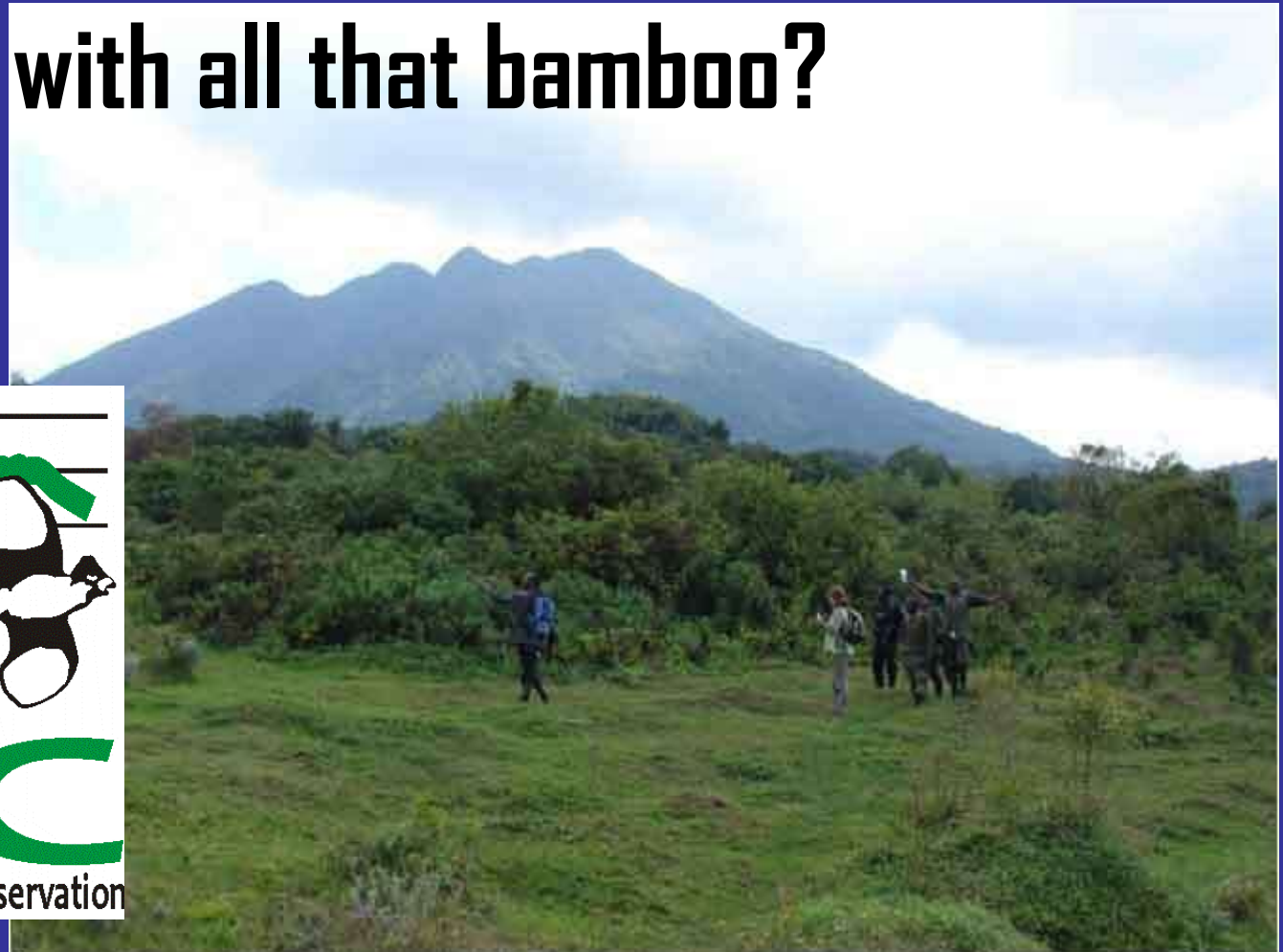


Impacts of bamboo harvest in Mgahinga Gorilla National Park

What to do with all that bamboo?



Context

Conflicting demands on African
mountain bamboo (*Yushania alpina* (K. Schum.) Lin.)

