MINISTRY OF AGRICULTURE AND FISHERIES

"To increase Food, Nutrition and Income Security"

FARM MANAGEMENT MANUAL 2022/2023

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1. Introduction

The Farm Management Manual for Samoa – 2022/2023 has been compiled by MAF. Specifically, the manual is intended to assist farmers wishing to increase the income from their farms, and for farmers and their advisers to compile and analyze financial information for decision making regarding their farm business.

The manual contains budgets for a range of key cropping, livestock and aquaculture enterprises of commercial importance to Samoa.

The budgets that have been compiled for a general enterprise, based on an average of data collected from a number of farmers. The information in these budgets provides an indication of the profitability of a representative, "typical" enterprise and is designed to be simple to use for making farm business decisions.

The information contained in the manual provides farmers with:

Root Crops
- Taro (Talo Samoa)
- Cocoyam (Talo Palagi)
- Yam (Ufi)
- Ginger (Fiu)
- Giant Taro (Ta'amu)

Vegetables
- Bell Pepper
- Chinese Cabbage
- Cucumber
- Eggplant
- Head cabbage
- Lettuce
- Long Bean
- Tomato
- Radish
- Celery
- Okra
- Sweet Corn
- Pumpkin

Tree Crops & Fruits
- Banana
- Cocoa
- Lime
- Coconut
- Papaya
- Watermelon

Livestock
- Beef cattle
- Chicken (meat)
- Chicken (eggs)
- Piggery
- Sheep

Aquaculture
- Sea grapes
- Tilapia

2. Farm Management

Background

In recent years, there has been increasing recognition that the driving force that will revitalize the agriculture sector will be commercial development. While farmers whose primary objective is family food security are still the largest group of farmers, there are a growing number who are either becoming engaged or are interested in semi-commercial and commercial scale production to earn cash income for the family's needs.

Growing urbanization, tourism and export has given rise to commercial opportunities for increasing the local production of a range of agricultural products.

Advisers have traditionally focused on working with subsistence farmers to address technical issues relating to agricultural production. With increasing emphasis on commercial farming, there is a growing need to adopt a whole-farm management approach to farming, and in particular, to focus more on the business management and financial aspects of farming.

What is Farm Management?

"Farm management" is concerned with the management decisions made by a farmer that affect the performance of the farm, the impact on the land and outcomes for the family. Every year the farmer has many decisions to make such as which crops to grow, what area of each crop to plant, when to plant, where to market, how much fertilizer to use, etc., each of which will have an effect on the results that are achieved. The farmer has a certain amount of land available, money to spend and labour to use, and how these resources are used will determine whether he/ she achieves his/ her goals. The number of options available can make these decisions quite complex, and the shift to commercialization and the demands of the marketplace make it even more difficult.

The allocation of resources and the decisions that are made is "farm management".

The Farm as a business

If farm management is about allocating resources and making decisions, then it assumes that there are targets or goals to meet. For a farm earning cash income there will be two sets of goals – one dealing with the personal goals of the family, and the other with the farm as a business. Hence, farmers need to identify goals to guide and direct decision making.

Examples of personal and family goals might include:

- meeting church commitments;
- paying for children's education;
- meeting fa'alavelave and village obligations;
- paying off personal loans;
- acquiring personal possessions;
- improving the home, building a water tank, a septic tank, etc.;
- taking an overseas trip
- increasing leisure time;

Examples of possible farm business goals for Samoan farmers include:

- to earn a certain level of income (profit) to meet the family's needs;
- to reduce farm debt;
- to provide employment for family members;

- to build new businesses, such as processing or exporting;

As the goals that require increasing cash income become more important, subsistence and semi-subsistence farming households move towards developing more commercial farming operations. A commercial farm business cannot be sustained in the long run, without making a profit.

To be profitable a farm business needs to be able to achieve the following:

- Cover the cash costs of farming, such as seed and fertilizer,
- Service loan repayments for loans taken out to improve the farm
- When necessary, be able to maintain or replace aged equipment and to maintain resources such as pasture and trees.
- Have some surplus cash (the profit) to meet personal needs and reinvestment in the farm.

A successful farm business with be one that meets both the personal and business goals. The farm business is a means to an end, not the end itself. The end is the social, family and personal goals. The farm is the means to achieve these.

Farm Records

Farmers need to be able to plan and assess the use of farm resources to ensure they are using these resources in the most profitable way. The information presented in this manual provides general budgets and gross margins, it does not specifically relate to an individual farm, in a specific district. To be able to convert this general information into individual farm business plans that are specific to a farm, farmers need to have access to good farm management records for their farm, or at the very least for their district.

