

PULSES

BOOKLET

2012



Ministry of Primary Industries
Department of Agriculture

Produced by: Legalega Research Station

Foreword

Pulse is a leguminous crop yielding from one to twelve grains or seeds of valuable size, shape, and colour within a pod. Basically it is cultivated for food e.g. pigeon pea, cowpea etc and fodder e.g. Dum peas (matar dhal) and peanut (foliar) for the pig industry in Australia and China. They are important food crops due to their high protein and essential amino acid content. Like many leguminous crops, pulses play a key role in crop rotation due to their ability to fix nitrogen. Pulses contain 20-25% protein by weight, which is double the protein content of wheat and three times that of rice. For this reason, pulses are sometimes called “poor man’s meat”.

Pulses have significant nutritional and health advantages for consumers. They are the most important dietary predictor of survival in older people of different ethnicities as the fat content is negligible in consumption. Health benefits also include eating pulses like chickpea and soybean that could reduce mortality from coronary heart disease.

The main pulses found in Fiji are Pigeon pea, Cowpea, Urd and Mung bean. This group of crop is most suitable to be grown in the western and northern parts of the country as they thrive well under minor drought conditions.

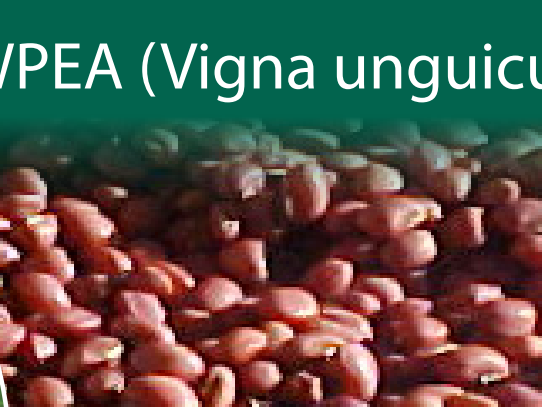
The ability of pulse crop to fix atmospheric nitrogen makes them valuable crop in a farming system. As they are short term crops, pulses can provide additional income to farmers who grow longer term crops, such as sugarcane. Pulses such as pigeon pea are dual purpose crops and can be grown either as a vegetable or as a grain crop. This provides growers with useful alternatives as they can allow the crop to mature and harvest the dry grain for dhal if prices for green pods are not favorable. Pulses are one of the most suitable groups of crops that can be successfully used as a crop with sugarcane without affecting the yields of cane.

With adoption of new cultivars, production can be achieved year round instead of being seasonal. The technological advantages of the pulse crops include their nitrogen fixing ability, rationing ability, drought tolerance, a short growing season, a good height for ease of picking and their capability to grow in the inter row between cane without adversely affecting yields.

Fiji currently imports around \$3.5m to 4.5million worth of pulses for local consumption from countries such as Singapore, Thailand, Malawi, Australia, New Zealand, China, Vietnam and Canada. A total of 921 tonnes of mixed pulses were imported in 2009. Fiji also exports about 54 tonnes of locally grown pulses to countries such as New Zealand, Australia, Canada, Kiribati and Nauru. This includes cowpea as fresh and frozen, while pigeon pea as fresh and peanut (Biosecurity Authority of Fiji, 2009).

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Miliakere Nawaikula (Mrs)
Director Research
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COWPEA (*Vigna unguiculata*)



Rachna variety



RECOMMENDED VARIETIES

MANA preferred for export
RACHNA for local consumption
SHIKAR for local consumption
TARA preferred for export

Maturity

Mana : 65 to 70 days
Rachna : 55 to 60 days
Shikar : 55 to 60 days
Tara : 65 to 70 days

Average fresh cowpea exports
(2009,BAF) : 31888kg

Average frozen cowpea
exports(2009,BAF) : 11718kg

Average mixed pulses imports
(2009,BAF) 922 tonnes

NUTRITINAL FACTS—KRS CHEMISTRY LAB

Nitrogen %	3.88
Calcium %	0.04
Magnesium %	0.17
Iron (mg/kg)	46
Zinc (mg/kg)	42
Crude Protein%	24.1
CHO%	56.7

Cowpea is an important legume of the tropics with its various uses such as grains, vegetables, fodder and as cover crop. The plant parts that are used for food are nutritious, providing proteins, vitamins and minerals. Another important feature of cowpea is, it fixes atmospheric nitrogen and enriches the soil. Cowpea is also exported to New Zealand and Canada as green pods and to Australia as peeled and frozen green peas.

Seed rate kg/ha, expected yield t/ha and gross margin

Variety	Seed Rate kg/ Ha	Green pod t/ha	Dry Seed t/ha	Gross Margins 4t/ha (\$4.00/kg- Green)	Gross Margin 2.5t/Ha (\$6.00/ kg- Dry)
Mana	28 kg	3 to 4 tonnes	1.5 to 2.0 tonnes	Income \$14,400 Expenses \$5,649.00 Gross margin \$8,751.00	Income \$13,500 Expenses \$6809.00 Gross Margins \$6691.00
Rachna	23 kg	5 to 6 tonnes	2.5 to 3.0 tonnes		
Shikhar	25 kg	4 to 5 tonnes	2.0 to 2.5 tonnes		
Tara	20 kg	5 to 7 tonnes	2.0 to 2.5 tonnes		

Planting Time:

Cowpeas can be planted from February to October. Planting during wetter months (Nov- Jan) will result in heavy vegetation, late flowering and reduced yields.