Valued by locals - but illegal since 1992

Key food of Mountain gorillas (*Gorilla beringei beringei*)
+ African golden monkeys (*Cercopithecus mitis kandti*)

UWA concern “lack of sprouts ...”?

Allowed cutting of “dry” stems from one
area as a trial



Aim

Clarify the status of the bamboo population

Clarify whether harvest impacted stem production



Methods

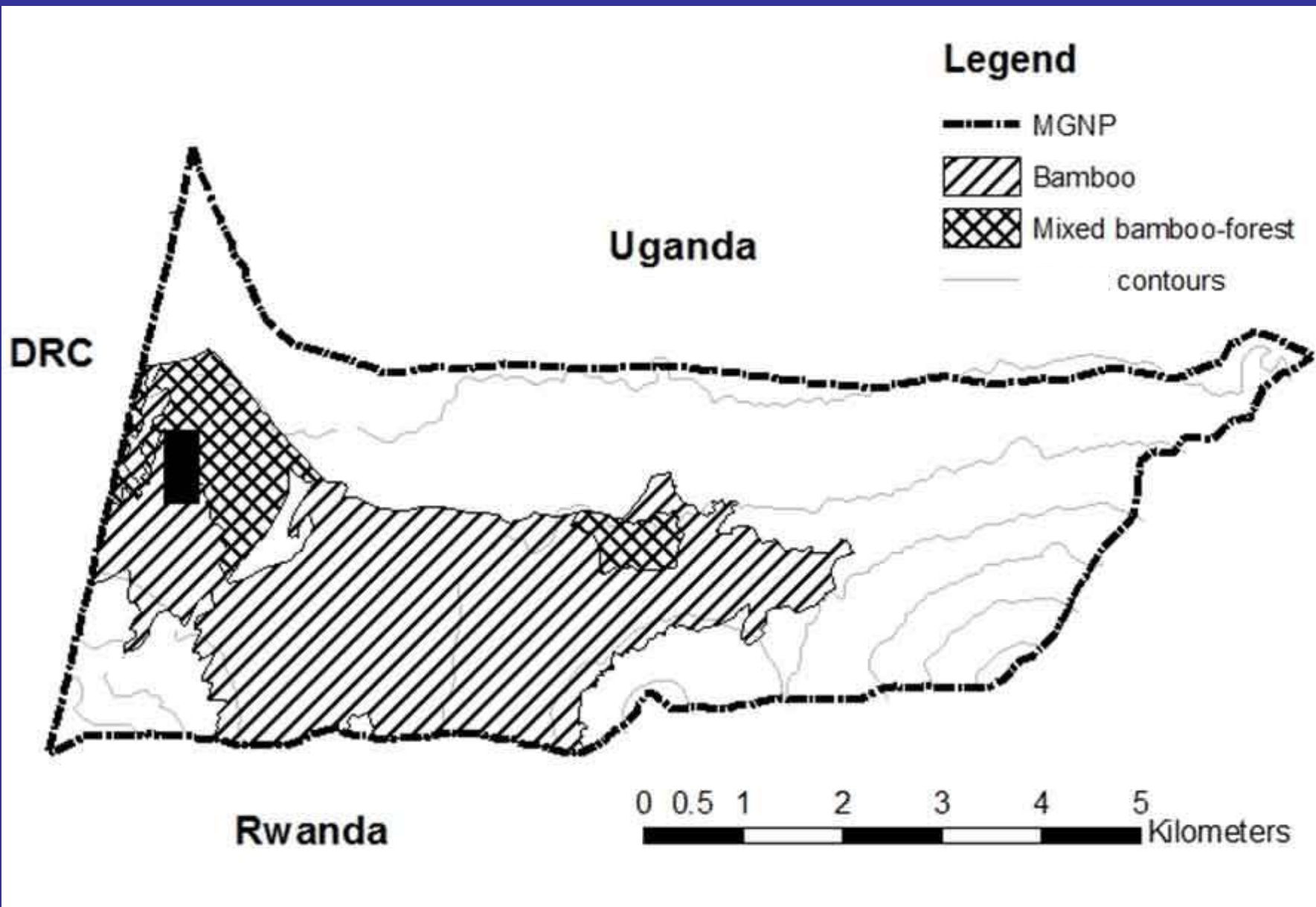
540 variable area plots as a regular 25 m grid across the trial area