Ideally advisers and farmers take the general information provided in the budgets in this manual and modify the figures with local information so that they end up with new budgets that are relevant to the local situation.

Common questions farmers seek answers to and that would benefit from local information are:

- How is my farm performing?
- How does it compare with other farmers, and how does it compare with what we have produced in other years?
- How are my production levels?
- How do the prices I get for my produce compare?
- How does the quality of my produce compare?
- What is my production costs compared to others?

The type of information that should be collected on the farm will include:

- the prices received for the produce
- the cost of all inputs
- the amount of labour used
- the number of plants grown, or area of land used
- the time of planting and harvesting
- varieties grown
- marketing details – where sold, packaging used (if any), and weight or number per package

A simple farm diary where farming and selling activities, and other information such as the price of seed, is recorded every day is the easiest way to keep this information.

Farm Management Terms

There is a number of farm management terms referred to throughout the manual.

Terms	Definition
Budgeting	Budgeting is a financial plan. It is an activity carried out for farm planning, which enables a farmer to consider the likely financial outcomes of certain management decisions. Different crops, different production systems and different districts will produce different financial or budget outcomes.
Gross Margin	The total or gross income minus direct costs for a farming enterprise A gross margin shows how much cash surplus a particular crop or enterprise contributes to the overall profitability of the whole farm business.
Direct Costs (also referred to as variable or operating costs)	Costs that are directly associated with a particular enterprise. These costs vary with the size of the enterprise and the amounts produced, and include fertilizer, herbicide, planting material, transport to market, and hired labour. Direct costs generally are for one production cycle, and will have to be paid again if and when the crop is replanted.
Fixed Costs (also referred to as fixed or non-operating costs)	Costs that cannot be easily allocated directly to one particular enterprise and have to paid whether production takes place or not. Examples of fixed costs are vehicle repairs and building maintenance. Fixed costs tend to be inputs that last more than one production cycle.
Working Capital	Cash required for day to day operation of the farm. Working capital is used for buying inputs such as planting material, breeding stock, fertiliser, paying labour, fuel etc. The amount of working capital needed is the amount of money that will have to be spent before the crop or enterprise is harvested, and the income from selling the harvested produce can be used to pay for further inputs.
Fixed Capital	Money that is required to purchase assets that can be reused a number of times to produce several crops over a number of cycles. Money for stockyards, a tractor, fencing, a 4WD double cab, tools, ladders, etc., are all examples of fixed capital items.
Total Capital	The total of working capital and fixed capital that is needed to set up and operate an enterprise or business.
Hired Labour	Labour that is paid wages. Usually this labour is brought in from outside the farm and is used for tasks the need to be done when there is insufficient family labour available. Hired labour is a direct cost to the farm.
Family Labour	Unpaid (unwaged) labour that is supplied by family members for carrying out tasks in a farming operation. For Samoan farm businesses, the farmer and other family members provide all or a large part of the labour and do not generally receive a cash wage. Because family members working on the farm do not directly receive a cash wage, the value of family labour is often overlooked or ignored. The amount of labour required producing and market a crop may well influence the decision as to whether to grow that crop. The level of family labour is included in the budgets in this manual to assist with this decision.
Profit	A business makes a profit if the total income is greater than all the costs of running that business, that is, both the direct and the fixed costs. The net result (that is, income less costs) is the profit. Profit should not be confused with profitable. A crop is profitable if the income is greater than the direct costs of growing that crop (that is, the gross margin is more than $0), but the farm business could still make a loss if the surplus from the crop cannot pay for all the fixed costs.
Steady State Production	The point of production where a long-term crop or enterprise, such as coconut, is no longer increasing in yield each year, and is said to be "mature". Generally, when an enterprise reaches steady state, the level of production and costs will be similar each year. This steady state of production will continue until the trees reach old age

	(senility) and the yield declines. In the case of livestock, an enterprise reaches steady-state when the herd has developed to a size where herd numbers remain constant that is, the number of animals sold equals the numbers retained, and the overall age structure of the herd does not change.

Budgeting Tools for Farm Management

A number of budgeting tools exist for analyzing the financial performance of farm businesses. The choice of which budgeting tool to use will depend on what farm management decisions need to be made.

Useful budgeting tools for farm management include:

- Gross margin budget;
- Whole-farm budget;
- Cash flow budget;
- Household budget.

Gross Margin Budget

Gross margins are a useful short-term tool for planning and budgeting, used to gain an indication of how profitable individual farming enterprises are. Gross margins are generally calculated for enterprises with a production cycle of one year or less.