Planting Density:

Fertile : 65cm between rows and 30cm within rows.
Poor soil : 65cm between rows and 20cm within rows.

Soil Requirements:

Wide range of soil types are suitable but good drainage is necessary.

Method of planting:

Direct sowing in rows. Place one or two seeds 20 to 30cm apart in rows and cover the seeds lightly with soil.

Fertilizer Requirement:

A mixture of Blend A & B at 200kg/ha of each blend applied as basal. (Lower rates on more fertile soil) and Foliar application of Bio Brew growth at the rate of 30ml/15L of water at 6 leaf stage. Apply Bio Brew harvest at the rate of 30ml/15L of water from flowering onwards every fortnight. Soil analysis should be done before fertilizer application.

Weed Control:

Hoeing or mechanical inter row cultivation can be done as and when required.

Pest Control:

Spray Lannate at 21-30ml in 15liters of water for controlling pod borer (*maruca testulalis*) or use Attack at 30ml in 15litres of water.

Permethrine at the rate of 15 ml to 16 Litres of water.

Spray only during the flowering time and as and when required. Regular inspection of the pest during flowering and after each harvest is necessary

Harvesting and Storage:

Handpick green filled tender pods as vegetable for local or export markets. The dry pods are also handpicked, dried. Threshed, winnowed and further sun dried for storage of seeds. For long storage, seeds maybe coated with a thin layer of cooking oil (3ml/100g of seeds) to prevent weevils from attacking.

GROSS MARGIN FOR COWPEA DRY SEED PER HECTARE

Tara variety



1.0 Income

Estimated (Av)Yield	5.0 t (Range 5 to 7 t /ha green pod)	
Conversion to dry seed	2.5t (Ratio 2: 1 green pod to dried seed)	
Farm-gate (Av) price	\$6.00/ kg (range\$5.00-\$10.00)	\$15,000.00
Marketable yield	90%	\$13,500
Rejected(weevils)	10%	\$1,500

2.0 Expenditure

2.1 Land preparation

Ploughing (twice each at \$200.00/ha) \$400.00 Harrowing (twice each at \$100.00/ha) \$200.00 Inter-row cultivation (once at \$150.00/ha) \$150.00 \$750.00

2.2 Material input

20Kg pure seed (Source LRS, rate \$3.58per kg)	\$72.00	
8 bags Blended fertilizer at \$63.00 per Bag (basal application)	\$504.00	
1 Kg Sodium Molybdate (recommended for red soils)	\$32.00	
8 Litres insecticide (Lannate 2L/ha X 4 sprays @\$92/L)	\$736.00	\$1344.00

2.3 Labor (Current farm labor rate of \$15.00 per day)

Seed sowing	07 man days	\$105.00	
Weed control	28 man-days	\$420.00	
Foliar Fert. Application	04 man-days	\$060.00	
Insecticide application	10 man-days (Mist Blower)	\$150.00	
Harvest (4men)&selection	30 man-days	\$1800.0	
Threshing & Drying (2 men)	20 man-days	\$600.00	\$3135.00

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative)	\$1000.00	
Post- harvest expenses (seed grading, packaging, storage etc)	\$500.00	\$1500.00

Total expenditure.....\$6,729.00

3.0 Gross Margin.....\$6,771.00

Effect of yield variation on Revenue			Note: Only harvesting and threshing costs change with yield variations while other costs remain the same
Yield (dry seed)	2.5tonnes	3.0tonnes	
Gross income	\$13,500.00	\$16,200.00	
Expenditure	\$6,729.00	\$7,729.00	
Gross margin	\$6,771.00	\$8,471.00	



GROSS MARGIN FOR COWPEA GREEN POD PER HECTARE

Tara variety



1.0 Income

Estimated (Av) Yield	5t (Range 5 to 7 t /ha)	
Farm gate (Av) price	\$4.00/ kg (range\$3.50-\$5.50)	\$20,000.00
Marketable yield	90%	\$18,000
Rejected(holes and infested with pests)	10%	\$2,000

2.0 Expenditure

2.1 Land preparation

Ploughing (twice each at \$200.00/ha)	\$400.00	
Harrowing (twice each at \$100.00/ha)	\$200.00	
Inter-row cultivation (once at \$150.00/ha)	\$150.00	\$750.00

2.2 Material input

20Kg pure seed (Source LRS, rate \$3.58per Kg)	\$72.00	
8 bags Blended fertilizer at \$63.00 per Bag (basal application)	\$504.00	
1 Kg Sodium Molybdate (recommended for red soils)	\$32.00	
8 Litres insecticide (Lannate 2L/ha X 4 sprays @\$92/L)	\$736.00	\$1344.00

2.3 Labour Current farm labour rate of \$15.00 per day

Seed sowing	07 man days	\$105.00	
Weed control	28 man-days	\$420.00	
Foliar Fert. application	04 man-days	\$060.00	
Insecticide application	10 man-days (Mist Blower)	\$150.00	
Harvesting (5 harvests with 5 men)	30 man-days	\$2250.00	
Selection of marketable pods(2 men)	15man-days	\$450.00	\$3435

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative)	\$1000.00	
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\$1000.00