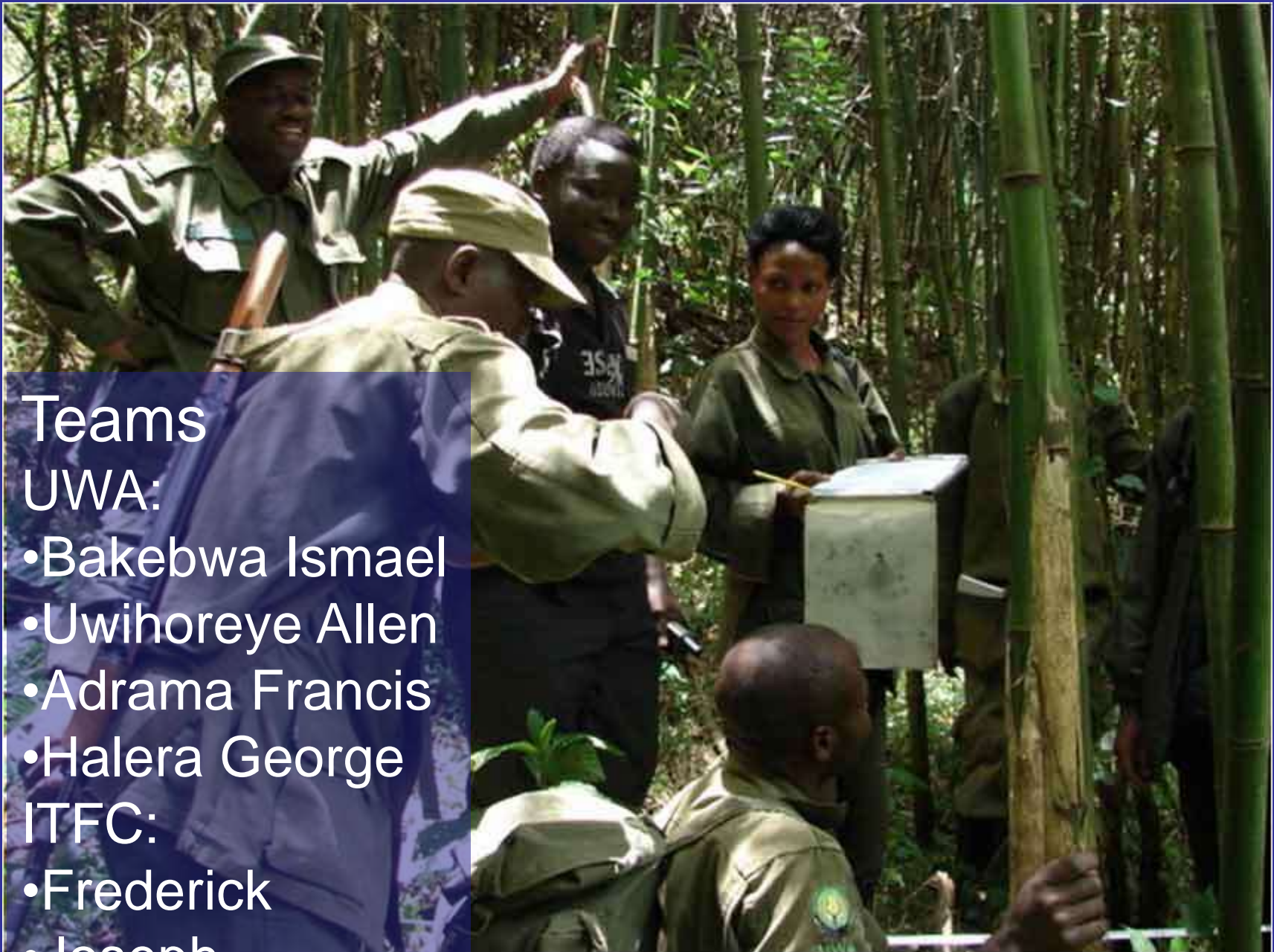
In each plot 20 fully expanded stems (including cut stems) and sprouts were assessed + a subsample-measured.

