



**FIJI NATIONAL  
UNIVERSITY**



**Pacific Horticultural  
& Agricultural Market  
Access Plus Program**

Supported by Australia & New Zealand

# Coconut Varieties and their Derived Products

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**NEW ZEALAND  
FOREIGN AFFAIRS & TRADE  
Aid Programme**

# Introduction

Coconut Industry serves as a significant importance to the Fijian economy due to its contribution to economic and social wellbeing of most rural based population. It has proven over the years to be an important source of livelihood for most rural and maritime people, even though the performance of the industry has been on the decline since 1970s. Its resilience has encouraged Government to continue to rehabilitate and develop this industry which supports an estimated 280,000 farmers who are dependent on it for livelihood. Coconut covers an area of about 64,188 ha of arable land. Coconuts are a critical part of the Fijian way of life with almost 1 in 32 people dependent on coconuts.

The performance of the industry has been largely affected by natural disasters, coconut timber harvesting from senile palms, the shift to more lucrative shorter-term crops like Kava and taro, low yields, high transportation costs with unfavourable market prices. These coupled with the lack of labour and high labour costs have caused many farmers to lose interest in the once lucrative industry.

Traditionally, copra production was the primary focus of this industry, with coconut oil as the primary product. However, in recent years, there has been a significant shift towards the development of value-added coconut products in Fiji. This transition is driven by various factors, including changing consumer preferences, global market trends, and the desire for sustainability. to other divisions, depending on the market opportunities.

The increasing demand for value-added products has sparked interest in exploring and cultivating different coconut varieties to meet consumer preferences and diversify product offerings in the market. This booklet provides valuable information about selected coconut varieties and various value-added products derived from them.

## Coconut varieties in Fiji

Fiji has a collection of 17 coconut varieties. These varieties are planted in the Ministry of Agriculture Gene Bank at Taveuni Research and Development Centre. The varieties are:

Tall Coconut Varieties	
Dwarf Variety	
Fiji Tall	Malayan Green Dwarf
Rotuman Tall	Malayan Red Dwarf
Rennel Island Tall	Malayan Yellow Dwarf
Niu Yabia	Niu Leka Dwarf
Niu Yalewa	Niu Bulu Drau
Markham Valley Tall	Mua Hybrid
Niu Ni Magimagi	Niu ni Tonga
Stripe	Niu wai
Niu Kitu	



# Malayan Red Dwarf

"A delicious source of hydration"



Variety	Malayan Red Dwarf (MRD)
Starts bearing	3 years after planting
Water content/nut (ml)	550
Brix content (%)	5
No. of bunch/tree/year	10
No. of nuts/bunch	8
Whole nut weight (kg)	0.90
Weight of husked nut (kg)	0.60
Kernel thickness (mm)	14.2
Shell thickness (mm)	2.5
Fresh kernel weight/nut (g)	230
Dry copra weight/nut (g)	120
Yield (Coconuts/ha/year)	8000
Expected Gross income (sales of drinking coconut)	\$16,000/ha/year

# Malayan Yellow Dwarf

"A delicious source of hydration"



Variety	Malayan Yellow Dwarf (MYD)
Starts bearing	3 years after planting
Water content/nut (ml)	580
Brix content (%)	5
No. of bunch/tree/year	10
No. of nuts/bunch	7
Whole nut weight (kg)	1.4
Weight of husked nut (kg)	0.87
Kernel thickness (mm)	9.30
Shell thickness (mm)	2.70
Fresh kernel weight/nut (g)	210
Dry copra weight/nut (g)	110
Yield (Coconuts/ha/year)	7000
Expected Gross income (sales of drinking coconut)	\$14,000/ha/year

# Malayan Green Dwarf

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"A delicious source of hydration"



