Bamboo and rattan inventory in Uganda

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Inventory problems:

- What to measure ?
- Harvestable amounts ?
- Optimal size of plot ?
- Number of plots required ?
- Clumped distributions
- Growth / replenishment rates ?

BAMBOO
Arundinaria alpina

MSc project 1999 – Robert Bitariho

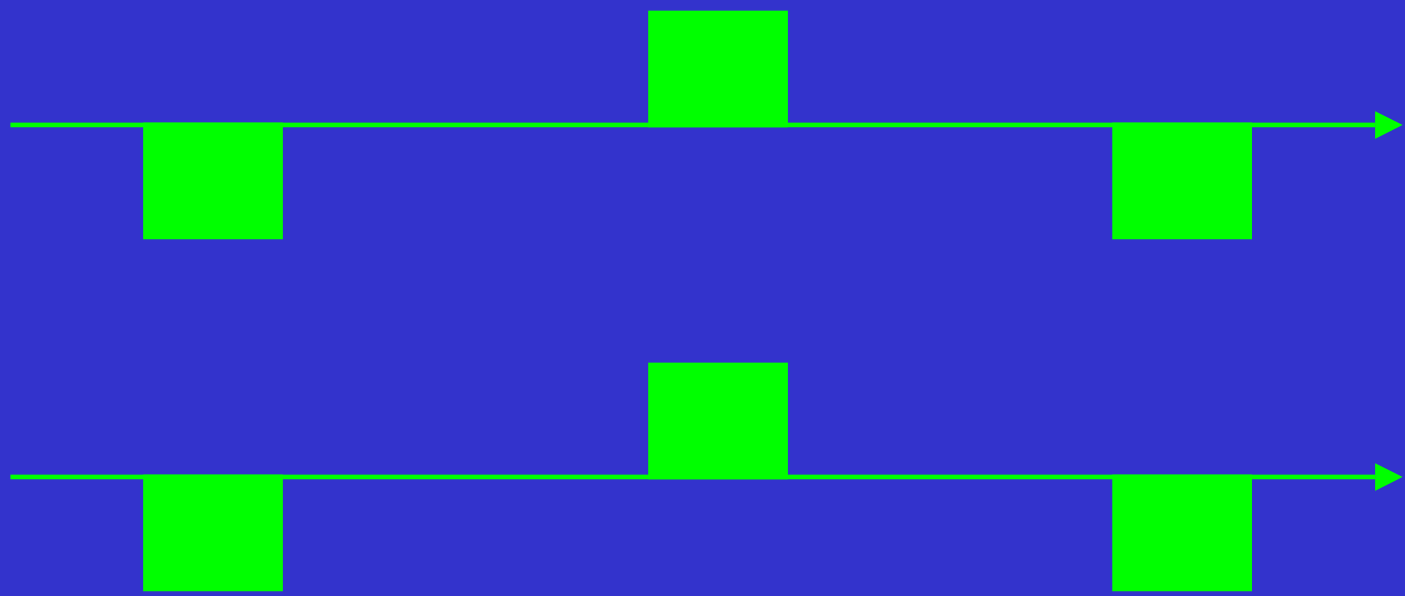
Sampling design: Stratified systematic

Stratified according to density of bamboo (from aerial photos and field surveys):

- Homogeneous
- Mixed bamboo dominant
- Mixed bamboo other species dominant

Transects laid out E-W from available trail and centre of patch

Transects 100 m apart with 10x10 plots with 100 m between plots alternating from left to right side of transect line.



In plots – for all stems the following records were made:

- Stem diameter (mm)
- Stem height (m)
- Internode length (cm)
- Age class (shoot, young, mature, old, dead)
- Gorilla / Monkey / Elephant damage (~15% of stems)
- Borer infestation (moth larvae)
- Quality (as assessed by users)

RESULTS

Bamboo type	Bwindi		Mgahinga	
	Shoots	Culms	Shoots	Culms
Homogeneous	-	-	2,250	41,020
Mixed bamboo dominant	240	27,045	1,140	34,475
Mixed other trees dominant	60	5,965	451	5,505

Data from Mgahinga NP (Bitariho 1999)
Homogeneous area
Plot = 5 x 5 m
N = 20
Mean = 69.7 stems per plot
SE% = 20.6%

Data from Bwindi NP (Cunningham 1992)
Homogeneous area
Plot = 10 x 10 m
N = 4
Mean = 177 stems per plot
SE% = 18.4%

