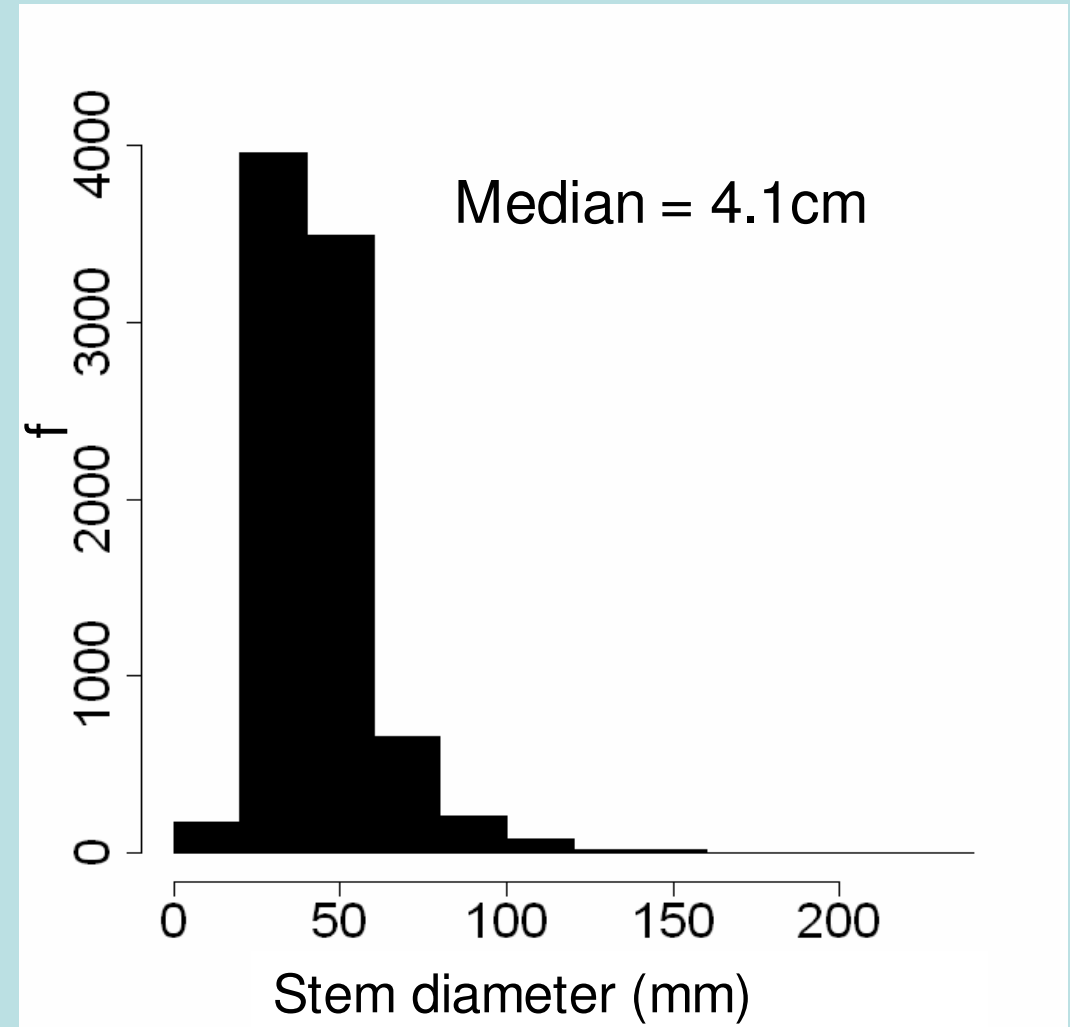
Permanent plots at Welverdiend

- 20 plots
 - 0.5ha to 10ha
- Sampled every 1 or 2 months
- Cut stems measured and marked
- Stratified
 - Distance
 - Geology