Variety	Malayan Green Dwarf (MGD)
Starts bearing	3 years after planting
Water content/nut	500 ml
Brix content (%)	5
No. of bunch/tree/year	10
No. of nuts/bunch	7
Yield	7000 drinking coconuts/ha/year
Expected Gross income	\$14,000/ha/year

## Fiji Tall Variety



### Characteristics

Starts bearing at	5-7 years
Plant height at first bearing	1.2 m
Plant height at 20 years	20-25 m
Stem	Stout stem
Nut colour	Green to reddish brown
Economic life span	60 -80years
No of bunches/tree/year	11
Matured nuts/bunch	6
Average nuts/hectare	5800-6000
Average whole nut weight (kg)	1.59
Average Husked nut weight (kg)	0.65
Fresh kernel weight/nut (kg)	0.36
Dry copra/nut (kg)	0.18
Copra production (t/ha)	0.9



## Rennell Island Tall



### Characteristics

Starts bearing at	5-7 years
Plant height at first bearing	1.2 m
Plant height at 20 years	10-15 m
Stem	Stout stem
Nut color	Green to reddish brown
Economic life span	60 -80 years
No of bunches/tree/year	8-12
Matured nuts/bunch	4-6
Average nuts/hectare	5500-6800
Average whole nut weight	2.5 kg
Average Husked nut weight	1.4 kg
Fresh kernel weight/nut (kg)	0.6 kg
Dry copra/nut (kg)	0.33 kg
Copra production (t/ha)	1.5

## Rotuman Tall



### Characteristics

Starts bearing at	5-7 years
Plant height at first bearing	1.2 m
Plant height at 20 years	10-15 m
Stem	Stout stem
Nut color	Green to reddish brown
Economic life span	60 -80 years
No of bunches/tree/year	8-12
Matured nuts/bunch	4-6
Average nuts/hectare	5500-6800
Average whole nut weight	2.5 kg
Average Husked nut weight	1.4 kg
Fresh kernel weight/nut (kg)	0.6 kg
Dry copra/nut (kg)	0.33 kg
Copra production (t/ha)	1.5