A gross margin is the difference between gross income (total value of production) and the direct costs associated with a single enterprise (e.g. planting material, fertiliser, selling costs etc.).

Gross Margin = Gross Income – Direct Costs

Gross margins are generally expressed on a per unit basis (e.g. gross margin per plant, gross margin per acre, gross margin per head for livestock, gross margin per family labour day etc.).

In the gross margins presented in this manual there is a section for hired and family labour inputs. This shows how much time will be required to produce the crop or undertake this enterprise. As well as being used to calculate the costs for the hired labour for the gross margin, this section will also allow farmers and advisers to calculate how much labour they will need to have available if they wish to grow this crop.

A sensitivity analysis is carried out after calculating the gross margin, to see how any change in key variables, such as yield and price, will change the gross margin. The sensitivity analysis allows the farmer and the adviser to assess the financial impact of something going wrong, and therefore the risks to the farm business.

An example of a gross margin budget for taro is elaborated below.

- The farmer receives $4,000 of total income selling taro grown on 1 acre of land. He/ she then needs to deduct the total direct costs associated with producing the taro of $4,598. The taro enterprise is profitable as it has a positive gross margin of $10,602 per acre or $2.65 per plant. That is, if the farmer can match the yield and costs in this gross margin budget, there will be $2,800 available from growing one acre of taro to go towards fixed costs and family needs.
- The family labour input is 26 days, so if there is a gross margin or surplus of $10,602 it means that the labour has earned $116.70 per day ($2,800/32 = 116.70), which is considerably more than what could be earned from wages somewhere else ($20 per day).

- From the sensitivity analysis the taro is still profitable when price drops to $15 per pile and yield drops from 4000 to 3000 taro.
- This gross margin is for a crop that is grown entirely for selling. In reality farmers would use some of the crop to feed the family and some of the crop for social obligations. The gross margin calculations need to be adjusted for these changes.

Using the same example,

- If 1,000 taros are used by the family and 1,000 taros are used for social obligations, then there are just 2,000 left for selling. The gross income will drop to $2,000, but there will also be a reduction in the number of trips to market, which will take $30 off the costs.
- The gross margin under this set of circumstances becomes:

    - Gross Income - $2,000
    - Direct Costs - $1,170
    - Gross Margin - $ 830

That is the farmer is budgeting to have $830 from the 1 acre of taro crop that he/ she can use to put toward household costs.

For other farmers there may be other changes. Some may not use herbicide, and decide to mulch instead. The chemical cost will go down and the labour requirement will go up. Again, a different gross margin will be calculated.

The important point is that the gross margins provided in this manual need to be modified to suit the situation that is being looked at. At the very least the farmer and the adviser need to read through the assumptions that are presented at the start of each gross margin very carefully to decide whether their crop would be grown in the same way and with the same results.

3. Root Crops

3.1. Taro (Talo Samoa) - *Colocasia esculenta*

This gross margin budget represents a 0.5 acre fully commercial (taro Samoa) enterprise, selling 2,023 of Samoan taro

a) Production Information

Recommended Varieties:

- Talo Fusi
- Talo Salani
- Talo Tanumalala
- Samoa # 2

Seed Rate:

- *Traditional Farming System:* Approximately 4,000 suckers are planted into a 1-acre plot.

Planting Time:

- The best yields are obtained when taro is planted in the wet season (December – March).

Planting Methods:

- Suckers are planted into a one-acre plot, at a plant spacing of 1m x 1m.

Plant Spacing:

- *Traditional System:* Between rows: 1m Plants within rows: 1m

Cropping System:

- Grown as a mono crop

Growth Period:

- 8-9 months

Number of Months to Harvesting:

- Harvesting @ no less than 8 months for the export market whilst some local varieties are harvest at 9 months or more.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 8-12 tonnes/acre.

Markets: Fugalei Market

Price: **$**20.00 per basket

c) Direct Costs

Planting Material:

- Sucker

Fertilizer:

- Soil analysis should be done before fertilizer application. Fertilizer application for taro production in Samoa is not practiced widely.

Weed Control/ Management:

- Paraquat @ 100ml/15L Water.
- Preferably manual weeding.

Product	Application	Price
Gramoxone	100ml/15L	$145.00

Disease Control/Management:

- *Soft Corm Rot:* Start with healthy planting material free from rot and improve drainage.
- *Army Worm:* Physical control will help reduce populations through

the removal and destruction of leaves infested with egg masses or young larvae.