Stems categorized:

- 'young' = green and shiny
- 'mature' = dull green
- 'dead' = dry and lacking leaves (soft rotten stems not recorded)
- & sprouts counted







Teams

UWA:

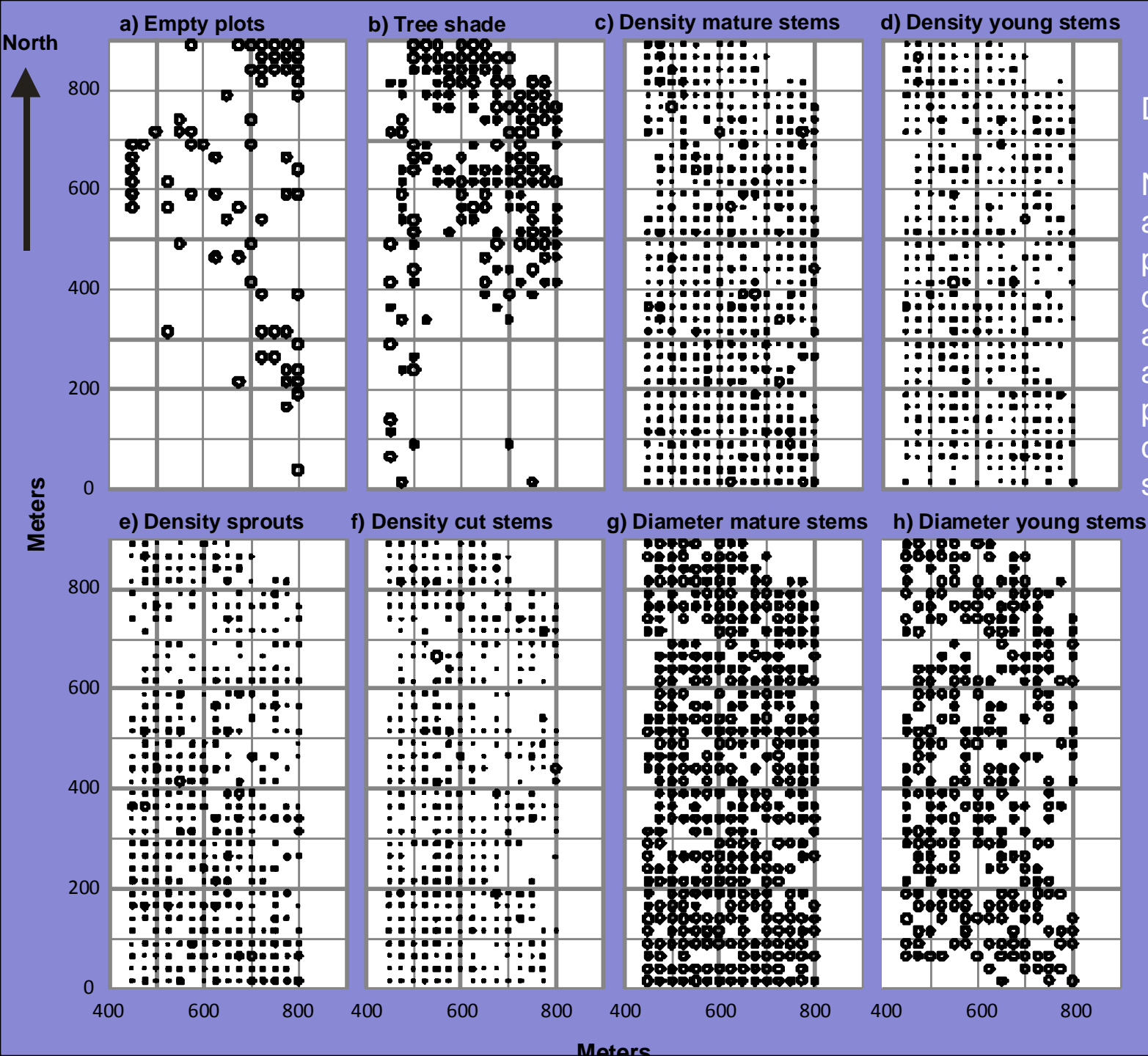
- Bakebwa Ismael
- Uwihoreye Allen
- Adrama Francis
- Halera George

ITFC:

- Frederick
- Joseph







Data per plot :

Note in c-f symbol areas are proportional to density while in g and h symbol areas are proportional to diameter (same scale).