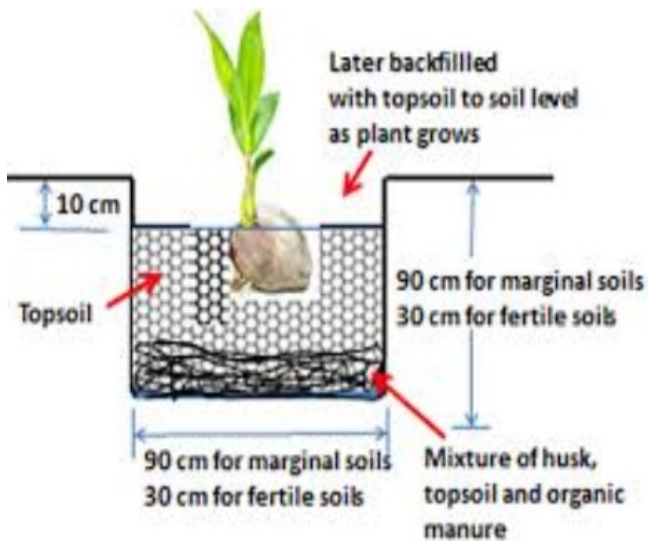
## Mua Hybrid



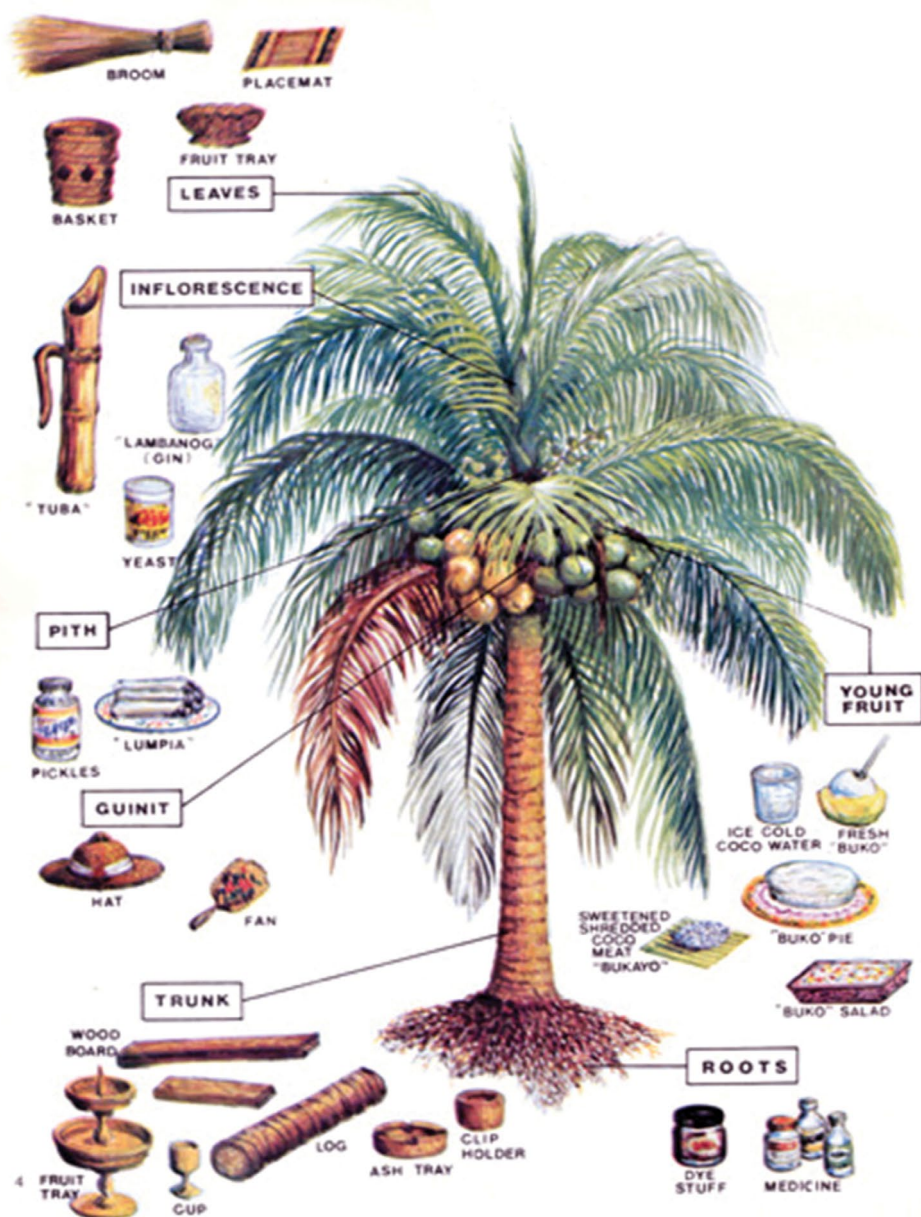
### Characteristics

Origin	Malayan Red Dwarf x Rotuman Tall
Local Name	Mua Hybrid
Yield (Copra production)	1.4 t/ha
Starts bearing at	3-4 years
Plant height at first bearing	~1m
Plant height at 20 years	10-15 m
Stem	Stout stem
Nut colour	Orange to Reddish brown
Economic life span	40 years
No of bunches/tree/year	11
Matured nuts/brunch	6
Average nuts/hectare	6000
Average whole nut weight (kg)	2.20
Average Husked nut weight (kg)	0.98
Fresh kernel weight/nut (kg)	0.48
Dry copra weight/nut (kg)	0.24

