

Development of methodologies for the first National Forest Inventory in PNG

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Hotel Hodava, Port Moresby

Bruno Kuroh
FRI



Learning from PSP Data

Objective: To determine Optimal plot size, number and shape of plots required for the Multipurpose National Forest Inventory (NFI) in PNG

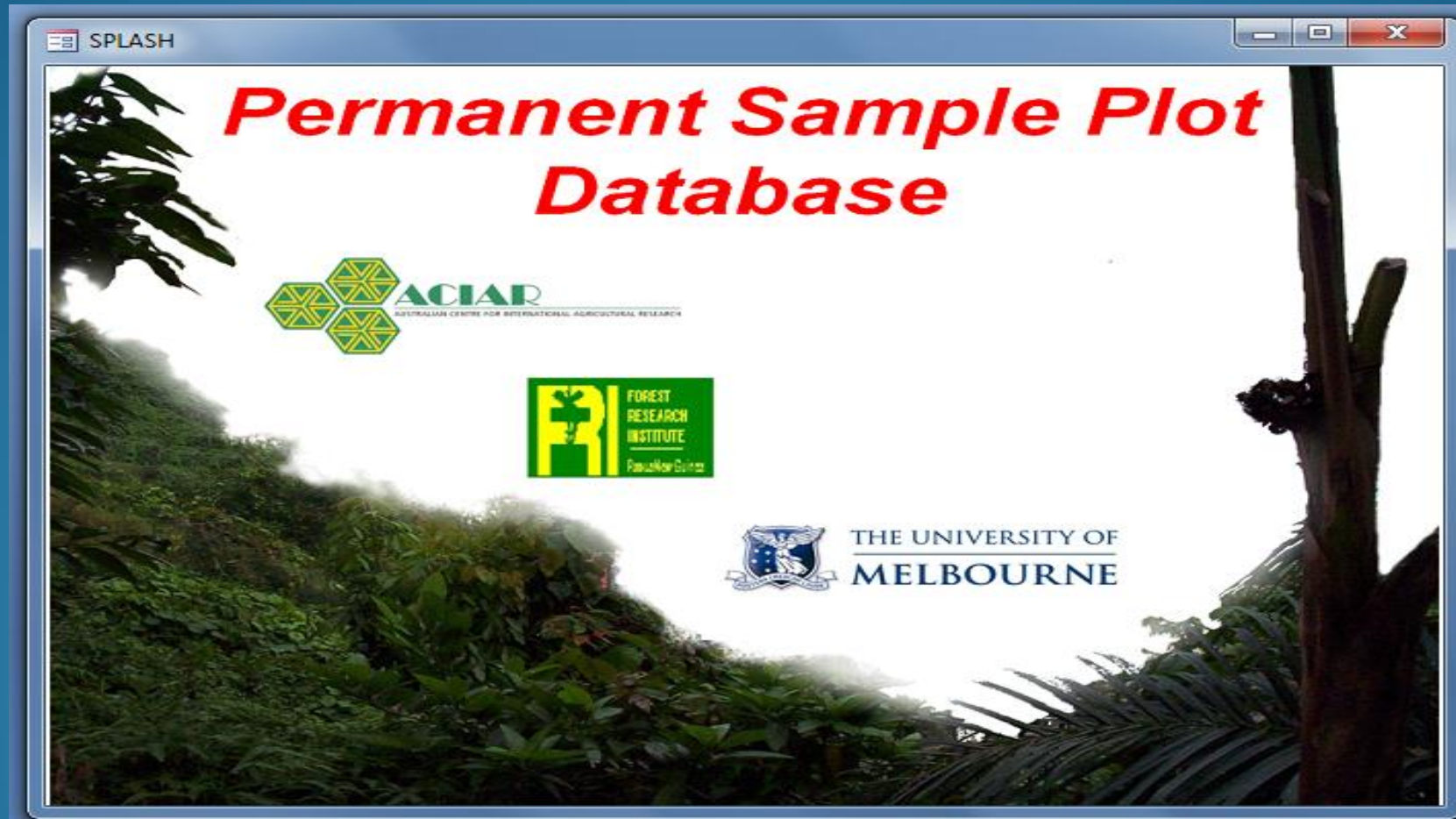
To achieve this: Need to access and use available country specific data/information