Results

471 of the 540 plots contained bamboo

9420 stems (including cut stems) were recorded along with 1981 sprouts

Mean bamboo densities were 3.96 (95% CI 3.77- 4.16) stems m^{-2}

0.68 (95% CI 0.64 - 0.73) sprouts m^{-2}

Bamboo densities and mean diameters were lower in areas with tree shade versus pure bamboo

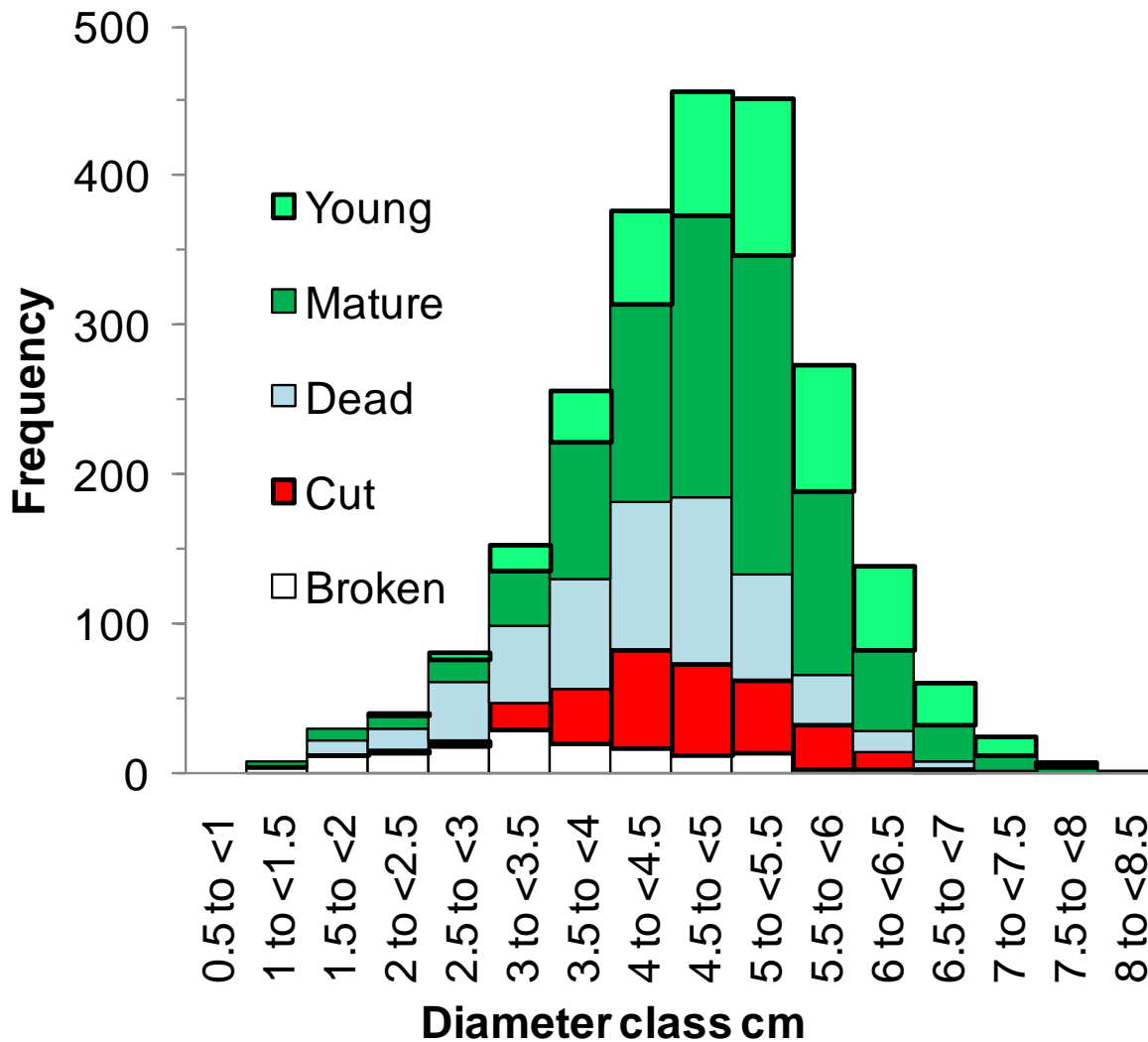
Results