## Planting at optimal depth to withstand cyclones



# Coconut products





## Economics of 6,000 coconuts

From 1 Hactare coconut plantation every year for the next 30-50 years

PRODUCT	UNIT	GROSS VALUE
Copra	1 ton	\$1200
Husked coconuts	6000 nuts	\$3000
VCO	400 litres	\$4000
Drinking coconut (Bu)	6000 Bu	\$12,000
Cups (Bilo) - biproduct from VCO	6000 Bilo	\$12,000
Soap - biproduct from VCO	2000 bars	\$4000
Copra meal - biproduct from VCO	525 kg	\$437



## COCONUT GROSS MARGIN - WET (GREEN) COPRA EQUIVALENT

Using Traditional Farming Systems at minimal input at 123 plants per hectare

INCOME	UNIT	AMOUNT	RATE/UNIT	TOTAL
Coconuts	no.	6000		
Copra dry	tonne	1	1200	\$1,200.00
Husks*	no.	6000	0.01	\$60.00
Shells	no.			
Leaves	no.			
<b>TOTAL</b>				<b>\$1,260.00</b>
<b>VARIABLE COSTS</b>				
<i>Labour</i>				
Clearing of weeds	times	4	100	\$400.00
Collecting of nuts	persondays	4	15	\$60.00
Cutting of coconuts and deflesh	persondays	4	15	\$60.00
Bagging of Copra	persondays	1	15	\$15.00
Other Costs				\$0.00
Empty bags	no.	24	1	\$24.00
Miscellaneous Costs				\$71.00
<b>TOTAL VARIABLE COSTS</b>				<b>\$630.00</b>
<b>GROSS MARGIN</b>				<b>\$630.00</b>
Technical Coefficients	Details	Comments		
Spacing	9m x 9m	Traditional spacing		
Number of Nuts per hectare	123	Fiji Tall variety		
*Opportunity Costs of coconut husks/kg	\$0.25	Used as Firewood for drier		
Clearing of Coconut Plantation	Quarterly	Mostly the removal of Shrubs		



## COCONUT GROSS MARGIN - DRY COPRA EQUIVALENT

*Using Traditional Farming Systems at minimal input at 123 plants per hectare*

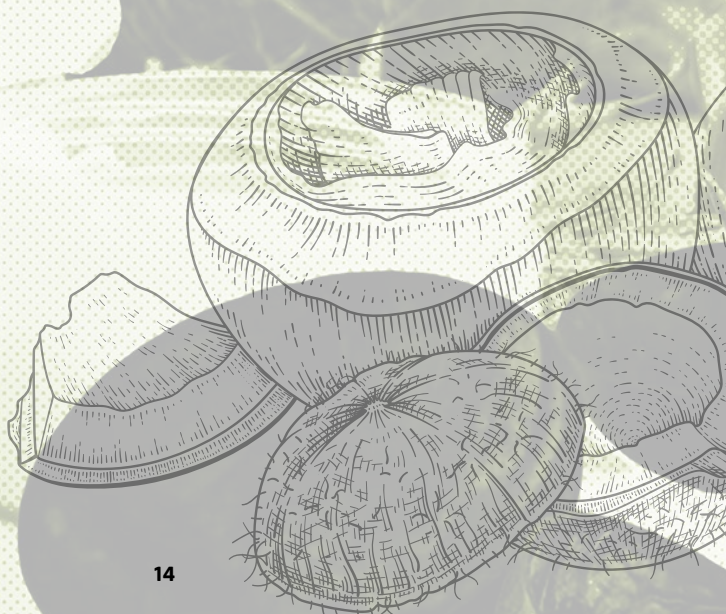
INCOME	UNIT	AMOUNT	RATE/UNIT	TOTAL
Coconuts	no.	6000		
Copra dry	tonne	1	1200	\$1,200.00
Husks*	no.	6000	0.01	\$60.00
Shells	no.			
Leaves	no.			
<b>TOTAL</b>				<b>\$1,260.00</b>
<b>VARIABLE COSTS</b>				
<i>Labour</i>				
Clearing of weeds	times	4	100	\$400.00
Collecting of nuts	persondays	4	15	\$60.00
Cutting of coconuts and deflesh	persondays	4	15	\$60.00
Firewood cutting and collection	persondays	2	15	\$30.00
Fireman costs	persondays	4	15	\$60.00
Cartage of firewood & husks to drier	persondays	1	15	\$15.00
Turning of Copra after 2 days	persondays	1	15	\$15.00
Bagging of Copra	persondays	1	15	\$15.00
Other Costs				<b>\$0.00</b>
Empty bags	no.	24	1	<b>\$24.00</b>
<b>Miscellaneous Costs</b>				<b>\$71.00</b>
<b>TOTAL VARIABLE COSTS</b>				<b>\$750.00</b>
<b>GROSS MARGIN</b>				<b>\$510.00</b>
Technical Coefficients	Details	Comments		
Spacing	9m x 9m	Traditional spacing		
Number of Nuts per hectare	123	Fiji Tall variety		
*Opportunity Costs of coconut husks/kg	\$0.01	Used as Firewood for drier		
Clearing of Coconut Plantation	Quarterly	Mostly the removal of Shrubs		