Use of existing PSP data set

PSP Database

1. Total of 135 plots
2. 8 in Unlogged forest
3. 127 in Logged over forest
4. Distributed within 3 major forest types
 - Lowland forest on plains and fans
 - Lowland forest on uplands
 - Lower Montane Forest

Use of Country specific data



Use of existing country specific data

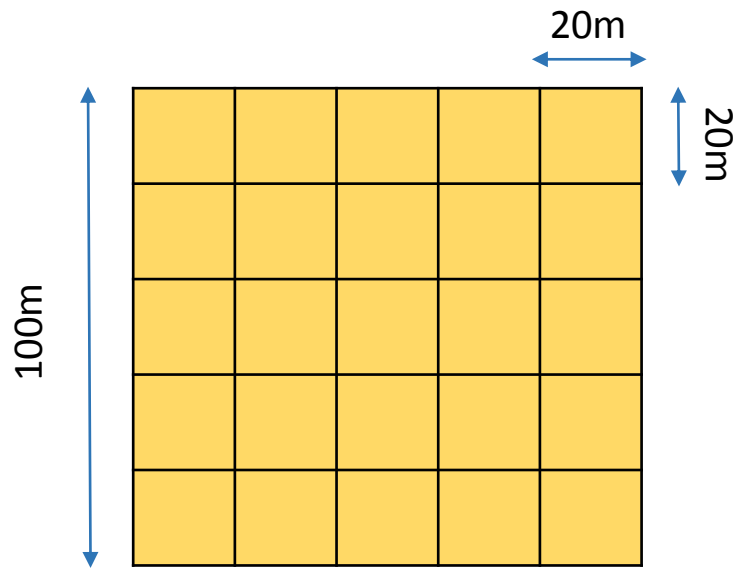
The screenshot displays the Microsoft Access 2007 interface for a database named "PSP2011 : Database (Access 2007)". The ribbon includes tabs for Home, Create, External Data, and Database Tools. A "Security Warning" message is visible at the top, stating "Certain content in the database has been disabled". On the left, a "Tables" list includes JF_PLOT, JF_TREE, LOCATION, PLOT, PLOT_RECORD, PLOT_TYPE, PROVINCE, SPECIES, and TREE_MEASUREMENT. A central splash screen window titled "SPLASH" features the text "Permanent Sample Plot Database" in red, the ACIAR logo, the Forest Research Institute Pacific logo, and the University of Melbourne logo. The splash screen background shows a lush green forest. The Windows taskbar at the bottom shows the system tray with the time 3:27 PM and date 19/05/2014.

Analyze PSP data to determine the optimum plot size and required numbers

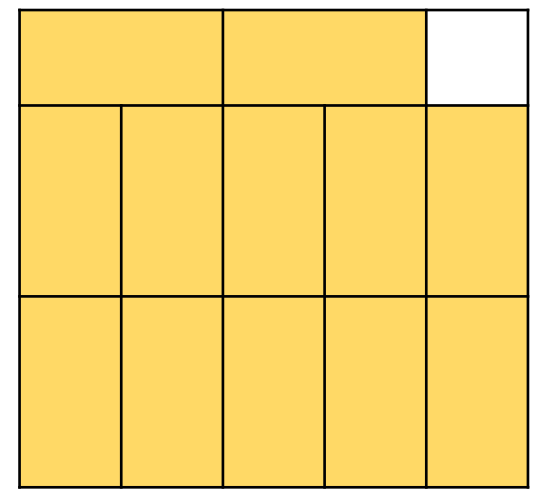
- ▣ Numerical example of calculating number of plots:

$$N = (C*t/e)^2$$

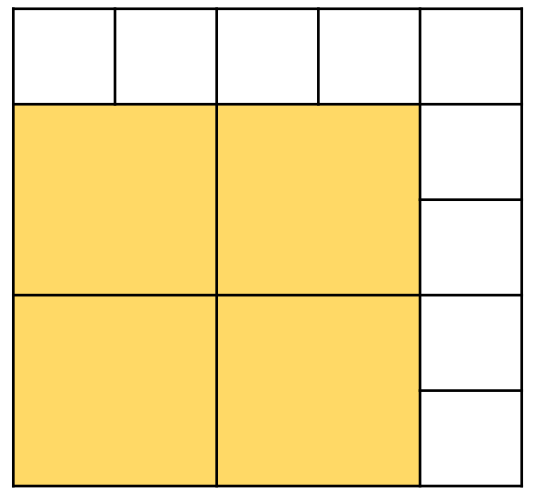
- ▣ Where N= # of units required;
- ▣ C = coefficient of variation – a normalised measure of dispersion of a probability distribution. Defined as the ratio of the standard deviation to the mean;
- ▣ e= required precision; t= student's t at the nominated probability level and the appropriate # of degrees of freedom.



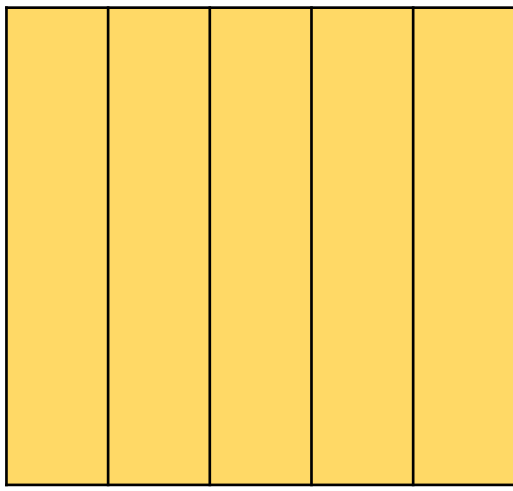
20x20m (0.04ha, 25 per plot)
100m



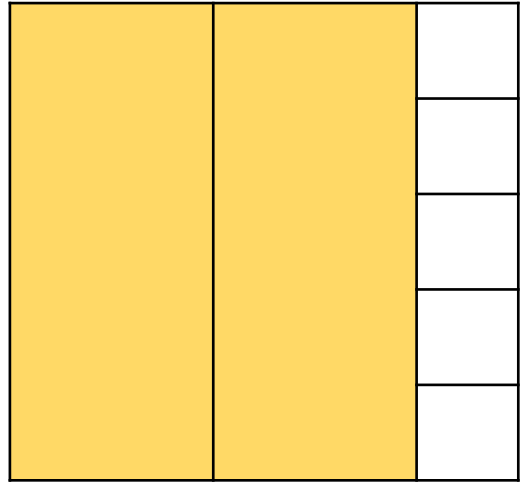
20x40m (0.08ha, 12 per plot)



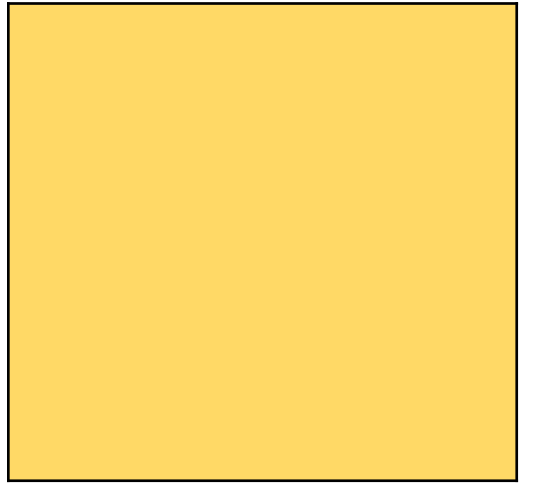
40x40m (0.16ha, 4 per plot)



20x100m (0.2ha, 5 per plot)



40x100m (0.4ha, 2 per plot)



100x100m (1ha)

Number of PSP plots in different forest type and disturbance

		Forest type		Disturbance	
PSP plot	135	Lowland forest	127	Logged	119
				Primary	8
		Montane forest (> 1,000m asl)	8	Logged	6
				Primary	2

