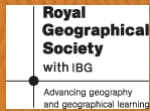


Climate change, biodiversity and livelihoods in the Kalahari, Botswana

Susannah M. Sallu

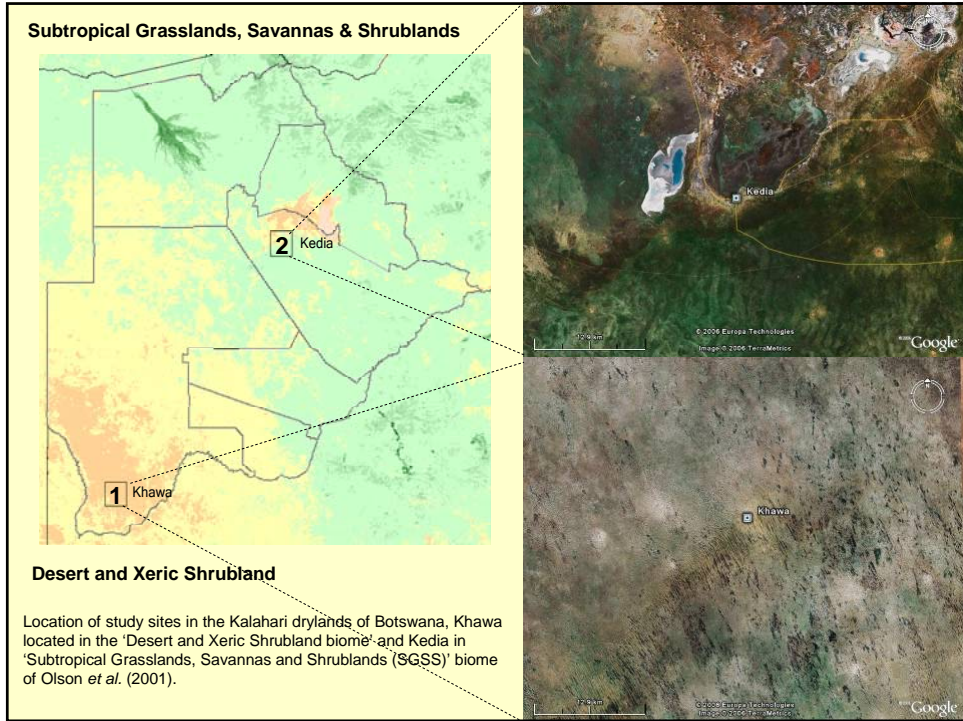
PhD Biodiversity dynamics, knowledges and
livelihoods in Kalahari dryland biomes

Oxford University Centre for the Environment
susannah.sallu@geog.ox.ac.uk



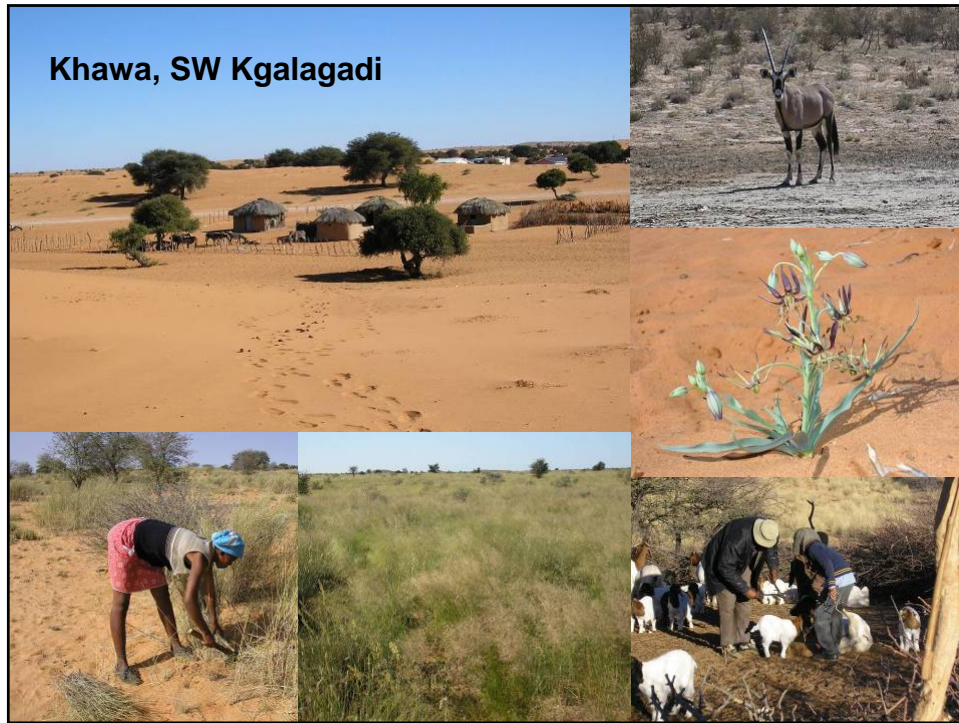
Kalahari ecosystems

- Research surrounding 2 remote Kalahari settlements indicate that vegetation dynamics is:
 - highly contextual (regionally and locally);
 - affected by complex combinations of natural-
and human-determined events that drive
dynamic non-equilibrium patch processes
within **quasi-equilibrium stability** at the
landscape scale.