## GROSS MARGIN OF 6,000 HUSKED COCONUTS

*Husked nuts from own plantation at farm gate sales*

Details	Unit	Amount	Rate	Total
Sale of coconut (husked)	no	6000	\$0.30	\$1,800.00
Husks*	no	6000	\$0.01	\$60.00
Gross Income				\$1,860.00
<b>Expenditure</b>				
<b>Variable Costs</b>				
Collection	mandays	4	\$20.00	\$80.00
Husking	mandays	40	\$20.00	\$800.00
Marketing	mandays	4	\$20.00	\$80.00
<b>Total Variable Costs</b>				<b>\$960.00</b>
<b>Gross Margin</b>				<b>\$900.00</b>
*Opportunity Costs of Coconut Husks				



## GROSS MARGIN OF VCO 6,000 HUSKED COCONUTS

*Manual VCO production from own plantation*

Details	Unit	Amount	Rate	Total
Sale of VCO	litres	400	\$10.00	\$4,000.00
Husks*	no	6000	\$0.01	\$60.00
Shell*	no	12000	\$0.01	\$120.00
Coconut Crude Oil	litres	100	\$3.00	\$300.00
Coconut Meal	kg	520	\$0.75	\$390.00
				<b>\$0.00</b>
<b>Gross Income</b>				<b>\$4,060.00</b>
<b>Expenditure</b>				
<b>Variable Costs</b>				
Collection	mandays	4	\$20.00	\$80.00
Husking	mandays	40	\$20.00	\$800.00
Scraping	mandays	15	\$20.00	\$300.00
Pressing & coco meal prep				
Harvesting & Filtering	mandays	15	\$20.00	\$300.00
Drying	mandays	15	\$20.00	\$300.00
Bottling & labelling	mandays	2	\$20.00	\$40.00
Empty Bottles	no	400	\$0.45	\$180.00
Label	no	400	\$0.05	\$20.00
Empty bags	no.	13	\$1.00	\$13.00
Marketing	mandays	4	\$20.00	\$80.00
<b>Total Variable Costs</b>				<b>\$2,413.00</b>
<b>Gross Margin</b>				<b>\$1,647.00</b>

\*Opportunity Costs of Coconut Husks



## GROSS MARGIN OF VCO 6,000 HUSKED COCONUTS

*Manual VCO production from purchased husked nuts*

Details	Unit	Amount	Rate	Total
Sale of VCO	litres	400	\$10.00	\$4,000.00
Husks*	no	6000	\$0.01	\$60.00
Shell*	no	12000	\$0.01	\$120.00
Coconut Crude Oil	litres	100	\$3.00	\$300.00
Coconut Meal	kg	520	\$0.75	\$390.00
				<b>\$0.00</b>
<b>Gross Income</b>				<b>\$4,060.00</b>