Total expenditure

\$6529.00

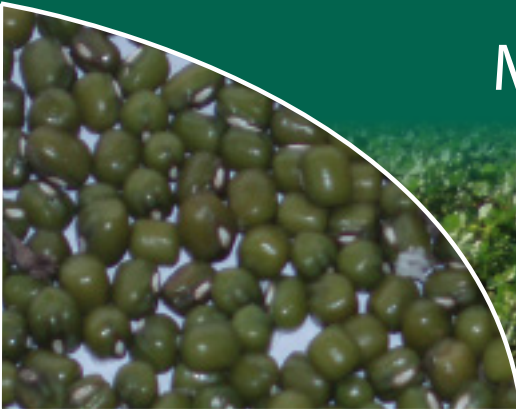
3.0 Gross Margin

\$11,471.00

Effect of yield variation on Revenue			Note: Only harvesting and threshing costs change with yield variations while other costs remain the same
Yield (dry seed)	5.0tonnes	6.0tonnes	
Gross income	\$18000.00	\$21,600.00	
Expenditure	\$6529	\$7579	
Gross margin	\$11,471.00	\$14,021	



MUNG (*Vigna radiata*)



Jyoti variety



Recommended Varieties

Jyoti
Aakarshan

Maturity

Jyoti.....70 to 85 days
Aakarshan.....75 to 90 days

NUTRITIONAL FACTS – KRS CHEMISTRY LAB

Nitrogen %	3.24
Calcium %	0.09
Magnesium %	0.15
Iron (mg/kg)	36
Zinc (mg/kg)	35
Crude Protein%	20.3
CHO%	64.4



Mung is an important legume with its various uses such as grains, vegetable and as cover crop. The dry seeds that are used for food are nutritious, providing proteins, dietary fibre, vitamins and minerals. It makes a delicious dhal whether alone or mixed with other pulses. Mung is also relished as bean sprouts. Another important feature of mung is, it fixes atmospheric nitrogen and enriches the soil.

Seed rate kg/ha, expected yield t/ha and gross margin

Variety	Seed Rate kg/ Ha	Dry seed yield (t/ha)	Dry Seed t/ha	Gross margins (dry @ \$6/kg-1.3t/ha)
Jyoti	18kg	1.0 to 1.5	1.5 to 2.0 tonnes	Gross Income - \$7,800 Expenses - \$3,905 Gross Margin - \$3,895
Aakarshan	22kg	1.0 to 1.6	2.5 to 3.0 tonnes	
Mixed pulses imports(BAF,2009)- 921 tonnes				

Planting Time

Mung can be planted from February to October. Planting during wetter months (Nov-Jan) will result in heavy vegetation, late flowering and reduced yields.

Planting Density

Sow seeds at 45cm between rows and 8cm within rows.

Soil Requirements

Wide range of soil types are suitable but good drainage is necessary.

Method of Planting

Direct sowing in rows. Place one or two seeds 8 cm apart in rows and cover the seeds lightly with soil.

Fertilizer Requirement

Mixture of Blend A & B at 200kg/ha of each blend applied as basal.(Lower rates on more fertile soil). Foliar application of BioBrew growth at the rate of 30ml/15L of water at 6 leaf stage. Apply BioBrew harvest at the rate of 30ml/15L of water from flowering onwards every fortnight.

Soil analysis should be done before fertilizer application.

Pest Control

Spray Lannate at 30ml in 15litres of water for controlling pod borer (*Maruca testulalis*) or use Attack at 30ml in 15litres of water. Spray only during the flowering time and as and when required.

Regular inspection of the pest during flowering and after each harvest is necessary.

Weed Control

Hoeing or mechanical inter row cultivation can be done as and when required.

Harvesting and Storage

The dry pods are handpicked, dried, threshed, winnowed and further sun dried for storage of seeds. For long storage, seeds maybe coated with a thin layer of cooking oil(3ml/100g of seeds) to prevent weevils from attacking.

GROSS MARGIN FOR MUNG DRY SEED PER HECTARE

Aarkashan variety



1.0 Income

Estimated (Av) Yield	1.3 t (Range 1.0 to 1.5 t /ha)
Farm gate (Av) price	\$6.00/ kg (range\$5.00- \$7.00).....\$7,800.00
Marketable yield	90%.....\$7,020.00
Rejected(weevils)	10%.....\$780.00

2.0 Expenditure

2.1 Land preparation

Ploughing (twice each at \$200.00/ha).....	\$400.00
Harrowing (twice each at \$100.00/ha).....	\$200.00
Inter-row cultivation (once at \$150.00/ha).....	\$150.00 \$750.00

2.2 Material input

18Kg pure seed (Source LRS, rate \$3.22per Kg).....	\$58.00
8 bags Blended fertilizer at \$63.00 per Bag (basal application).....	\$504.00
1 Kg Sodium Molybdate (recommended for red soils).....	\$32.00
8 Litres insecticide (Lannate 2L/ha X 4 sprays @\$92/L).....	\$736.00 \$1,330.00