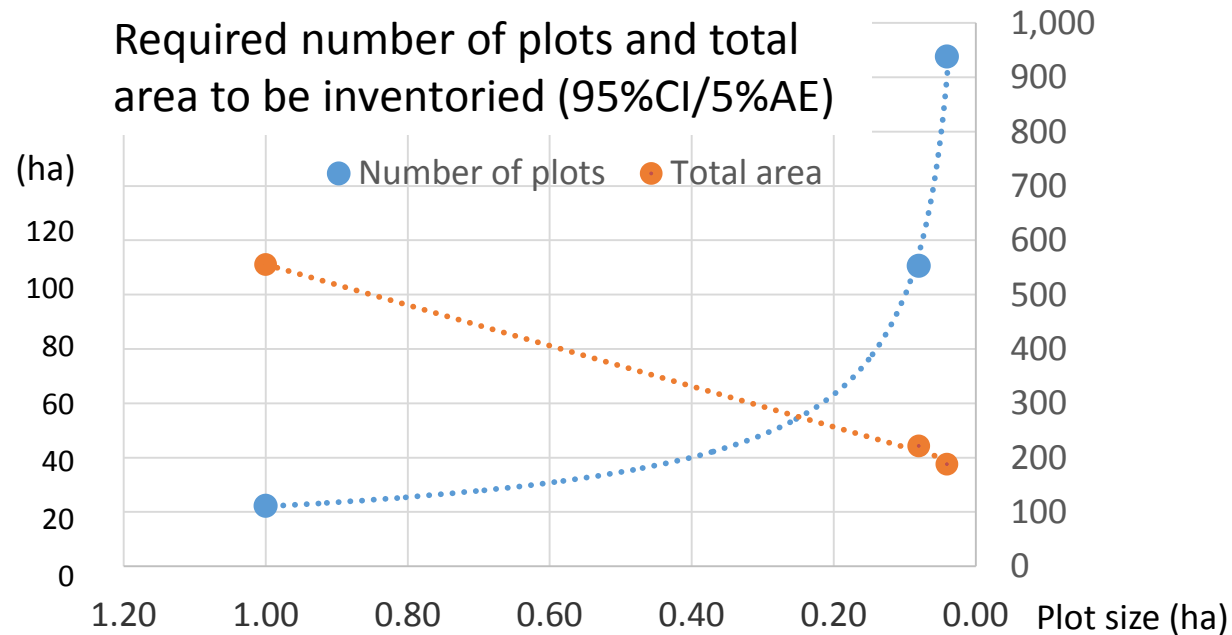
Number of plots for analysis in different plot size

		100x100 m	40x100 m	20x100 m	40x40 m	20x40 m	20x20 m
		1 ha	0.4 ha	0.2 ha	0.16 ha	0.08 ha	0.04 ha
Lowland forest	Logged	119	238	595	476	1,428	2,975
	Primary	8	16	40	32	96	200
Montane forest	Logged	6	12	30	24	72	150
	Primary	2	4	10	8	24	50

Required number of plots for logged over lowland forests

	100x100 m (1 ha)		20x40 m (0.08 ha)		20x20 m (0.04 ha)	
Number of samples	72		538		1,992	
Allometric model	Brown 1	Brown 2	Brown 1	Brown 2	Brown 1	Brown 2
Mean biomass(kg)	178,254	191,660	13,828	14,840	7,020	7,561
SD	47,049	45,239	8,294	7,608	5,483	5,067
SE	5,545	5,331	358	328	123	114
CV	0.26	0.24	0.60	0.51	0.78	0.67
t	1.994	1.994	1.960	1.960	1.960	1.960
95%CI 5%E	111	89	553	404	938	690
95%CI 10%E	28	22	138	101	234	173
95%CI 20%E	7	6	35	25	59	43

Brown 1: $y = \exp(-2.134 + 2.530 \times \ln(D))$
 Brown 2: $y = 42.69 - 12.800 \times (D) + 1.242 \times (D)^2$
 (Brown 1997)



When plot size decreased, required number of plots increased but the total area surveyed decreased.

Tentative conclusions

- General preference of circular plot were observed at previous workshop.
- Circular plot is not appropriate where larger plot size is required.
- PSP data show that smaller size plot are more cost efficient.
- Five circular plots (0.1 ha) per cluster maybe the way to go.
- 400-500 plots are required if we want 95% CI & 5% precision with 0.1 ha circular plot.



Ended...

Thank you...