Development of methodologies for the first National Forest Inventory in PNG

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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

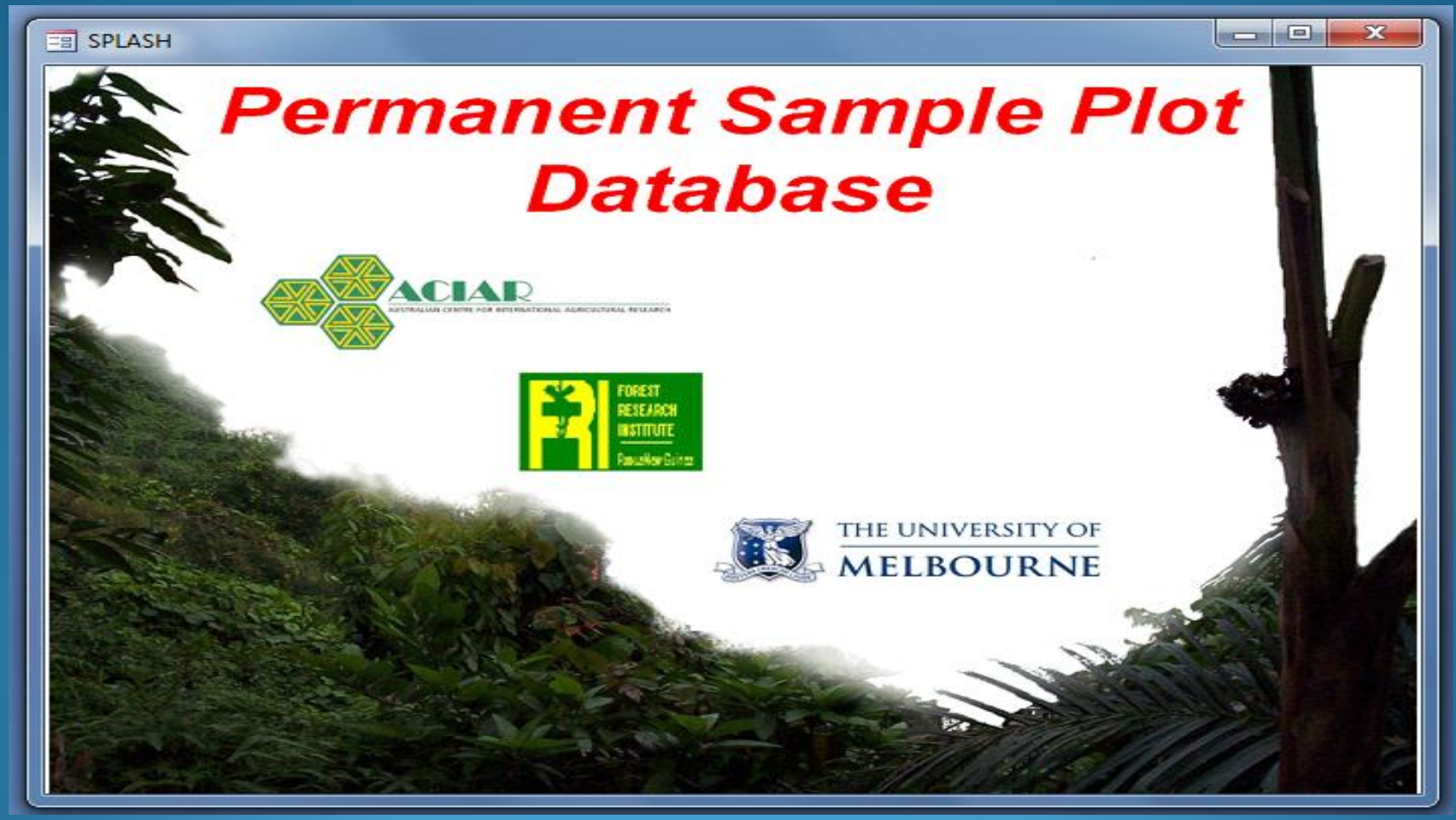
To achieve this: Need to access and use available country specific data/information