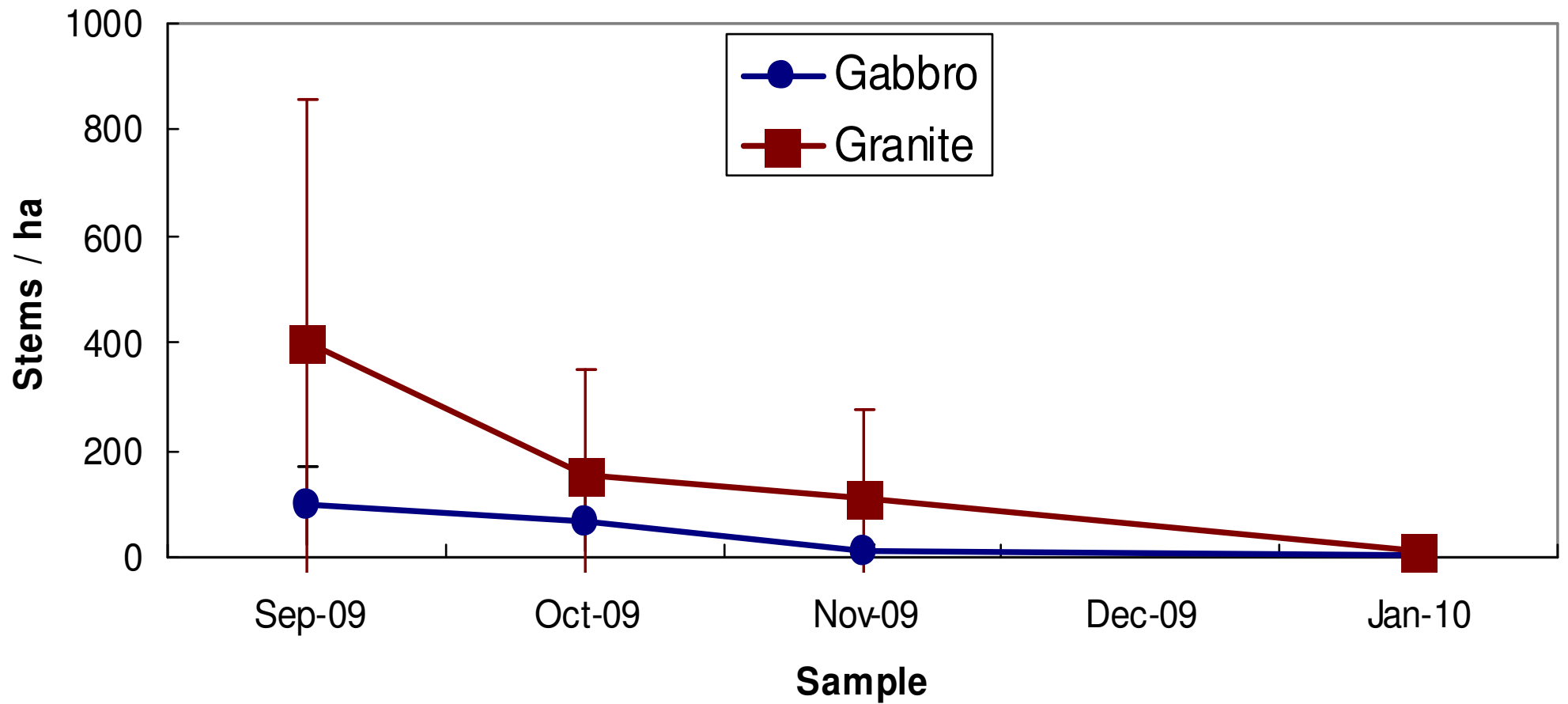
Results: stem sizes

- 71 ha, 4 months:
16 817 stems cut
- 49 species
 - 34 “preferred”