2.3 Labour (Current farm labour rate of \$15.00 per day)

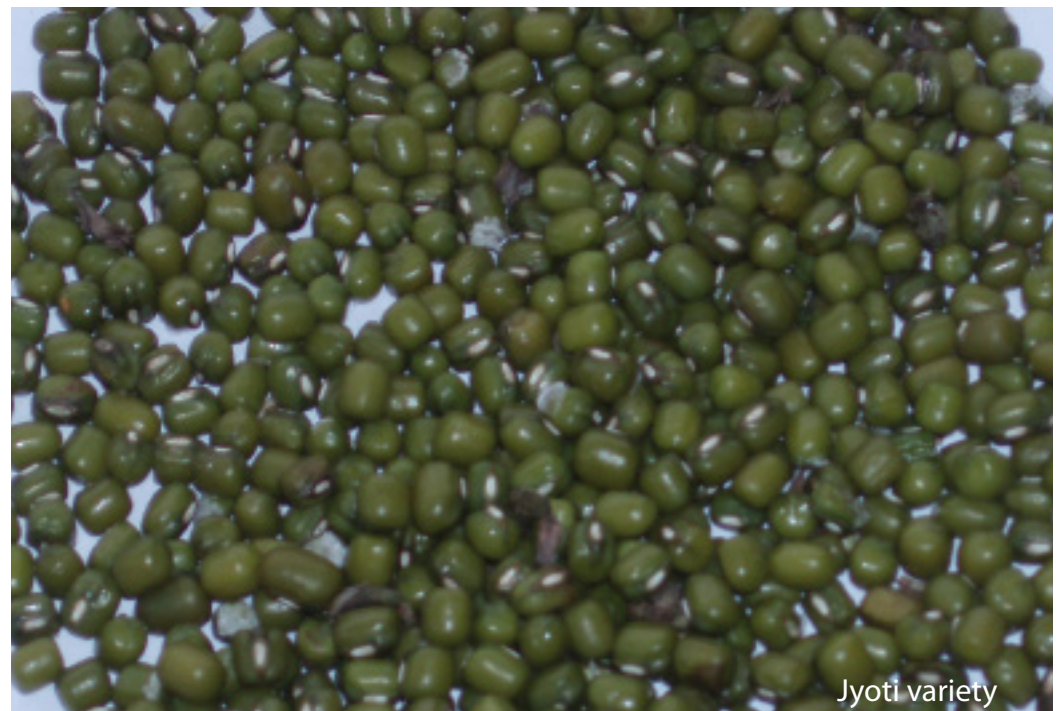
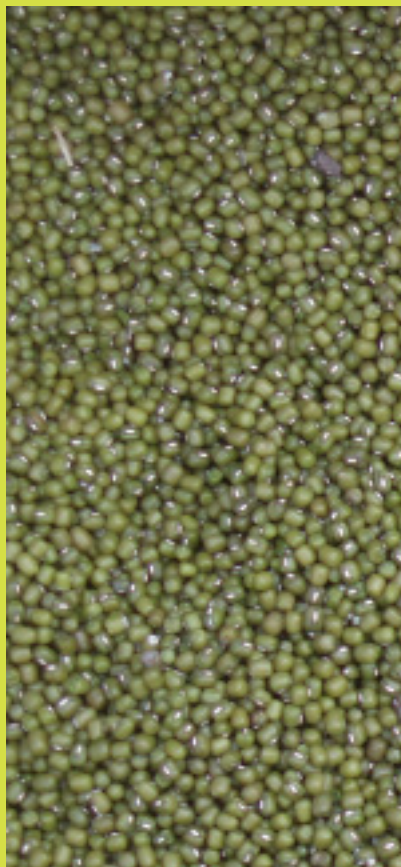
Seed sowing	07 man days.....	\$105.00
Weed control	20 man-days.....	\$300.00
Foliar Fert. Application	04 man-days.....	\$060.00
Insecticide application	04 man-days (Mist Blower).....	\$060.00
Harvesting	20 man-days.....	\$300.00
Threshing & Drying	10 man-days.....	\$150.00 \$975.00

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative).....	\$500.00
Post- harvest expenses (seed grading, packaging, storage etc).....	\$350.00 \$850.00
Total expenditure.....	\$3905.00

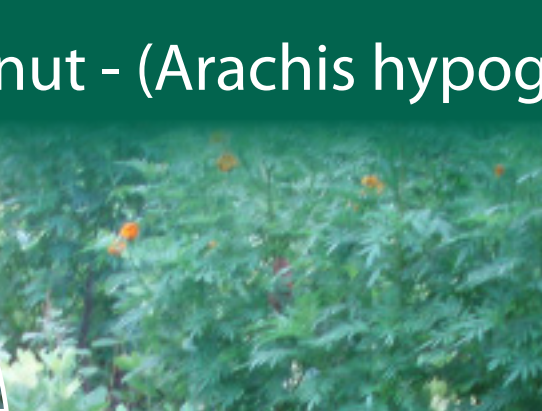
3.0 Gross Margin.....\$3,895.00

Effect of yield variation on Revenue		All mature mung plants are uprooted for post-harvest processes thus keeping costs same.
Yield	1.3tonnes/ha	
Gross income	\$7,800.00	
Expenditure	\$3,905.00	
Gross income	\$ 3,895.00	



Jyoti variety

Peanut - (Arachis hypogaea)



Local Spanish variety



Recommended Varieties

Local Spanish

Vishaal

Volasiga

Maturity

Local Spanish - 100 -115 days

Vishaal -115 to140 days

Volasiga - 115 to 140 days

11.9 tonnes imported (dried)

1.9 tonnes exported - fresh(2009 figures BAF)

NUTRITIONAL FACTS - KRS CHEMISTRY LAB

Nitrogen %	3.11
Calcium%	0.03
Magnesium%	0.22
Iron mg/kg	21
Zinc mg/kg	41
Crude protein%	31.9
CHO%	58.0

Peanut is an important legume of the tropics and can be successfully grown in many parts of the country. It is a good source of vitamins, dietary fibre, oil and proteins. Another important feature of peanut is, it fixes atmospheric nitrogen and enriches the soil.