Insect Control/ Management:

- *Mealy bug:* Spray of horticultural oil (e.g. Conqueror) or soap should be considered.

Selling Costs:

Selling Cost	Price
Transport to Market	$180.00/6trips
Hired of market stall	$60.00/ 6days

d) Labour

Hired labour and Family Labour are paid $24.00 per day.

Total cost of hired labour = $168.00

Total cost of family labour = $624.00

e) Food Value:

Contain large amount of Vitamin A, Vitamin B1, Vitamin B2 and Vitamin C.

Enterprise Budget for Taro

GROSS MARGIN BUDGET FOR

Varieties: Talo Fusi, Talo Salani, Talo Tanumalala, Samoa # 2.

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	2,023
(B) Area (Acres):	0.5
Plant Spacing:	1m x 1m
Growth Period (months):	8-9 months
Mortality (%)	5%
No. of plants harvested for sale:	2,023
Marketable yield deduction (%)	10%
Marketable yield:	2,023
Average yield per plant (no. of fruit)	1
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Taro Samoa	2,023	piles @	$20.00	$40,460.00
(D) TOTAL INCOME ($)				$40,460.00

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	4000	sucker @	$1.00	$4,000.00
Crops Husbandry				
(Weed Control)				
Gramoxone	5	litres @	$29.00	$145.00
Selling Costs				
Transport to market	6	trips	$30.00	$180.00
Hire of market stall	6	days	$10.00	$60.00
Labour				
Hired labour	7	days @	$24.00	$168.00

(E) TOTAL COSTS ($)	**$4,553.00**
(F) GROSS MARGIN ($) (D-E)	**$35,907.00**
Gross Margin per family labour input (F/H)	$1,381.04
Gross Margin per plant (F/A)	$17.75
Gross Margin per acre (F/B)	$71,814.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	**Price ($/)**		
	$15.00	**$20.00**	**$25.00**
2,003	$25,492.00	$35,507.00	$45,522.00
2,023	$25,792.00	$35,907.00	$46,022.00
2,043	$26,092.00	$26,092.00	$46,522.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Land Preparation	7		7
Planting		10	10
Weeding and Spraying		2	2
Harvesting		8	8
Marketing		6	6
TOTAL DAYS	7	**26**	**33**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$168.00
(K) Total Costs of family labour (I*H)			$624.00
Total labour requirement (days)			33
GROSS MARGIN - including Family labour costs (F-K)			**$37,260.00**

3.2. Cocoyam (Talo Palagi) - *Xanthosoma Saggitifolium*

This gross margin budget represents a 0.6 acre fully commercial taro palagi enterprise, selling 607 yield of taro.

a) Production Information

Recommended Variety:
- Local

Seed Rate:
- *Traditional Farming System:* Approximately 1,010 suckers are planted into a 1-acre plot

Planting Material:
- Suckers or headsets are planted into a one acre of land.

Plant Spacing:
- *Traditional System:* Suckers are planted at a spacing of 2m x 2m.

Cropping System:
- Grown as a mono crop

Planting Time:
- The best yields are obtained when Talo Palagi is planted in the wet season (December – March).

Grown Period:
- 8-15 months

Number of Months to harvest:
- Harvesting commences from 8 months up to 15 months and depends on the soil fertility.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Yield: 8 – 12 tonnes/acre.

Markets: Fugalei Market

Price: $30.00 per basket

c) Direct Costs:

Planting Materials:
- Suckers

Fertilizer:
- Soil analysis should be done before fertilizer application. Inorganic Fertilizer application for talo palagi production in Samoa is not widely practiced.

Weed Control/ Management:
- Paraquat @ 100ml/15L Water can be used (sold as Gramoxone etc.).
- Preferably manual weeding is recommended

Product	Application	Price
Gramoxone	100ml/ 15L	$145.00

Disease Control/Management:
- No major disease of economic importance.

Insect Control/ Management:
- *Plant Hoppers and Cutworms:* Apply Malathion at 30ml/15L of water OR Diazion at 60ml/15L of water when appropriate.

Selling Costs:

Selling Cost	Price
Transport to market	$180.00/ 6trips
Hired of market stall	$60.00/ 6days

d) Labour

Hired labour are paid $24.00 per day

e) Capital Cost

There are no significant capital costs for the taro palagi enterprise

f) Food Value

Fiber, Potassium, Modest Amount of B1, Vitamin C and fair amount of Iron.