Social composition of settlement

	Khawa
History of human settlement	Short – settlers since 1975
Population size 2004/5	683
Number of households	76
Average number of people per household 2004/5 (std. error)	6 (± 0.6)
Number of ethnic groups	5
Dominant ethnic group	Batlharo (75%)



Contemporary rural livelihoods

- Biodiversity dynamics - a **key** component of contemporary rural livelihoods in Khawa
- Livelihoods typically diverse and dynamic
 - av. 9 strategies per household (2004)



Relative importance of each livelihood strategy group to households in Khawa 2004.

Settlement Household category	Khawa			
	A	B	C	Total
1. Wild animals and plants	2.27	2.12	1.79	6.18
2. Pastoralism	2.04	1.33	0.34	3.71
3. Agriculture and gardening	0.00	0.00	0.03	0.03
4. Social security	0.69	1.74	1.37	3.80
5. Employment	1.14	0.93	0.87	2.94
6. Other income generation activities	0.38	0.33	0.14	0.85

Household groups:

A = Elite: diversified pathway with tendency to specialise;

B = Intermediate: diversified pathway with tendency for dependency;

C = Destitute: dependency pathway.

Mean scores range between 0 and 3, where 0 = not important & 3 = very important.

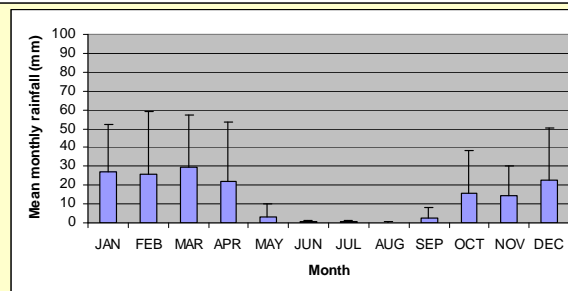
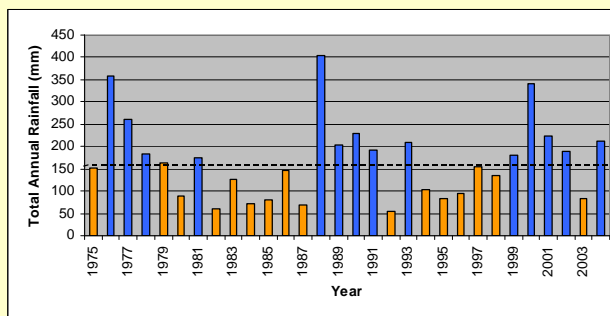
Totals indicate the cumulative importance of related strategies.

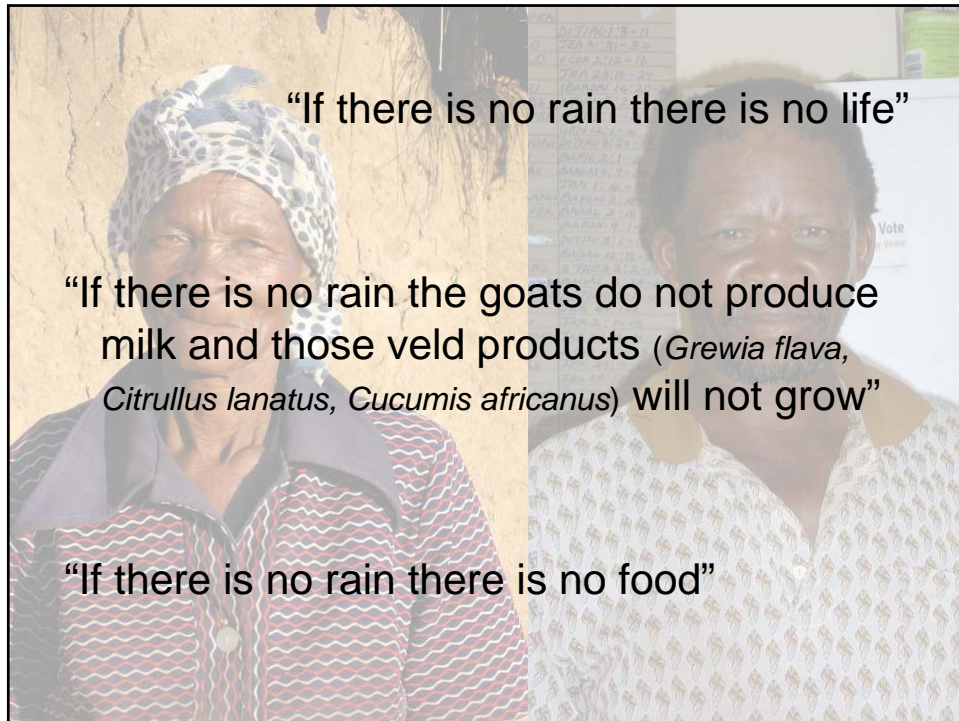
Contemporary rural livelihoods continued...