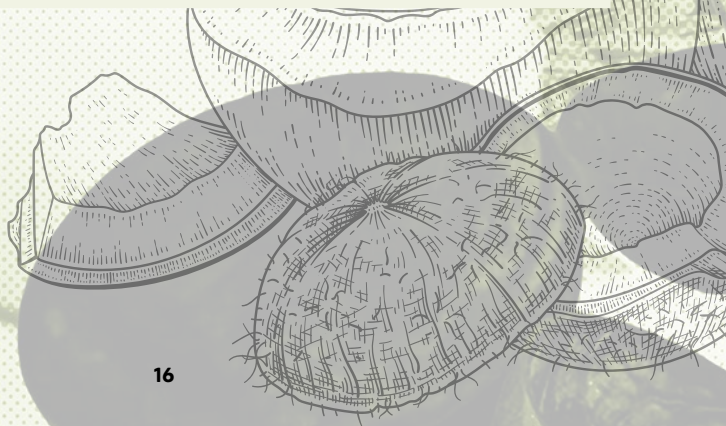
### Expenditure

#### Variable Costs

Purchase of husked nuts	nuts	6000	\$0.30	\$1,800.00
Scraping	mandays	15	\$20.00	\$300.00
Pressing & coco meal prep	mandays	15	\$20.00	\$300.00
Harvesting & Filtering	mandays	15	\$20.00	\$300.00
Drying	mandays	15	\$20.00	\$300.00
Bottling & labelling	mandays	2	\$20.00	\$40.00
Empty Bottles	no	400	\$0.45	\$180.00
Label	no	400	\$0.05	\$20.00
Empty bags	no.	13	\$1.00	\$13.00
Marketing	mandays	4	\$20.00	\$80.00
<b>Total Variable Costs</b>				<b>\$3,333.00</b>

**Gross Margin** **\$727.00**

\*Opportunity Costs of Coconut Husks





## GROSS MARGIN OF SOAP FROM 6,000 COCONUTS

*Soap production as a byproduct of VCO*

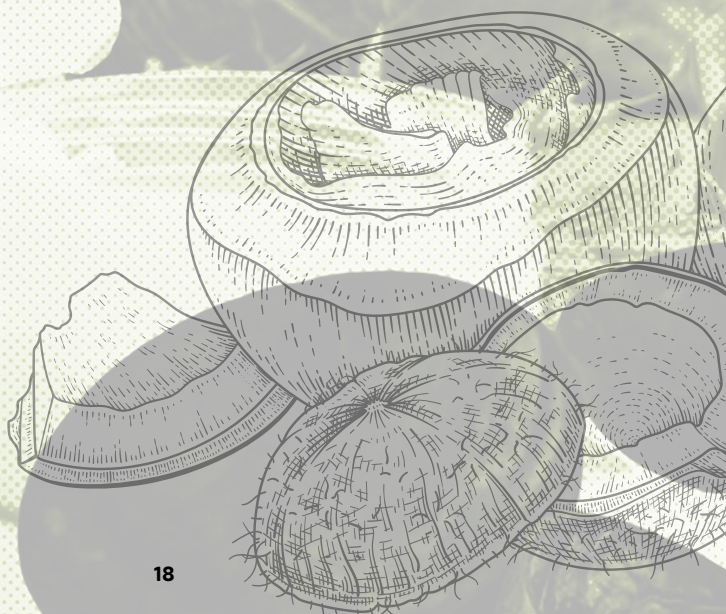
Details	Unit	Amount	Rate	Total
Sale of coconut soap	no	2000	\$1.00	\$2,000.00
Gross Income				\$2,000.00
<b>Expenditure</b>				
<b>Variable Costs</b>				
Mixing of ingredients	mandays	1	\$20.00	\$20.00
Coconut Crude Oil	litre	100	\$3.00	\$300.00
Caustic Soda	kg	14.5	\$12.00	\$174.00
Moulding	mandays	1	\$20.00	\$20.00
Harvesting	mandays	1	\$20.00	\$20.00
Labelling & Packaging	mandays	1	\$20.00	\$20.00
<b>Total Variable Costs</b>				<b>\$494.00</b>
<b>Gross Margin</b>				<b>\$1,506.00</b>