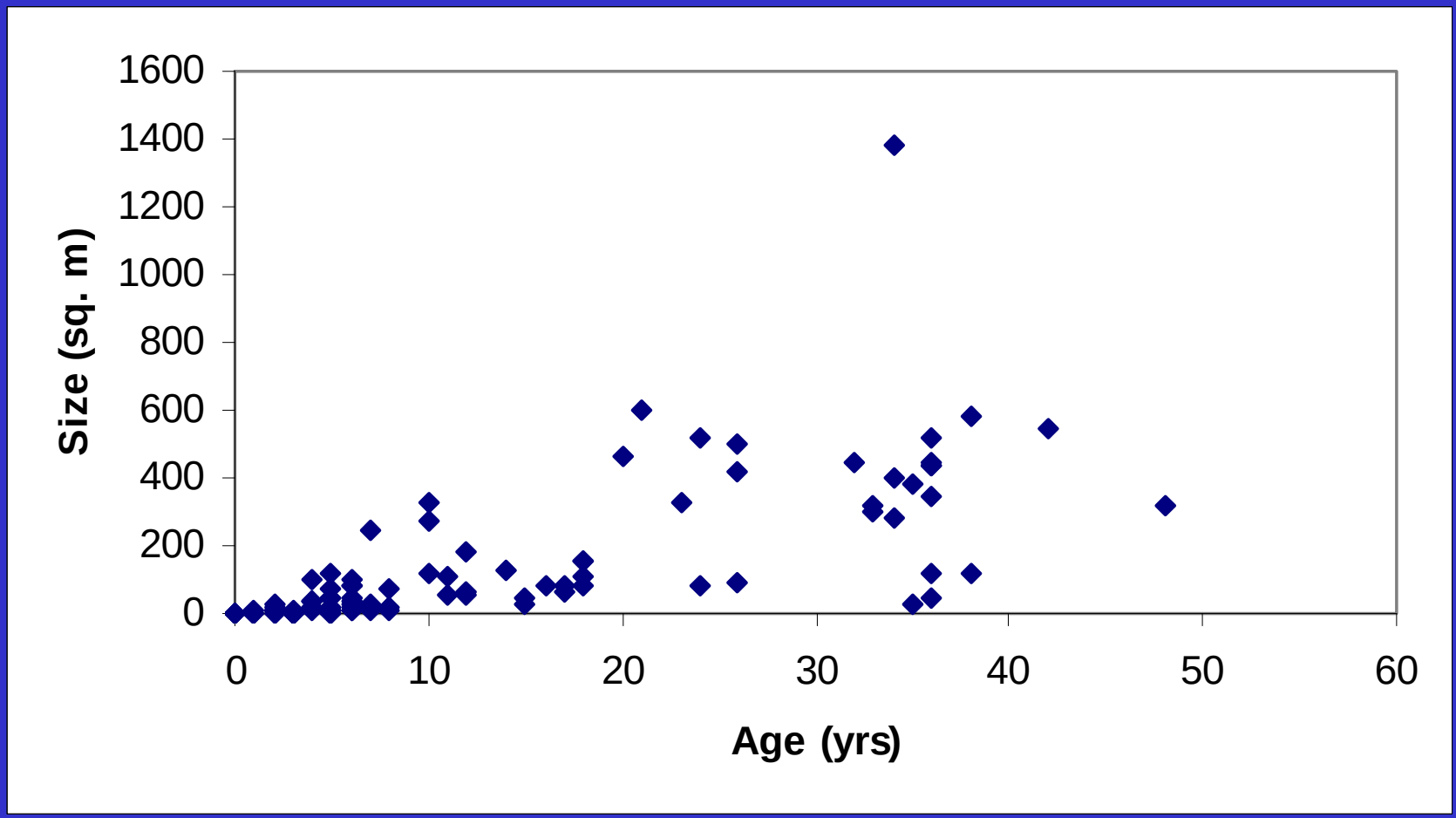
Recommendation for FD Exploratory Inventory

- Keep same sampling intensity and design (0.05 %)
- Restrict north-west quadrant to 6 m radius instead of 12.4 m