Densities of new stems were positively related to the densities of older stems ($p \ll 0.001$)

Diameters of young stems were positively correlated with size of older stems (even in absence of tree shade)

Younger stems were larger than older stems

Results



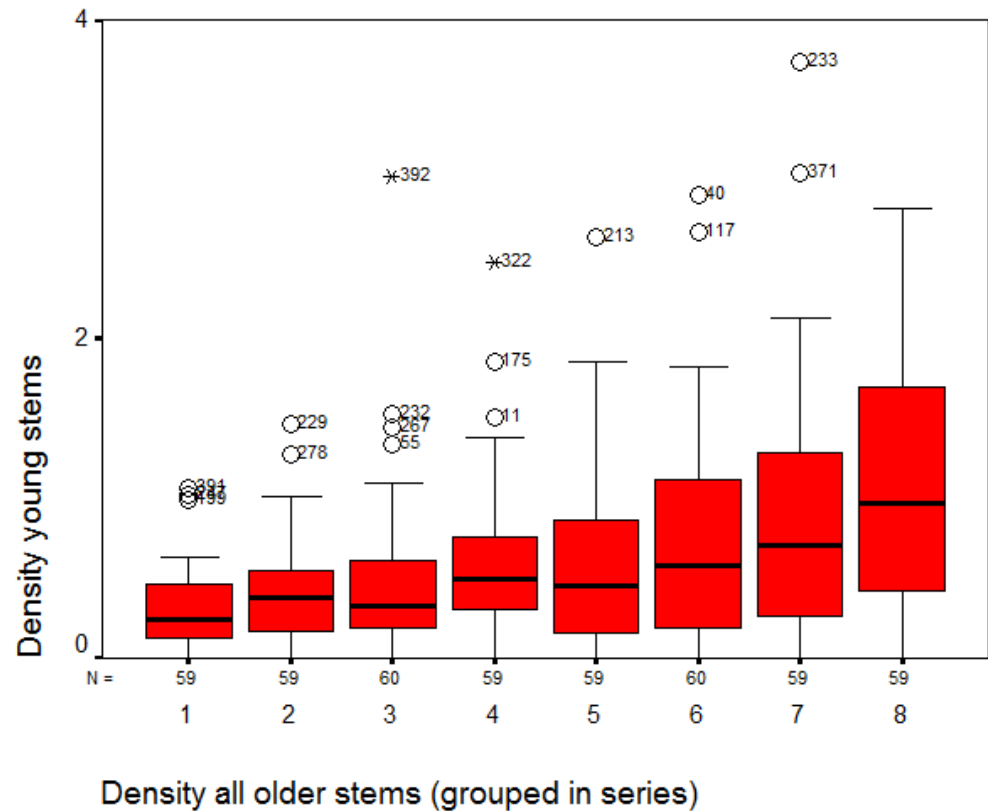
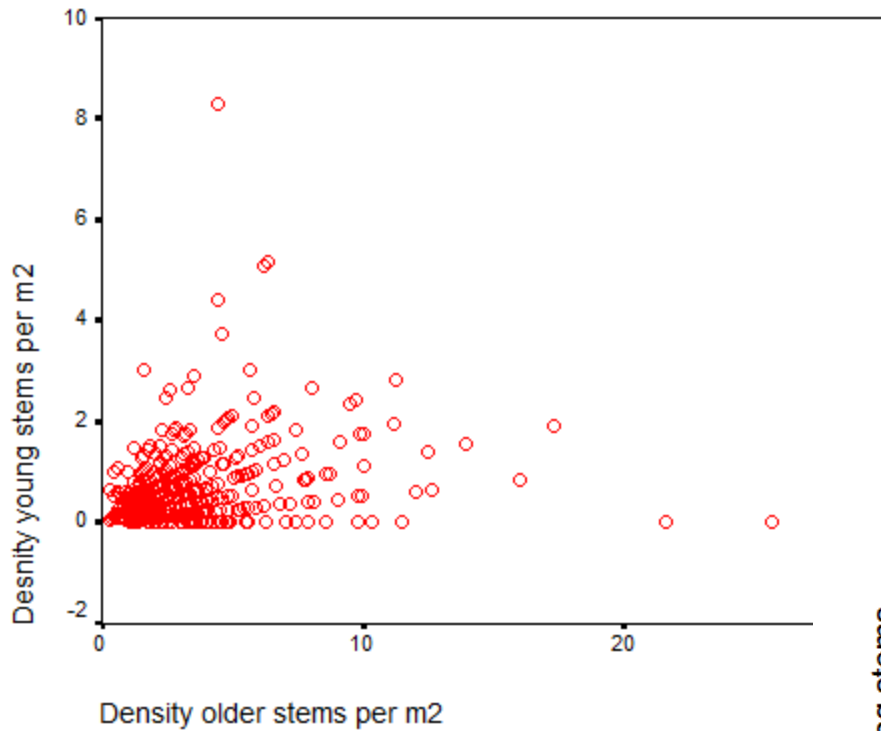
Diameter distribution of stems (each observation is one mean value from one plot)