## GROSS MARGIN OF BOWLS FROM 6,000 COCONUTS

*Using the mechanised Option without handle*

Details	Unit	Amount	Rate	Total
Sale of Yaqona Bowls	no	6000	\$1.00	\$6,000.00
Gross Income				\$6,000.00
<b>Expenditure</b>				
<b>Variable Costs</b>				
Inputs				
Electricity	daily	250	\$0.10	\$25.00
Vanish	bowls	6000	\$0.05	\$300.00
Sand Paper	sand paper	6000	\$0.05	\$300.00
Labour				
Scraping	bowls	6000	\$0.10	\$600.00
Polishing	mandays	1	\$20.00	\$20.00
Vanishing	mandays	1	\$20.00	\$20.00
Marketing	mandays	1	\$20.00	\$20.00
<b>Total Variable Costs</b>				<b>\$1,285.00</b>
<b>Gross Margin</b>				<b>\$4,715.00</b>





## GROSS MARGIN OF BOWLS FROM 6,000 COCONUTS

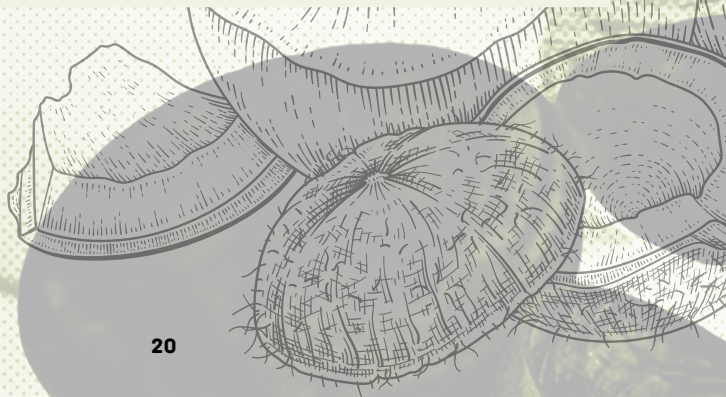
*Using the mechanised Option with handle*

Details	Unit	Amount	Rate	Total
Sale of Yaqona Bowls	no	6000	\$1.00	\$6,000.00
Gross Income				\$6,000.00
<b>Expenditure</b>				
<b>Variable Costs</b>				
Inputs				
Electricity	daily	250	\$0.10	\$25.00
Vanish	bowls	6000	\$0.05	\$300.00
Sand Paper	sand paper	6000	\$0.05	\$300.00
Coco wood for handle	senile tree	1	\$50.00	\$50.00
Labour				
Scraping	bowls	6000	\$0.10	\$600.00
Felling of senile tree & ripping	contract	1	\$50.00	
Handle Preparation & fitting	mandays	250	\$0.10	\$25.00
<b>Polishing</b>	<b>mandays</b>	<b>1</b>	<b>\$20.00</b>	<b>\$20.00</b>
<b>Vanishing</b>	<b>mandays</b>	<b>1</b>	<b>\$20.00</b>	<b>\$20.00</b>
<b>Marketing</b>	<b>mandays</b>	<b>1</b>	<b>\$20.00</b>	<b>\$20.00</b>
<b>Total Variable Costs</b>				<b>\$1,360.00</b>
<b>Gross Margin</b>				<b>\$4,640.00</b>