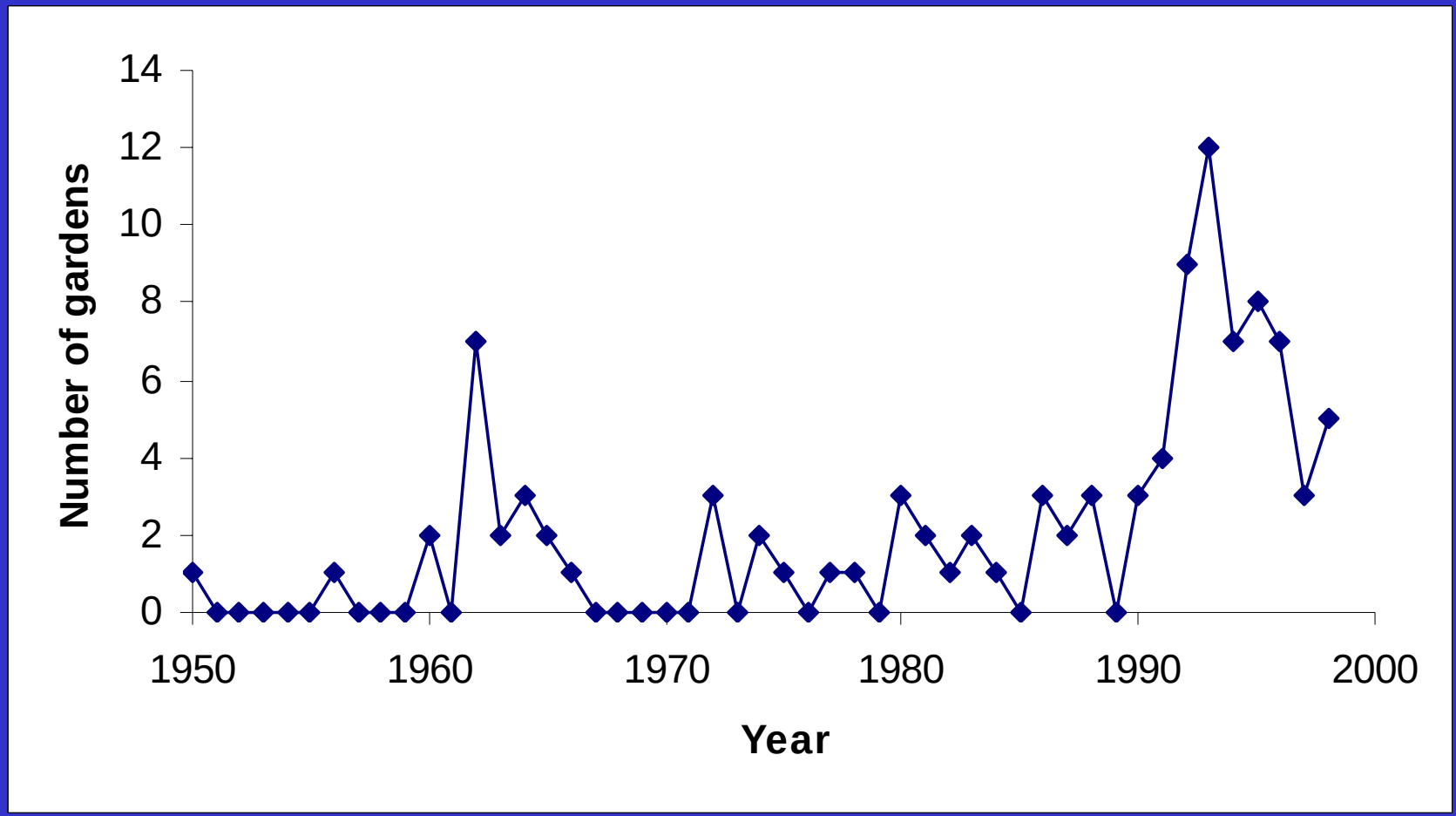
Bamboo gardens – outside forest

Park	< 10 yrs old		>= 10 yrs old	
	Number	Size (ha)	Number	Size (ha)
Bwindi	8	0.0013	3	0.0222
Mgahinga	58	0.0027	45	0.0279

Growth of bamboo gardens around Mgahinga NP



Bamboo garden establishment around Mgahinga



Cutting reduces the size of the new shoots and the recovery period to full sized clums is dependant on the intensity of cutting Wimbush 1945

Cutting intensity	Recovery to full sized stems
100 %	8-9 years
90% (residuals well distributed)	7-8 years
50%	3-4 years

Management issues:

- Ecology – successional processes
- Optimal harvesting intensity
- Intensive management – within Echuya?
- Export levies ?
- Batwa – extreme poverty, social justice and livelihood issues


RATTAN
Calamus deeratus
MSc project 2001 - Clement Okia

More work done on optimal plot sizes – recommendations range from:

0.0025 - 5 x 5 m
0.025 - 25 x 10 m

Important features to measure: count, length

10% sampling intensities often quoted – but is only possible within strata containing rattan.

Sampling design: Systematic

Contiguous strips of 10x10 m plots 100 long placed 20 m intervals = 3% SI

Enumeration of:

- Age classes: Seedlings, juveniles, mature
- Damage
- Occular estimate of length
- Canopy openess (spherical densiometer)
- Sucker vs seedling regeneration

Majority (75%) of young shoots are suckers, only 6% are mature plants.

Number of stems per ha

Site	Seedlings	Juveniles	Mature	Total
N15	1,714	1,456	87	3,257
N3	2,296	1,891	243	4,430
W21	2,385	2,123	435	4,943

Inventory issues:

- Density within clump high – but are small and difficult to locate so can’t stratify
- Investigate suitable design for FD
- Is it just the mature stems that are gone ?
- Is there a stock of immature rattan present in the forest ?

Growth - 20 stems tagged for 6 months and measured at 2 month intervals

- Average growth rate = 1 m in six months (including dry season) with significant variation between sites.
- Annual growth ~ 2 m per year?

Management issues:

- Enrichment planting within suitable degraded sites
- Cultivation in private woodlots/plantations on suitable sites (technology transfer needed)
- Introduction of exotic species - African or Asian species ?