Dead and broken stems were typically smaller than average

Young are larger than mature stems

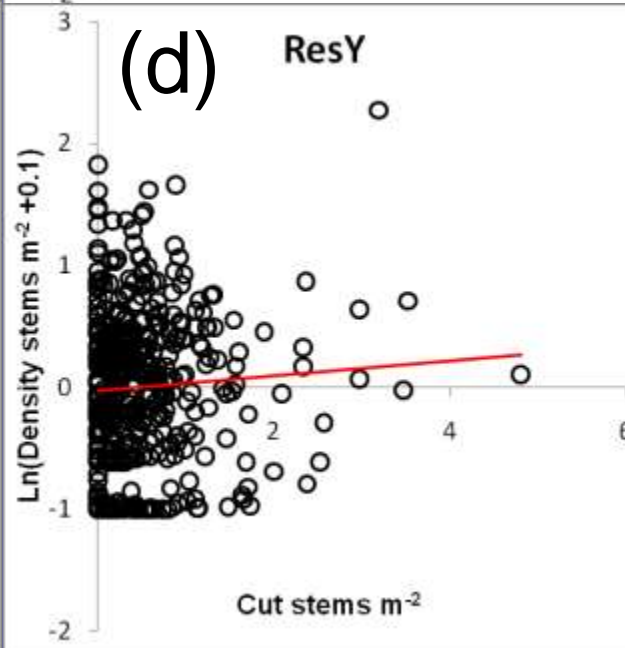
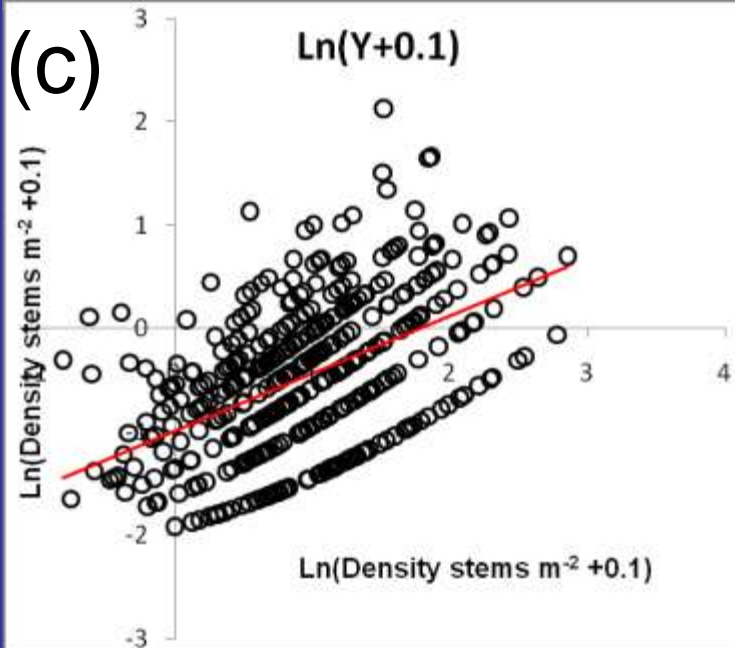
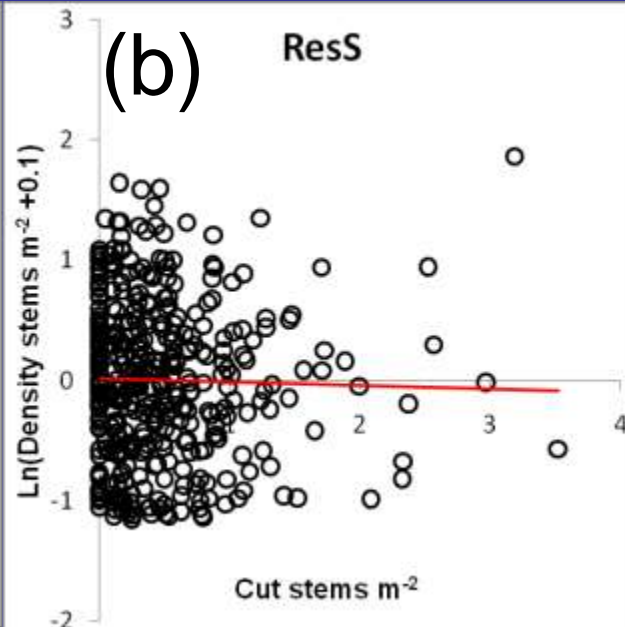
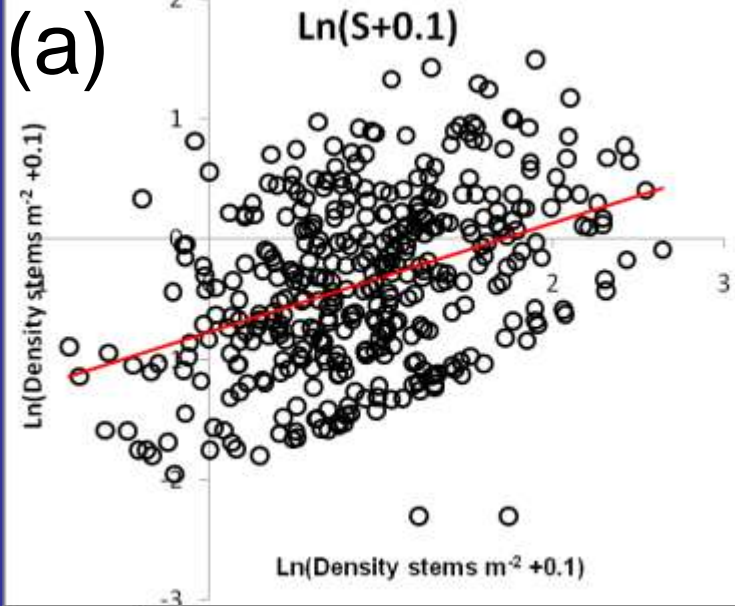
Results

Density of young stems increases with stem density (same for sprouts)



Results

Regressions of log-transformed (a) sprout density and (c) young stem density against log-transformed density of all older stems and the relationship of the residuals from these relationships for (b) sprouts and (d) young stems against density of cut stems.



Results

Cutting of dry stems had no detectable impact on either the density or stem diameter of new bamboo

Any effect on the density of new bamboo is estimated to contribute less than 2% of local variation.

Conclusion

Tree shade associated with lower stem densities and sizes,
(stem crowding is not)

Bamboo appears in a “building phase” with diameters increasing

Densities of young stems determined by extent of rhizome (as
revealed by older stems)

No detected impact of past cutting of dry stems

High densities of sprouts

But impacts likely with sustained and repeated harvesting

Any harvest must be monitored (controlled, replicated design)