



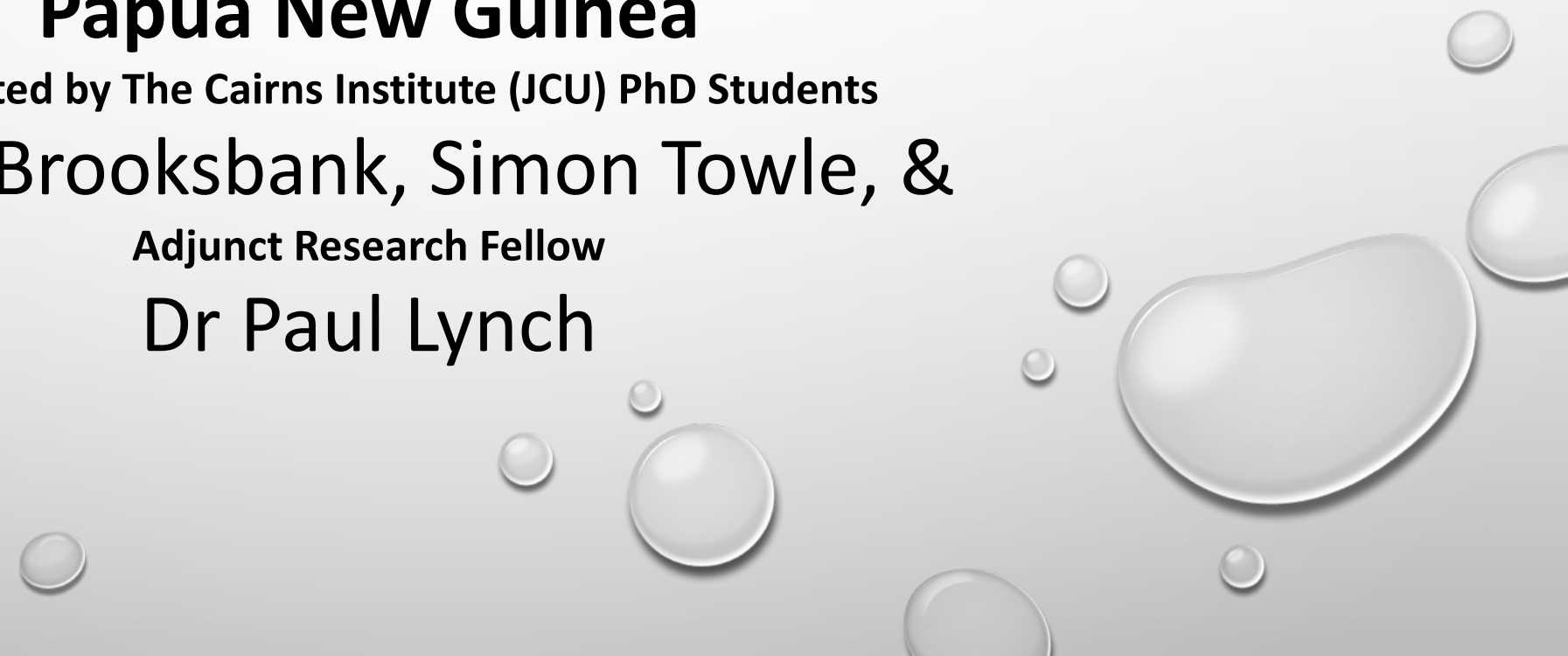
Niu Pawa
Sustainable Energy for Manus Province,
Papua New Guinea