Enterprise Budget for Taro Palagi

GROSS MARGIN BUDGET FOR TARO PALAGI

Varieties: Local

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	607
(B) Area (Acres):	0.6
Plant Spacing:	2m x 2m
Growth Period (months):	8-15months
Mortality (%)	5%
No. of plants harvested for sale:	607
Marketable yield deduction (%)	10%
Marketable yield:	607
Average yield per plant (no. of fruit)	6-8
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Taro Palagi	607	piles @	$30.00	$18,210.00
(D) TOTAL INCOME ($)				**$18,210.00**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	1010	sucker @	$1.00	$1,010.00
Crops Husbandry				
(Weed Control)				
Gramoxone	5	litres @	$29.00	$145.00
Selling Costs				
Transport to market	6	trips	$30.00	$180.00
Hire of market stall	6	days	$10.00	$60.00
Labour				
Hired labour	7	days @	$24.00	$168.00
(E) TOTAL COSTS ($)				**$1,563.00**
(F) GROSS MARGIN ($) (D-E)				**$16,647.00**
Gross Margin per family labour input (F/H)				
Gross Margin per plant (F/A)				$27.42
Gross Margin per acre (F/B)				$27,745.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	**Price ($/)**		
	$20.00	**$30.00**	**$40.00**
550	$9,437.00	$14,937.00	$20,437.00
607	$10,577.00	$16,647.00	$22,717.00
664	$11,717.00	$18,357.00	$24,997.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Land Preparation	7		7
Planting		10	10
Weeding and Spraying		2	2
Harvesting		8	8
Marketing		6	6
TOTAL DAYS	7	**26**	**33**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$168.00
(K) Total Costs of family labour (I*H)			$624.00
Total labour requirement (days)			33
GROSS MARGIN - including Family labour costs (F-K)			**$16,023.00**

3.3. Yam (Ufi) - *Dioscorea spp.*

This gross margin budget represents a 0.4 acre fully commercial Yam (Ufi) enterprise, selling 4,047 yams

a) Production Information

Recommended Varieties:

- Palai Uea
- Palai Mao'i
- Ufi Lei
- Palai Niu Kini
- Ufi Tau.

Seed Rate:

- *Traditional Farming System:* Approximately 5,000 mounds are planted into a 1-acre plot.

Planting Materials:

- Tuber cuttings or seedlings are planted into mounds.

Plant Spacing:

- *Traditional System:* Seedlings or tuber cuttings are planted at a spacing of 2m between mounds and 2m within mounds

Cropping System:

- Grown as an intercrop

Planting Time:

- The best yields are obtained when yam is planted in the wet season (December – March).

Growth Period:

- 10-36months

Number of Months to Harvesting:

- Early varieties can be harvested from 9 to 10 months of planting. Harvest index is when leaves start to senescence and are falling off. Some varieties (i.e. Palai Mao's) are left on the ground for 3 to 4 years for bigger harvest.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 8 – 12 tonnes/acre.

Markets:

Price:

c) Direct Costs:

Planting Material:

- Tuber

Fertilizer:

- Soil analysis should be done before fertilizer application. Inorganic Fertilizer application for yam production in Samoa is not practiced whereas composting is very common when planting yams.

Weed Control/ Management:

- Paraquat @ 100ml/15L Water can be used for post emergent before canopy closure and spray shields to be used to avoid damage of plants.
- Preferably manual weeding is recommended.

Product	Application	Price
Gramoxone	100ml/ 15L	145.00/5L

Disease Control/Management:

- *Yam Anthracnose & Dioscorea Leaf Spot:* Spray with Manzate @ 53g/16L of Water to alternate with Benomyl @ 11g/16L Water at 2

weeks interval. Plant resistant varieties.

- *Tuber Rot:* Headsets to be treated with wood ash or treated or sprayed with c @ 53g/16L before planting. Use disease free planting material.

Product	Application	Price
Manzate	53g/ 16L	$56/1kg
Benomyl	11g/16L	
conqueror	53g/16L	$55.00/50ml

Insect Control/ Management:

- *Tuber Scale:*
  - Use clean planting material.
  - Practice Crop Rotation
  - Dip planting material or mini setts with wood ash before planting

Selling Costs:

Selling Costs	Price
Transport to market	$120.00/ 4trips
Hire of market stall	$40.00/ 4days

d) Labour

Family labour are paid at an average rate of $24.00 per day.

e) Food Value:

Fiber, Potassium, Modest Amount of B1, Vitamin C and fair amount of Iron.

Enterprise Budget for Yam

GROSS MARGIN BUDGET FOR YAM

Varieties: Palai Uea, Palai Mao'i, Ufi Lei, Palai Niu Kini, Ufi Tau.