Results: temporal trend

Number stems cut

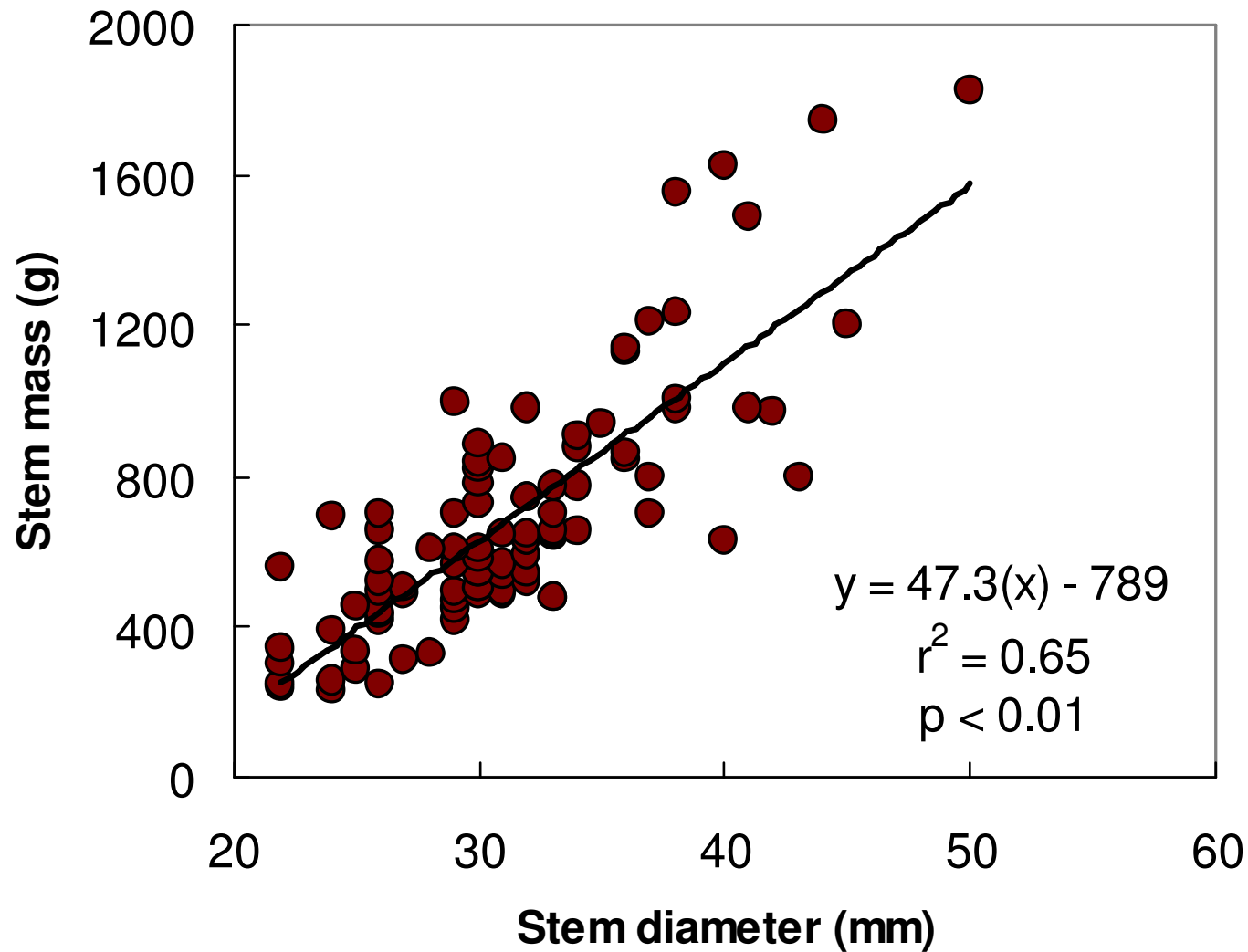


Results: temporal trend

Size of cut stems



Biomass – scaling



- Biomass tripped off and left behind: mean = 31% (SD = 9.5%)

Biomass supply

	Biomass harvested (kg/ha/year)	Biomass used (kg/ha/year)	Area required per year (ha/household) ¹
Gabbro	601	414	4.0
Granite	1935	1335	12.8

¹ assuming 14.5kg used / household / day
(Shackleton & Shackleton, 2004)

Conclusions

- Current rates of harvesting seem sustainable
 - BUT need to monitor
 - Both supply and demand
 - For extreme events (global climate change)
- Seasonal trend in demand
 - Important for interpreting short-term studies
- Major gap: land use change
 - Cultivation
 - Extent?
 - Regrowth rates?



Acknowledgements

- Patrick Ndhlovu and Mightyman Mashele