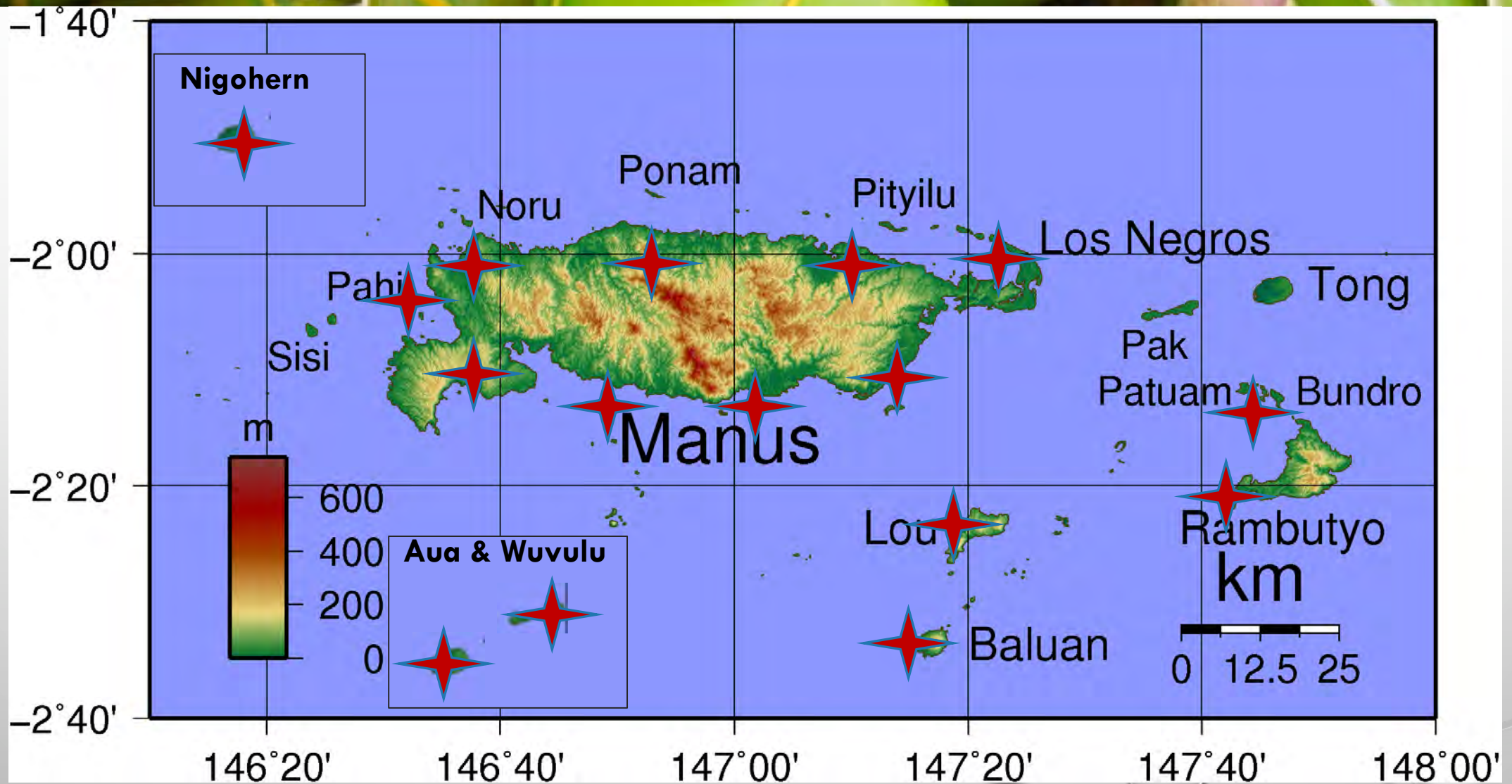
Presented by The Cairns Institute (JCU) PhD Students

Lokes Brooksbank, Simon Towle, &

Adjunct Research Fellow

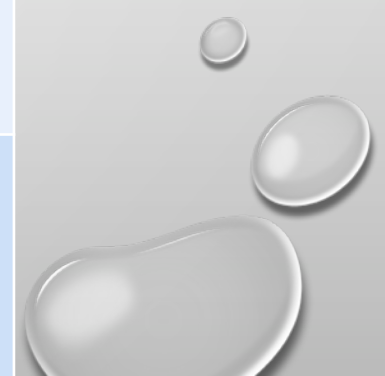
Dr Paul Lynch







Population	50,321 (2011 census)
Population Growth Since 2000	0.7%
Population Density	24 person/sq. Km
Average Household Size	4.5 persons.
Highest Population	Lorengau Urban (15.1%)
Land Mass	1,943 sq/k
Sea Mass	461,693.4 sq/k
Rainfall	average 3,750 mm per annum
Soil Type	Volcanic, gravel sand, limestone, clay and large areas of low laying mangroves/swamps.
Land Use	Mainly for food crops farming. Areas of rubber, cocoa , vanilla in the inland area, and coconut all over the coastal areas and the outer islands.