Seed rate kg/ha, expected yield t/ha and gross margin

Variety	Seed Rate kg/ Ha	Dry seed yield t/ha (unshelled)	Gross margins (dry @ \$8/kg-1.5t/ha)
Local Spanish	115kg	1.5 to 2.8 tonnes	Income - \$12,000 Expenses - \$4,899 Gross Margin -\$7,101
Vishaal	135kg	1.8 to 3.0 tonnes	
Volasiga	107kg	2.5 to 3.6 tonnes	

Planting Time

Peanuts can be planted from February to October. Planting during wetter months (Nov-Jan) will result in heavy vegetation, late flowering and reduced yields.

Planting Density

Sow seeds at the spacing of 65cm between rows and 10cm within rows.

Soil Requirements

It requires light medium soils which are free draining and do not have high clay content.

Method of Planting

Direct sowing in rows. Place one or two seed 10cm apart in rows and cover the seeds lightly with soil.

Weed Control

Hoeing or mechanical inter row cultivation can be done as and when required

Pests and Disease Control

- Peanut leaf rust and peanut leaf spot are two common diseases found in peanut. Spraying fungicides like Kocide at 2g/L. Crop rotation is also recommended as this reduces the resistance build up.

Fertilizer Requirement

- Ammonium Sulphate – 110kg/ha, Single superphosphate – 400kg/ha and Muriate of Potash – 100kg/ha or A mixture of Blend A & B at 200kg/ha of each blend applied as basal. (Lower rates on more fertile soil).
- Foliar application of BioBrew growth at the rate of 30ml/15L of water at 6 leaf stage. Apply BioBrew harvest at the rate of 30ml/15L of water from flowering onwards every fortnight.
- Soil analysis should be done before fertilizer application.

Harvesting and Storage

Harvesting is usually done by pulling up of plants. Plucking of peanuts is done easily soon after harvesting. It is further sun dried and winnowed before bagged for storage.

GROSS MARGIN FOR PEANUT DRY SEED PER HECTARE

Local Spanish variety



1.0 Income

Estimated (Av) Yield	1.5t (Range 1.5 to 2.8 t /ha)	
Farm gate (Av) price	\$8.00/kg (range\$6.00-\$8.00)	\$12,000.00
Marketable yield	90%	\$10,800.00
Rejected (holes and infested with pests)	10%	\$1,200.00

2.0 Expenditure

2.1 Land preparation

Ploughing (twice each at \$200.00/ha)	\$400.00	
Harrowing (twice each at \$100.00/ha)	\$200.00	
Inter-row cultivation (once at \$150.00/ha)	\$150.00	\$750.00

2.2 Material input

115Kg pure seed (Source LRS, rate \$3.96per Kg)	\$456.00	
8 bags Blended fertilizer at \$63.00 per Bag (basal application)	\$504.00	
1 Kg Sodium Molybdate (recommended for red soils)	\$32.00	
1 Litres insecticide (Lannate 1L/ha X 1 spray @\$92/L)	\$92.00	\$1,084.00

2.3 Labour Current farm labour rate of \$15.00 per day

Seed sowing	07 man days	\$105.00	
Weed control	28 man-days	\$420.00	
Foliar Fert. Application	04 man-days	\$060.00	
Insecticide application	02man-days (Mist Blower)	\$030.00	
Harvesting (4men)	20 man-days	\$1200.00	
Selecting/cleaning and drying	20 man-days	\$300.00	\$2115.00

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative)	\$600.00	
Post- harvest expenses (seed grading, packaging, storage etc)	\$350.00	\$950.00
Total expenditure	\$4899.00	

3.0 Gross Margin

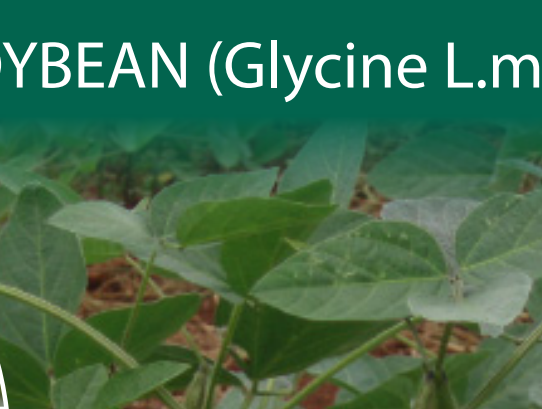
\$7,101.00

Effect of yield variation on Revenue		Harvesting selection and other costs increases with an increase in yield.
Yield	1.5tonnes/ha	
Income	\$12,000.00	
Expenditure	\$4899.00	
Gross Margin	\$7,101.00	



Local Spanish variety

SOYBEAN (Glycine L.max)



Kalokalo variety



Nutritional facts– Soy bean (green) Nutritional value 100g (Wikipedia)

Nitrogen %	3.88
carbohydrates	5.94g
protein	3.04g
water	90.4g
fat	0.18g
Vitamin A%	0 %
Vitamin B6	7%
Vitamin C	22%
Vitamin K	31%
Calcium	1%
Iron	7%
Magnesium	6%
Phosphorus	8%
Potassium	3%
Zinc	4%



Vegetable soybean is one of the new promising crops for Fiji. It can be grown all year round targeting the local hotel industry for the Japanese tourists and local market for making of tofu. The green vegetable soybean can be cooked in many dishes and is highly nutritious. Soybean is one of the leguminous crop that fixes atmospheric nitrogen and enriches the soil.