Use of existing PSP data set

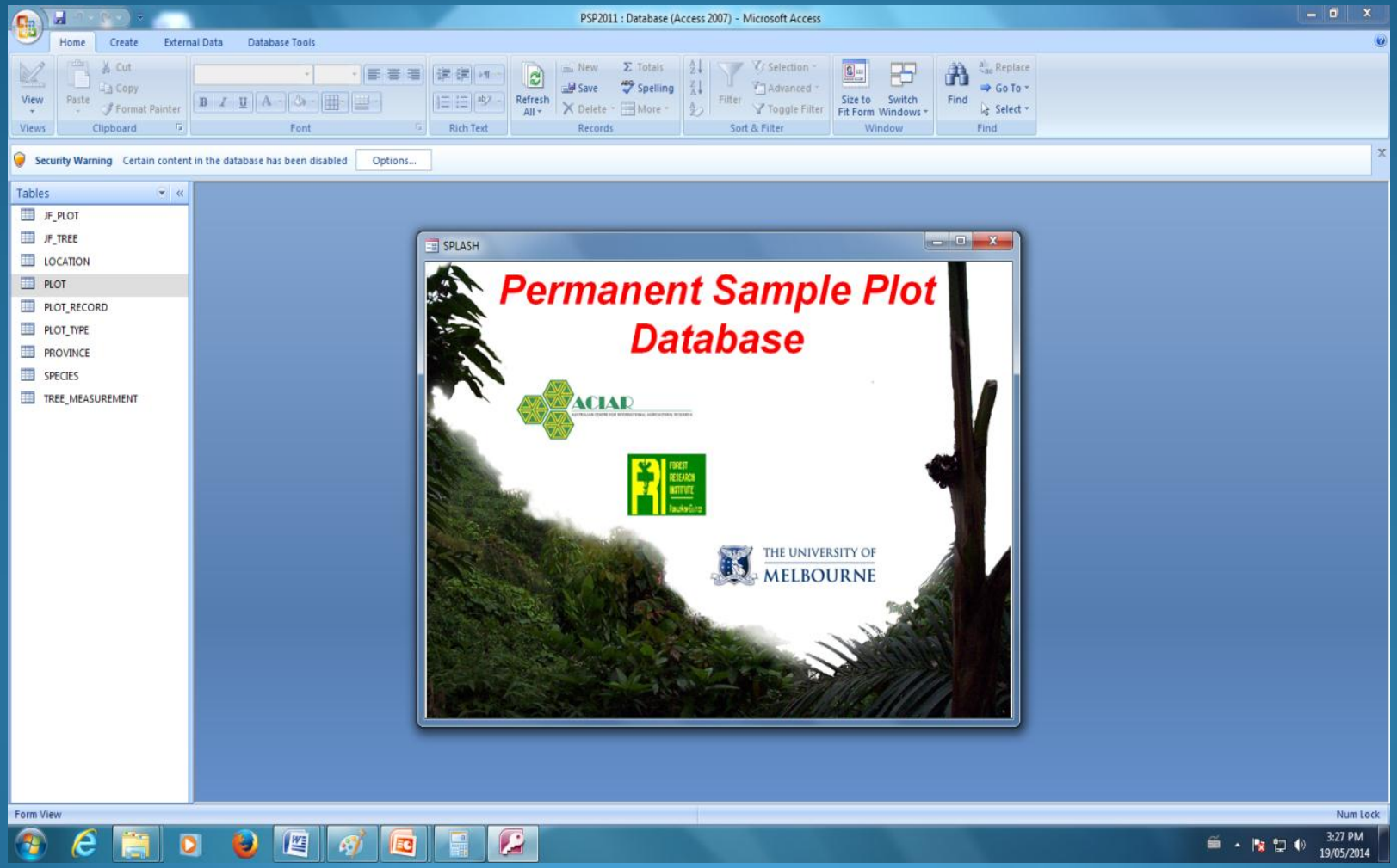
PSP Database

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

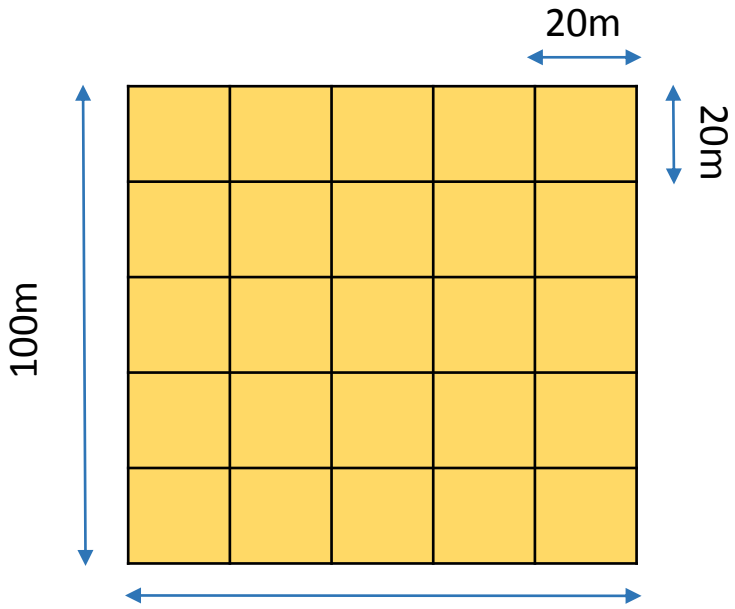


Analyze PSP data to determine the optimum plot size and required numbers

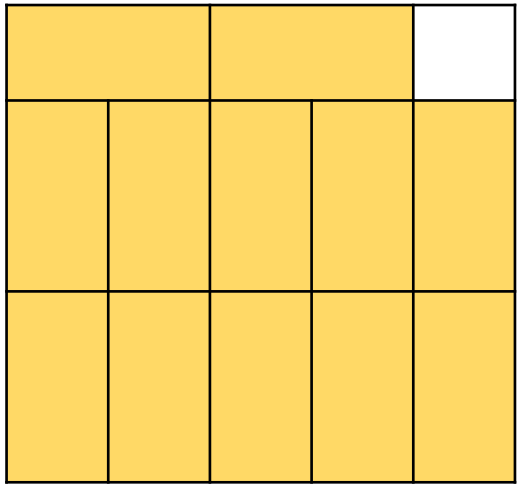
- Numerical example of calculating number of plots:

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

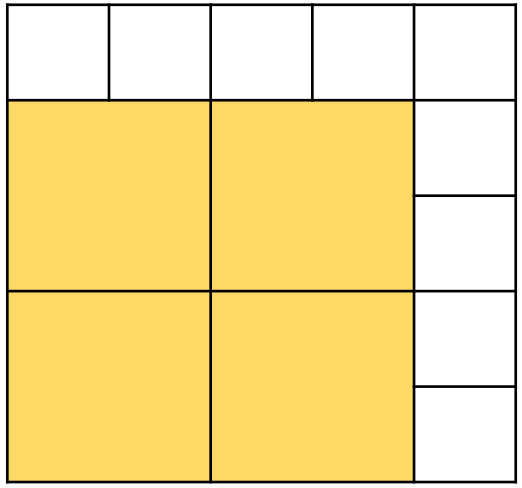
- Where N= # of units required;
- C = coefficient of variation – a normalised measure of dispersion of a probability distribution. Defined as the ratio of the standard deviation to the mean;
- e= required precision; t= student's t at the nominated probability level and the appropriate # of degrees of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



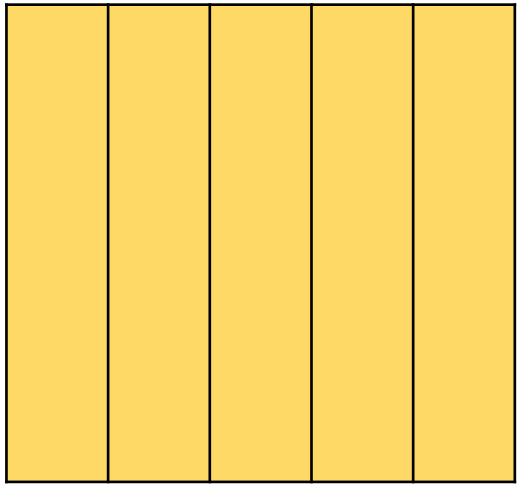
20x20m (0.04ha, 25 per plot)