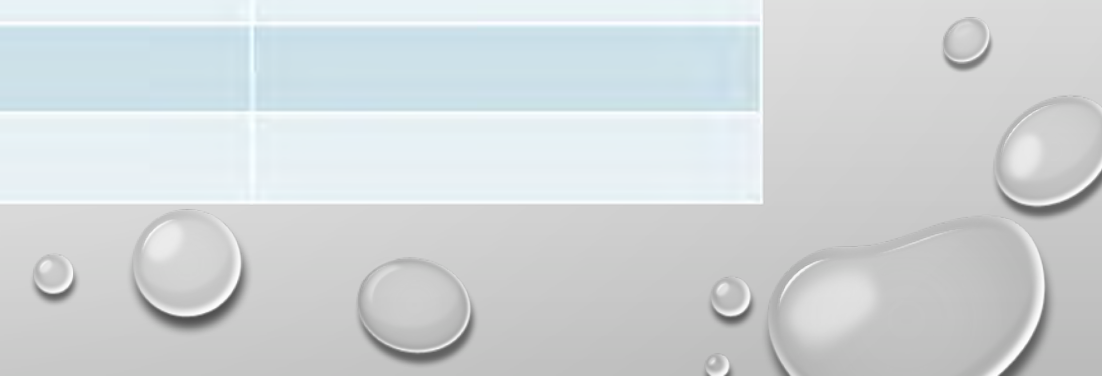




		% OF POPULATION
SMALLHOLDERS	EST: 6,000	11%
Average Small Holder	2 x Hectare planting	
DISTRIBUTION of coconut plantings	12 X LLG	
CURRENT MAJOR PRODUCING LLGs	RAPATONA	6.8%
	NIGOHERM	3.1%
	AWA WUVULU	2.2 %
		11.1%
CURRENT ANNUAL AVERAGE PROCUCTION	200TONS/YR (Silan Ltd purchase data)	
Provincial Potential production	Est: 20,000tons/yr	6,000 small holders 6,626Ha Plantation

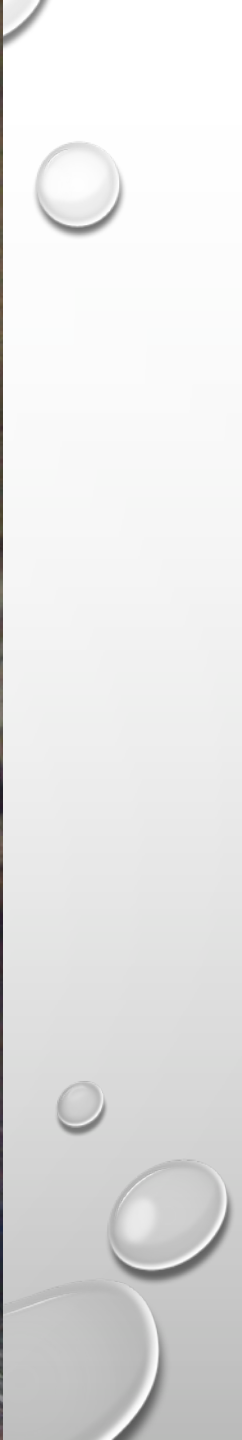


INFORMATION	DATA	AVERAGES
PLANTATIONS IN MANUS	24	
HECTARAGE	6,626 Hectares	276.1125 Ha
CAPACITY OUTPUT - HIGH INPUT SCALE	4,638.6 t/Ha	193 t/Ha
CAPACITY OUTPUT - LOW INPUT SCALE	1393.543 t/Ha	57.98 t/Ha
Source: PNGCCI 2002		





2010-05-20



Estimated cost and coconut oil production

Levelised cost of electricity (LCOE) is a commonly used measure which reflects the average cost of electricity generation and can also be utilised to calculate the average minimum cost at which electricity can be sold (IEA, 2005). The LCOE considers lifetime costs to lifetime electricity generation such as maintenance, servicing, replacement of parts, fuel and initial capital investment costs (IEA, 2005; Cole & Banks, 2017).

- Specific cost analysis for coconut biofuels are not as readily available in comparison to solar and wind, however a detailed study of coconut fuel in Fiji estimates LCOE of electricity generated using coconut oil to be \$0.40 per kWh compared with \$0.47 per kWh using solar technology alone. Data from literature focusing on Pacific suggests that on small Pacific islands coconut fuel could be produced at \$0.70 per litre compared with diesel at \$0.80 per litre equalling 12% less which would be reflected in LCOE calculations.
- A thousand mature coconuts weighing approximately 1,440 kilograms yield around 170 kilograms of copra from which around 70 litres of coconut oil can be extracted (Bourke & Harwood, 2009). Referring to these figures, $70/170 = 0.14$ litres of oil per kilo of copra, latest DPI estimates suggest that 200 tonnes of copra is currently being purchased on Manus Island, potential past DPI figures estimate that with operational plantations and small holding plots a median figure of 20,000 tonnes of copra be produced annually. 20,000 tonnes = 820,000 litres which is equal to 4,100,200 litre barrels of coconut oil per year.



PRESENTATION REFERENCE SOURCES

- SLIDE 1 - *Papustyla pulcherrima*, Manus Green Shell, adapted from google images.
- SLIDE 2 – Map of plantations locations, manus province PNG. Adapted from Department of Primary industries Papua New Guinea, 2010.
- SLIDE 4 - Manus bio-fuels infrastructure, Towle, 2010.
- SLIDE 7 - Copra Shed, adapted from DPI, 2010.