Variety	Seed rate kg/ha	Green pod yield t/ha	Gross margin (green -3t/Ha @\$4/kg)
Kalokalo	28kg	3 to 5 tonnes	Income— \$10,800.00 Expenses— \$4,648.00 Gross Margin— \$6,152.00

Days to mature: 70 to 80 days for green pods

Planting Time

The variety is photo period non sensitive and can be planted any time of the year. However planting in wetter months (Nov-Jan) will induce vegetative growth, late flowering and have reduced yields.

Planting Density

Fertile soils – 45cm between rows and 20cm within rows.
Poor soils – 45cm between rows and 15cm within rows

Soil Requirements

A wide range of soil types are suitable but prefers black soil and good drainage is necessary.

Method of Planting

Direct sowing in rows. Place one or two seeds 15cm to 20cm apart in rows and cover the seeds lightly with soil.

Weed Control

Hoeing or mechanical inter-row cultivation can be done as and when required.

Pest Control

No major pests have been found but control measures to be taken for leaf miners soybean loop hopper and maruca testulalis.

Use permetherine at the rate of 15ml to 16litres of water

Spray lannate at 21-30ml in 15litres of water or use attack at 30ml in 15 litres of water.

Regular inspection of pest during flowering is recommended.

Fertilizer Requirement

A mixture of Blend A & B at 200kg/ha of each blend applied as basal. (Lower rates on more fertile soil) and Foliar application of BioBrew growth at the rate of 30ml/15L of water at 6 leaf stage. Apply BioBrew harvest at the rate of 30ml/15L of water from flowering onwards every fortnight.

Soil analysis should be done before fertilizer application.

Harvesting and Processing

Handpick green filled tender pods as vegetable for hotels and local market.

GROSS MARGIN FOR SOYBEAN DRY SEED PER HECTARE

Local Spanish variety



1.0 Income

Estimated (Av) Yield	3t (Range 3 to 5t /ha)	
Farm gate (Av) price	\$4.00/ kg(range\$4.00-\$5.00)	\$12,000.00
Marketable yield	90%	\$10,800
Rejected (holes and infested with pests)	10%	\$1,200

2.0 Expenditure

2.1 Land preparation

Ploughing (twice each at \$200.00/ha)	\$400.00	
Harrowing (twice each at \$100.00/ha)	\$200.00	
Inter-row cultivation (once at \$150.00/ha)	\$150.00	\$ 750.00

2.2 Material input

28kg pure seed (Source LRS, rate \$3.58per kg)	\$101.00	
8bags Blended fertilizer at \$63.00 per Bag (basal application)	\$504.00	
1kg Sodium Molybdate (recommended for red soils)	\$32.00	
8litres insecticide (Lannate 2L/ha X 4 sprays @\$92/L)	\$736.00	
		\$1,373.00

2.3 Labour Current farm labour rate of \$15.00 per day

Seed sowing	07 man days	\$105.00	
Weed control	28 man-days	\$420.00	
Foliar Fert. Application	04 man-days	\$060.00	
Insecticide application	06 man-days (Mist Blower)	\$090.00	
Harvesting	20 man-days	\$600.00	
Selecting	15 man-days	\$450.00	\$1725.00

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative)	\$800.00	
	\$ 800.00	

Total expenditure \$4,648.00

3.0 Gross Margin \$6,152.00

Effect of yield variation on Revenue				Harvesting selection and other costs increases with an increase in yield.
Yield	1.5tonnes/ha	2 tonnes/ha	3 tonnes/ha	
Income	\$10,800.00	\$14,400.00	\$18,000.00	
Expenditure	\$4648.00	\$5248.00	\$5548.00	
Gross Margin	\$6,152.00	\$9152.00	\$12,452.00	



Kalokalo variety

PIGEON PEA (*Cajanus cajan*)



Uasivi variety



Nutritional facts– KRS Chemistry Lab

Nitrogen %	3.88
Calcium %	0.04
Magnesium %	0.17
Iron (mg/kg)	46
Zinc (mg/kg)	42
Crude Protein%	24.1
CHO%	56.7

New Improved Varieties

Uasivi - non-seasonal for green pod.
Sharvada non - seasonal for dhal
Bharpur - non-seasonal for dhal

Other recommended Varieties

Kamica - seasonal for Dhal.

Maturity

Uasivi - 85 to 95 (green)
- 120 days (dry)
Kamica - 145 to 155 days (dry)
Sharvada - 110 to 120 days (dry)
Bharpur - 95 to 110 days (dry)

Avg annual import - mixed pulses
(2009, BAF) 921 tonnes

Avg annual pigeon pea export as fresh
(2009, BAF)- 8.4 tonnes

Pigeon pea is one of the promising crops for drier areas of Fiji. It is exported as green pod to New Zealand and Canada and green tender peas to Australia. The green and dry peas can be cooked in many different dishes and are very nutritious, having about 20% protein. Pigeon pea is one of the leguminous crop that fixes atmospheric nitrogen and enriches the soil. There are two types of pigeon pea called photoperiod sensitive (seasonal) and photoperiod non-sensitive (round the year production). Good pest control is necessary to achieve high yields and quality produce.