Because of the complex dynamic non- equilibrium patch processes within quasi-equilibrium landscape scale stability:

- Landscape scale utilization of biodiversity dynamics – allows full utilisation of opportunities (spatial and temporal heterogeneity)
 - in many cases undermined by policy interventions (veterinary fencing, land use policies e.g. TGLP)

Temporal dynamics - rainfall



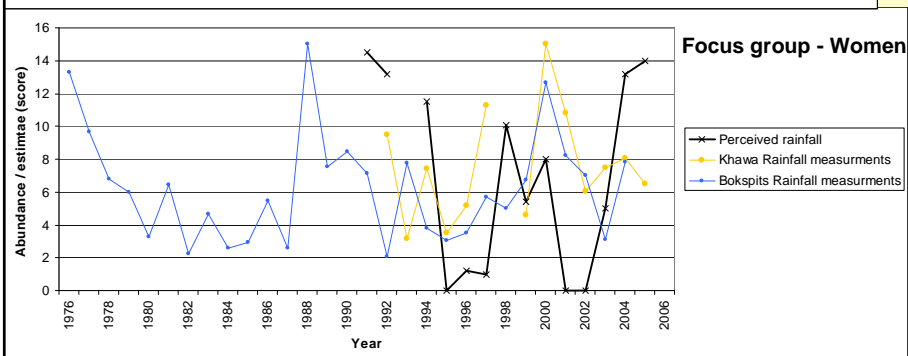
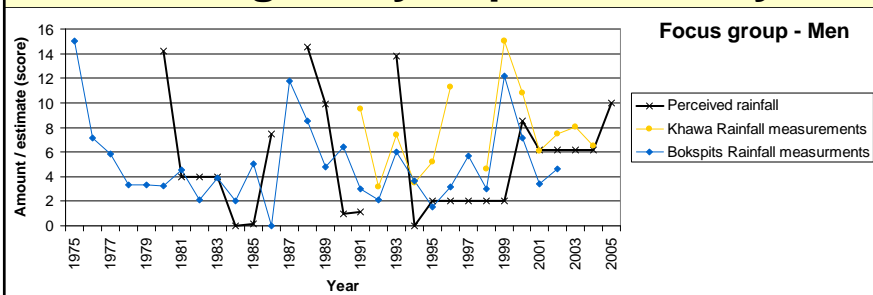


Local perceptions of rainfall dynamics (Khawa)

- 39 of 41 interviewed spoke of changes in rainfall (2 recent settlers)

Type of change (1974-2005)	Number of times stated (N=41)
Decrease	21
More irregular/less predictable	16
Pattern changed (rains later)	7
Changes annually	2
More noisy (thunder/lightening)	2
Comes with more wind	2
More drought	1

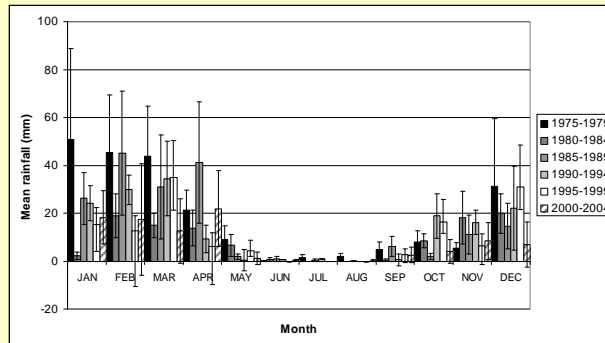
Irregularity/unpredictability



Pattern changes – later onset

Rainfall data indicates:

- Slight trend towards rain falling an average of one month later post-1984.
- Peaks in mean monthly rainfall falling in months of Feb, March & April (1985-2004) compared to Jan, Feb & March (1975-1984).



Tadross *et al.* (2005)
Journal of Climatology
18: 3356-3372.

Busby & New (Under
Review) *Geophysical
Research Letters*.

Monthly rainfall patterns for consecutive five year periods 1974-2004.

Later onset of rainfall = ineffective

- “these days the rain comes late....it means they (veld foods) try and grow in winter time when it’s too cold, so they die off”.



Potential impacts of drying?



Implications for rural livelihoods in Khawa

- **Increasing competition and elite capture for opportunities**
- **Livelihood adaptation & coping strategies witnessed:**
 - Continuation of traditional practices;
 - Increasing reliance on social security benefits;
 - Shift from rainfed cultivation to manually watered homestead gardens;
 - Specialisation within diversified household livelihood strategies;
 - Shift from farming cows to goats.