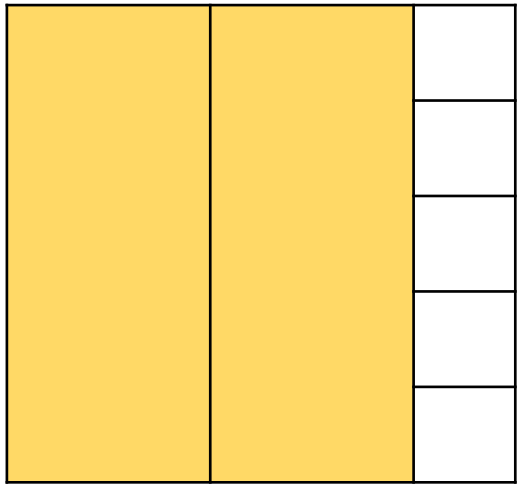
20x40m (0.08ha, 12 per plot)



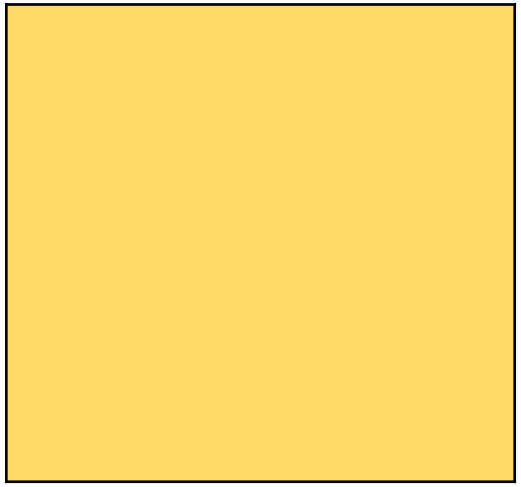
40x40m (0.16ha, 4 per plot)



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

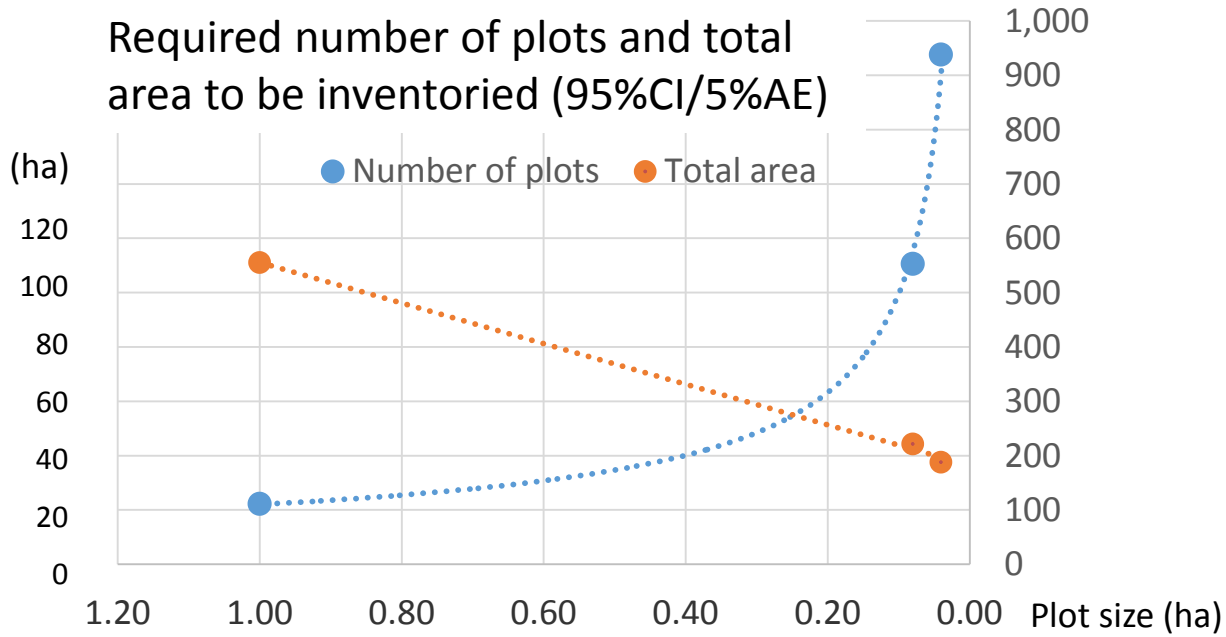
Number of plots for analysis in different plot size

		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…