Seed Rate (kg/ha), Expected Yield (t/ha) and Gross Margin

Variety	Seed rate kg/ha	Greenpod yield t/ha	Dry seed yield t/ha	Gross Margin 4t/ha(Green) @\$5/kg	Gross Margin 2.5t/ha (dry)@ \$6.00/kg
Uasivi	20kg	5 to 6 tons	-	Income \$18,000	Income \$13,500.00
Kamica	30kg	-	1.5 to 2 tons	Expenses \$7,066.00	Expenses \$5,766.00
Sharvada	18kg	-	2.5 to 3.0 tons		
Bharpur	23kg	-	2.0 to 2.5 tons	Gross Margin- \$ 10,934.00	Gross margin- \$7734.00

Planting Time

Kamica is photoperiod sensitive (seasonal). Therefore planting from January to June is recommended. Uasivi, Sharvada and Bharpur are photoperiod non- sensitive (non-seasonal) and can be planted anytime of the year.

(However avoid planting late in the year where flowering will not take place in wetter months thus reducing yields).

Planting Density

Fertile soils – 65cm between rows and 20cm within rows.

Poor soils – 65cm between rows and 10cm within rows.

Soil Requirements

Wide ranges of soil types are suitable but good drainage is necessary.

Method of Planting

Direct sowing in rows. Place one or two seeds 10cm to 20cm apart in rows and cover the seeds lightly with soil.

Weed Control

Hoeing or mechanical inter-row cultivation can be done as and when required.

Pest Control

Spray Lannate at 21-30ml in 15litres of water for controlling pod borer (*maruca testulalis*) or use Attack at 30ml in 15litres of water. Spray only during the flowering time and as and when required. Regular inspection of the pest during flowering and after each harvest is necessary.

Fertilizer Requirement

A mixture of Blend A & B at 200kg/ha of each blend applied as basal. (Lower rates on more fertile soil) and foliar application of Molybdenum powder(1kg/ha) at 2 wks and at 5 wks after planting on red soils only. Foliar application of BioBrew growth at 30 ml/15L of water at 6 leaf stage. Apply BioBrew harvest at 30ml/15L of water from flowering onwards every fortnight. Soil analysis to be done before fertilizer application

Harvesting and Processing

Handpick green filled tender pods as vegetable for local or export market. Use sickle to harvest mature dry pods with stem and sun dry. Thresh, winnow and further sun dry the seeds for storage. For long storage coat seeds with a thin layer of coconut oil to prevent weevils from attacking.

GROSS MARGIN FOR PIGEON PEA DRY SEED PER HECTARE

Bharpur variety



1.0 Income

Estimated (Av) Yield	2.5 t (Range 2 to 3 t /ha)	
Farm gate (Av) price	\$6.00/ kg(range\$6.00-\$8.00)	\$15,000.00
Marketable yield	90%	\$13,500
Rejected(weevils)	10%	\$1,500

2.0 Expenditure

2.1 Land preparation		
Ploughing (twice each at \$200.00/ha)	\$400.00	
Harrowing (twice each at \$100.00/ha)	\$200.00	
Inter-row cultivation (once at \$150.00/ha)	\$150.00	\$ 750.00

2.2 Material input

20Kg pure seed (Source LRS, rate \$4.17per Kg)	\$84.00	
8 bags Blended fertilizer at \$63.00 per Bag (basal application)	\$504.00	
1 Kg Sodium Molybdate (recommended for red soils)	\$32.00	
8 Litres insecticide (Lannate 2L/ha X 4 sprays @\$92/L)	\$736.00	\$ 1356.00

2.3 Labour Current farm labour rate of \$15.00 per day

Seed sowing	07 man days	\$105.00	
Weed control	28 man-days	\$420.00	
Foliar Fert. application	04 man-days	\$060.00	
Insecticide application	10 man-days(Mist Blower)	\$150.00	
Harvesting (2men)	30 man-days	\$900.00	
Threshing & Drying	25 man-days	\$375.00	\$2010.00

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative)	\$1000.00	
Post- harvest expenses (seed grading, packaging, storage etc)	\$650.00	\$1,650.00
Total expenditure		\$5,766.00

3.0 Gross Margin

\$7734.00

Effect of yield variation on Revenue			Note: Only harvesting and threshing costs change with yield variations while other costs remain the same
Yield	2.5tonnes/ha	3tonnes/ha	
Income	\$13,500.00	\$16,200.00	
Expenditure	\$5766.00	\$6216	
Gross Margin	\$7734	\$9,984	



Sharvada variety



GROSS MARGIN FOR PIGEON PEA GREEN POD PER HECTARE

Bharpur variety



1.0 Income

Estimated (Av) Yield	4t (Range 4 to 6 t /ha)	
Farm gate (Av) price	\$5.00/ kg(range\$5.00-\$7.00)	\$20,000.00
Marketable yield	90%	\$18,000
Rejected (holes and infested with pests)	10%	\$2,000

2.0 Expenditure

2.1 Land preparation

Ploughing (twice each at \$200.00/ha)	\$400.00	
Harrowing (twice each at \$100.00/ha)	\$200.00	
Inter-row cultivation (once at \$150.00/ha)	\$150.00	\$ 750.00

2.2 Material input

20Kg pure seed (Source LRS, rate \$4.17per Kg)	\$84.00	
8 bags Blended fertilizer at \$63.00 per Bag (basal application)	\$504.00	
1 Kg Sodium Molybdate (recommended for red soils)	\$32.00	
8 Litres insecticide (Lannate 2L/ha X 4 sprays @\$92/L)	\$736.00	\$1356.00

2.3 Labour Current farm labour rate of \$15.00 per day

Seed sowing	07 man days	\$105.00	
Weed control	28 man-days	\$420.00	
Foliar Fert. application	04 man-days	\$060.00	
Insecticide application	10 man-days(Mist Blower)	\$150.00	
Harvesting (8 harvests with 5 men)	40 man-days	\$3000.00	
Selection of marketable pods	15man-days	\$225.00	\$3960