## GROSS MARGIN OF DESSICATED COCONUTS FROM 6,000 NUTS

*Dessicated Coconut and Coconut Ice Cream using own coconuts*

Details	Unit	Amount	Rate	Total
Dessicated coconut (2:1)	kg	570	\$3.00	\$1,710.00
Coconut Ice Cream	litres	2400	\$5.00	\$12,000.00
Gross Income				\$13,710.00
<b>Expenditure</b>				
<b>Variable Costs</b>				
Inputs				
Electricity	daily	6000	\$0.10	\$600.00
Coconut Cream	litres	2400	\$0.10	\$240.00
White Sugar	500 gram pack	400	\$2.95	\$1,180.00
Vanilla	50 ml bottle	480	\$3.00	\$1,440.00
Containers for packing	2 litre	1200	\$0.50	\$600.00
Labour				
Scraping	nuts	6000	\$0.10	\$600.00
Pressing	kg wet	1140	\$0.10	\$114.00
Drying (mechanised)	kg wet	1140	\$0.10	\$114.00
Blending	kg wet	570	\$0.05	\$28.50
Packing	mandays	1	\$20.00	\$20.00
Marketing	mandays	1	\$20.00	\$20.00
<b>Total Variable Costs</b>				<b>\$4,956.50</b>
<b>Gross Margin</b>				<b>\$8,753.50</b>





## GROSS MARGIN OF ROASTED COCONUTS FROM 6,000 NUTS

*As a bakery product, deseert, cookie, porridge from own plantation*

Details	Unit	Amount	Rate	Total
Roasted coconut	345g pack	2608.696	\$3.75	\$9,782.61
Coconut milk				
Conversion rate 2 : 1				
<b>Gross Income</b>				\$9,782.61
<b>Expenditure</b>				
<b>Variable Costs</b>				
<i>Inputs</i>				
White Sugar	kg	200	\$2.95	\$590.00
Electricity	mandays	75	\$4.50	\$337.50
Gas	cylinder	1	\$60.00	\$60.00
Plastic bags	no	2608.696	\$0.50	\$1,304.35
<i>Labour</i>				
Deshelling (manual)	nuts	6000	\$0.10	\$600.00
Removal of testa	nuts	6000	\$0.10	\$600.00
Manual grater	nuts	6000	\$0.10	\$600.00
Mixing of white sugar & water	grated nuts	6000	\$0.05	\$300.00
Stir Frying on low flame	grated nuts	6000	\$0.05	\$300.00
Separation of crystallised sugar	grated nuts	6000	\$0.05	\$300.00
Packing into 375kg packs	packs	2608.696	\$0.10	\$260.87
Marketing	mandays	1	\$20.00	\$20.00
<b>Total Variable Costs</b>				<b>\$5,272.72</b>
<b>Gross Margin</b>				<b>\$4,509.89</b>

## GROSS MARGIN OF COCONUT CHIPS FROM 6,000 NUTS

*As snacks for up market clientele*

Details	Unit	Amount	Rate	Total
Coconut Chips	100 gram packs	8500	\$1.00	\$8,500.00
Gross Income				\$8,500.00
<b>Expenditure</b>				
<b>Variable Costs</b>				
Inputs				
White Sugar	kg	500	\$2.95	\$1,475.00
Electricity	mandays	75	\$0.50	\$37.50
Plastic bags	no	8500	\$0.05	\$425.00
Labour				
Deshelling (manual)	nuts	6000	\$0.10	\$600.00
Removal of testa	nuts	6000	\$0.10	\$600.00
Manual slicer	nuts	6000	\$0.10	\$600.00
Mixing of white sugar & water	grated nuts	6000	\$0.05	\$300.00
Stir Frying on low flame	grated nuts	6000	\$0.05	\$300.00
Separation of crystallised sugar	grated nuts	6000	\$0.05	\$300.00
Packing into 100g packs	packs	8500	\$0.10	\$850.00
Marketing	mandays	1	\$20.00	\$20.00
<b>Total Variable Costs</b>				<b>\$5,507.50</b>
<b>Gross Margin</b>				<b>\$2,992.50</b>