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	4,047
(B) Area (Acres):	0.4
Plant Spacing:	2m x 2m
Growth Period (months):	10-36months
Mortality (%)	5%
No. of plants harvested for sale:	4,047
Marketable yield deduction (%)	10%
Marketable yield:	4,047
Average yield per plant (no. of fruit)	100-200
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Yam (Ufi)	4,047	piles @	$25.00	$101,175.00
(D) TOTAL INCOME ($)				**$101,175.00**
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	5000	tuber @	$1.00	$5,000.00
Crops Husbandry				
Decease &Weed Control				
Gramoxone	5	L	$29.00	$145.00
Manzate	5	Kg	$56.00	$280.00
Conqueror	5	L	$55.00	$5,500.00
Selling Costs				
Transport to market	4	trips	$30.00	$120.00
Hire of market stall	4	days	$10.00	$40.00
Labour				
Hired labour	7	days @	$24.00	$168.00
(E) TOTAL COSTS ($)				**$11,253.00**
(F) GROSS MARGIN ($) (D-E)				**$89,922.00**
Gross Margin per family labour input (F/H)				$2,569.20
Gross Margin per plant (F/A)				$22.22
Gross Margin per acre (F/B)				$224,805.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	Price ($/)		
	$20.00	**$30.00**	**$40.00**
3,500	$58,747.00	$93,747.00	$128,747.00
4,000	$68,747.00	$108,747.00	$148,747.00
4,500	$78,747.00	$123,747.00	$168,747.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL
Planting	5		$120.00
Fertilizer		16	$384.00
Weeding and Spraying		15	$360.00
Harvesting		3	$72.00
Marketing		1	$24.00
TOTAL LABOUR DAYS @ $24/DAY	5	**35**	**$960.00**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$120.00
(K) Total Costs of family labour (I*H)			$840.00
Total labour requirement (days)			400

GROSS MARGIN - including Family labour costs (F-K) **$89,082.00**

3.4. Ginger (Fiu) - *Zingiber officinale*

This gross margin budget represents a 0.2 acre fully commercial Ginger enterprise, selling approximately 10,000 yield of ginger

a) Production Information

Recommended Varieties:

- Local Ginger
- Fijian Ginger

Seed Rate:

- Traditional Farming System: Approximately 11,000 rhizomes or root cuttings are planted into a 1-acre plot.

Planting Materials:

- Tuber cuttings or seedlings are planted into mounds.

Plant Spacing:

- *Traditional System:* Mature ginger produce is planted at a spacing of 0.6m between rows and 0.15m within rows.

Cropping System:

- Grown as an intercrop

Planting Time:

- The best yields are obtained when ginger is planted towards the end of dry periods in September.

Growth Period:

- 9-10 months

Number of Months to Harvesting:

- Mature: 9 to 10 months from planting.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 10 - 25tonnes/acre.

Markets: Fugalei Market

Price: an average price of $3.50 per bundle

c) Direct Cost

Planting Material:

- Rhizomes or root cuttings

Fertilizer:

- Poultry Manure:
  - 4 tonnes/acre Broadcast and mix well with soil 4 weeks before planting.
  - Hilling can be carried out throughout the growth period of ginger to avoid exposure of rhizome or root.

Weed Control Management:

- Atrazine 1.5L/acre. Pre emergence weedicide – Spray after planting at the rate of 60ml/15L of water

Insect Control/ Management:

- *Root Knot Nematode:*
  - Hot water treatment of planting materials at 510C for 10 minutes
  - Crop rotation with Talo and Ta'amu.
  - Sanitation – Remove all Rhizomes from the field after harvesting
  - Proper selection of seed materials.

Selling Costs:

Selling Cost	Price
Transport to market	$180.00/6trips
Hire of market stall	$60.00/6days

d) Labour

Both hired labour and family labour are paid at an average rate of $3.00 per hour

e) Food Value:

Good source of Energy, Potassium, Calcium and Sodium.

Enterprise Budget for GINGER

GROSS MARGIN BUDGET FOR GINGER

Varieties: Local Ginger, Fijian Ginger.