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative)	\$1000.00
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\$1000.00
\$7066.00

Total expenditure

3.0 Gross Margin

\$10,934

Effect of yield variation on Revenue				Note: Only harvesting and threshing costs change with yield variations while other costs remain the same
Yield	4tonnes/ha	5tonnes/ha	6tonnes/ha	
Income	\$18,000.00	\$22,500.00	\$27,000.00	
Expenditure	\$7,066.00	\$8341.00	\$9691.00	
Gross Margin	\$510,934.00	\$14,159.00	\$17,309.00	



Sharvada variety



URD (Vigna mungo)



Kiran variety



Recommended Varieties :

- Kiran - 65 to 70 days
- Raikivi - 65 to 80 days.

NUTRITIONAL FACTS KRS CHEMISTRY LAB

Nitrogen %	4.39
Calcium %	0.11
Magnesium %	0.19
Iron (mg/kg)	106
Zinc (mg/kg)	33
Crude Protein%	27.4
CHO%	55.8



Urd is one of the important legume crop of the tropics with its various uses such as grains, vegetable, and as cover crop. The plant parts that are used for food are nutritious, providing proteins, vitamins and minerals. Another important feature of urd is, it fixes atmospheric nitrogen and enriches the soil.

Seed rate kg/ha, expected yield t/ha and gross margin

Variety	Seed Rate kg/ha	Dry Seed Yield t/ha	Gross Margin (1.3t/ha-@ \$6.00/kg)
Kiran	17 kg	1.0 to 1.8 tons	Income \$7800
Raikivi	17 kg	1.0 to 1.5 tons	Expenses \$3880
Mixed pulses import(BAF,2009)- 921 tonnes			Gross Margin-\$3920

Planting Time

Urd can be planted from February to October in a well drained soil. Planting during wetter months (Nov-Jan) will result in heavy vegetation, late flowering and reduced yields.

Planting Density

Sow seeds at 45cm between rows and 8cm within rows.

Soil Requirements

Wide range of soil types are suitable but good drainage is necessary.

Method of Planting

Direct sowing in rows. Place one or two seeds 8 cm apart in rows and cover the seeds lightly with soil.

Weed Control

Hoeing or mechanical inter row cultivation can be done as and when required.

Fertilizer Requirement

A mixture of Blend A & B at 200kg/ha of each blend applied as basal. (Lower rates on more fertile soil) and Foliar application of Bio Brew growth at the rate of 30ml/15L of water at 6 leaf stage. Apply Bio Brew harvest at the rate of 30ml/15L of water from flowering onwards every fortnight. Soil analysis should be done before fertilizer application.

Pest Control

Spray Lannate at 30ml in 15liters of water for controlling pod borer (maruca testulalis) or use Attack at 30ml in 15litres of water. Powdery mildew is common and it is advised to practice crop rotation as this will reduce the disease outbreak. Application of Kocide at the rate of 2g/L is also recommended.

Spray only during the flowering time and as and when required. Regular inspection of the pest during flowering and after each harvest is necessary.

Harvesting and Storage

The plants with many dry pods are hand pulled, dried, threshed, winnowed and further sun dried for storage of seeds. For long storage, seeds maybe coated with a thin layer of cooking oil (3ml/100g of seeds) to prevent weevils from attacking.

GROSS MARGIN FOR URD DRY SEED PER HECTARE

Raikivi variety



Kiran variety



1.0 Income

Estimated (Av) Yield	1.3t (Range 1.0 to 1.5 t /ha)	
Farm gate (Av) price	\$6.00/ kg (range \$5.00- \$7.00)	\$7,800.00
Marketable yield	90%	\$7,202.00
Rejected(weevils)	10%	\$780.00

2.0 Expenditure

2.1 Land preparation

Ploughing (twice each at \$200.00/ha)	\$400.00	
Harrowing (twice each at \$100.00/ha)	\$200.00	
Inter-row cultivation (once at \$150.00/ha)	\$150.00	\$750.00

2.2 Material input

17Kg pure seed (Source LRS, rate \$3.70per Kg)	\$063.00	
8 bags Blended fertilizer at \$63.00 per Bag (basal application)	\$504.00	
1 Kg Sodium Molybdate (recommended for red soils)	\$32.00	
8 Litres insecticide (Lannate 2L/ha X 4 sprays @\$92/L)	\$736.00	\$1,335.00

2.3 Labour Current farm labour rate of \$15.00 per day

Seed sowing	07 man days	\$105.00	
Weed control	20 man-days	\$300.00	
Foliar Fert. Application	04 man-days	\$060.00	
Insecticide application	04 man-days (Mist Blower)	\$060.00	
Harvesting	18 man-days	\$270.00	
Threshing & Drying	10 man-days	\$150.00	\$945.00

2.4 Other Expenses

Pre-cultivation expenses (transport, administrative)	\$500.00	
Post- harvest expenses (seed grading, packaging, storage etc)	\$350.00	\$850.00
Total expenditure		\$3880.00
3.0 Gross Margin		\$3920.00

Effect of yield variation on Revenue		All mature Urd plants are uprooted for post-harvest processes thus keeping costs same
Yield	1.3tonnes/ha	
Income	\$7800.00	
Expenditure	\$3880.00	
Gross Margin	\$3920.00	



PULSES BOOKLET



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