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	8,993
(B) Area (Acres):	0.2
Plant Spacing:	0.6m x .15m
Growth Period (months):	9-10months
Mortality (%)	5%
No. of plants harvested for sale:	8,993
Marketable yield deduction (%)	10%
Marketable yield:	8,993
Average yield per plant (no. of fruit)	100-200
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Ginger	8,993	bundle @	$3.50	$31,475.50
(D) TOTAL INCOME ($)				**$31,475.50**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	11000	root cuttings	$0.50	$5,500.00
Crops Husbandry				
Decease &Weed Control				
Poultry Manure	100	sack @	$5.00	$500.00
Selling Costs				
Transport to market	6	trips	$30.00	$180.00
Hire of market stall	6	days	$10.00	$60.00
(E) TOTAL COSTS ($)				**$6,240.00**
(F) GROSS MARGIN ($) (D-E)				**$25,235.50**
Gross Margin per family labour input (F/H)				$721.01
Gross Margin per plant (F/A)				$2.81
Gross Margin per acre (F/B)				$126,177.50

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	**Price ($/)**		
	$20.00	**$30.00**	**$40.00**
3,500	$63,760.00	$98,760.00	$133,760.00
4,000	$73,760.00	$113,760.00	$153,760.00
4,500	$83,760.00	$128,760.00	$173,760.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL
Planting	5		$120.00
Fertilizer		16	$384.00
Weeding and Spraying		15	$360.00
Harvesting		3	$72.00
Marketing		1	$24.00
TOTAL LABOUR DAYS @ $24/DAY	5	**35**	**$960.00**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$120.00
(K) Total Costs of family labour (I*H)			$840.00
Total labour requirement (days)			400
GROSS MARGIN - including Family labour costs (F-K)			**$24,395.50**

3.5. Giant Taro (Ta'amu) - *Alocasia spp.*

This gross margin budget represents a 0.4 acre fully commercial Ta'amu (Giant Taro) enterprise, selling 700 plants.

a) Production Information

Recommended Varieties:

- Ta'amu Niu Kini
- Ta'amu Toga.

Seed Rate:

- *Traditional Farming System:* Approximately 1,010 suckers are planted into a 1-acre plot.

Planting Materials:

- Suckers or headsets are planted into a one acre of land.

Plant Spacing:

- *Traditional System:* Suckers are planted at a spacing of 1.5m x 1.5m.

Cropping System:

- Taamu can be intercropped with crops such as banana or coconut, however, in this instance; Ta'amu is grown as a mono crop.

Planting Time:

- The best yields are obtained when Ta'amu palagi is planted in the wet season (December – March).

Growth Period:

- 12-18months growth period.

Number of Months to Harvesting:

- Harvesting commences during the 12 months of the growth period and generally continues up to 14months after planting

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 8 – 12 tonnes/acre

Markets: Local flea markets.

Price: Taamu Tonga - $10
Taamu Niu Kini - $60

c) Direct Costs

Planting Material:

- Sucker

Fertilizer:

- Soil analysis should be done before fertilizer application. Inorganic Fertilizer application for Ta'amu production in Samoa is not practiced.

Weed Control/ Management:

- Paraquat @ 100ml/15L Water can be used (sold as Gramoxone etc.).
- Preferably manual weeding is recommended.

Product	Application	Price
Gramoxone	100ml/15L	$145.00/5L

Disease Control/Management:

- No major disease of economic importance.

Insect Control/ Management:

- *Plant Hoppers and Cutworms:* Apply Malathion at 30ml/15L of water

OR Diazion at 60ml/15L of water when appropriate.

Product	Application	Price
Malathion	30ml/15L	
Diazion	60lml/15L	

Selling Costs:

Selling Cost	Price
Transport to market	$180.00/6 trips
Hire of market stall	$60.00/6days

d) Labour

Hired labour is paid at an average rate of $24.00 per day

e) Food Value:

It is rich in Vitamin C, carbohydrate, zinc, Vitamin E, Magnesium and Iron

Enterprise Budget for Giant Taro

GROSS MARGIN BUDGET FOR GIANT TARO

Varieties: Ta'amu Niu Kini, Ta'amu Toga.

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	719
(B) Area (Acres):	0.4
Plant Spacing:	1.5m x 1.5m
Growth Period (months):	12-18months
Mortality (%)	5%
No. of plants harvested for sale:	719
Marketable yield deduction (%)	10%
Marketable yield:	719
Average yield per plant (no. of fruit)	1
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Giant Taro	719	corms @	$30.00	$21,570.00
(D) TOTAL INCOME ($)				**$21,570.00**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	1000	root cuttings	$0.50	$500.00
Crops Husbandry				
Decease &Weed Control				
Gramoxone	5	L	$29.00	$145.00
Selling Costs				
Transport to market	6	trips	$30.00	$180.00
Hire of market stall	6	days	$10.00	$60.00
Labour				
Hired labour	7	days @	$24.00	$168.00
(E) TOTAL COSTS ($)				**$1,053.00**
(F) GROSS MARGIN ($) (D-E)				**$20,517.00**
Gross Margin per family labour input (F/H)				$6,839.00
Gross Margin per plant (F/A)				$28.52
Gross Margin per acre (F/B)				$51,292.50

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

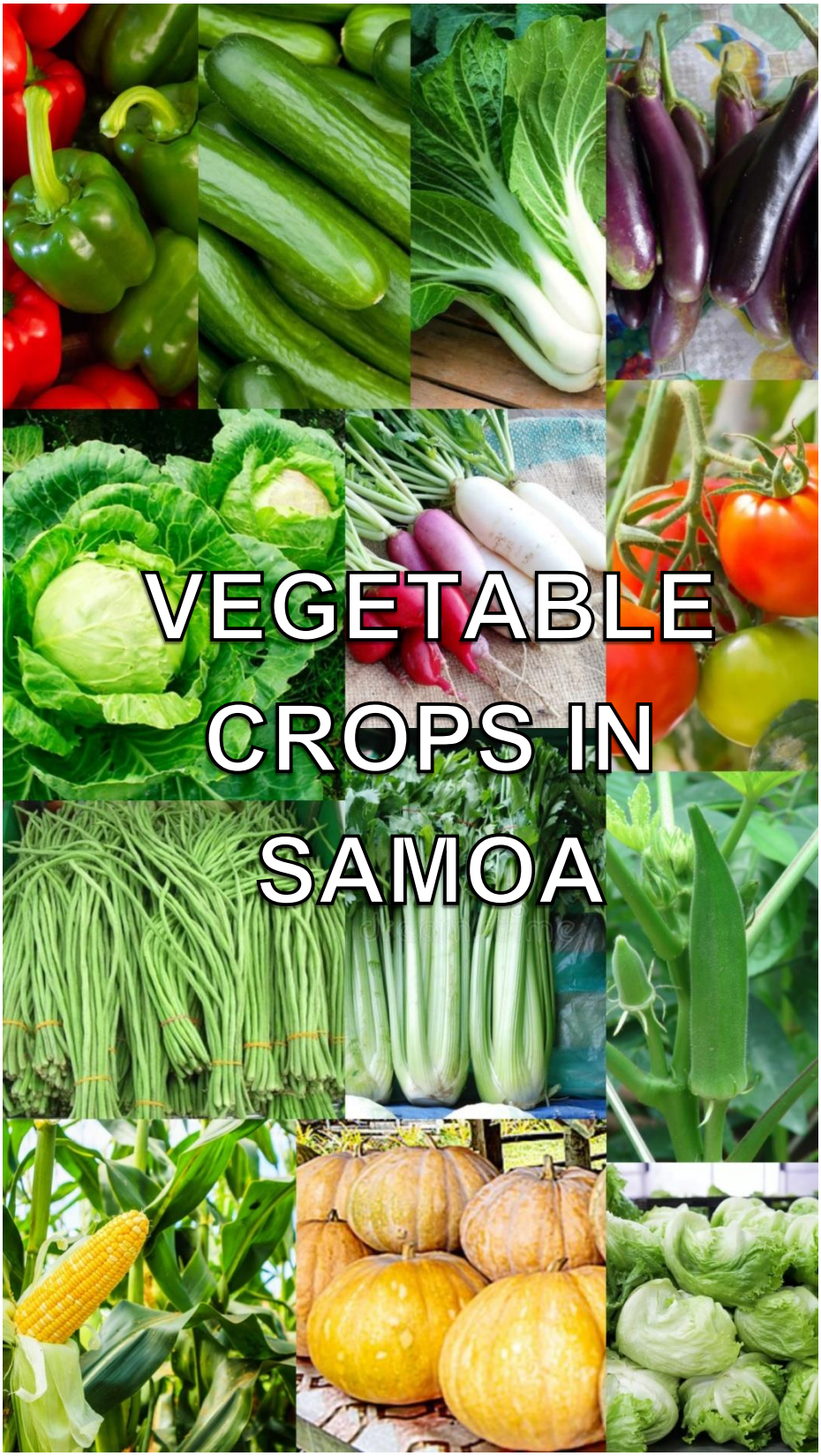
Yield ()	**Price ($/)**		
	$20.00	**$30.00**	**$40.00**
650	$11,947.00	$18,447.00	$24,947.00
700	$12,947.00	$19,947.00	$26,947.00
750	$13,947.00	$21,447.00	$28,947.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Slashing	4		2
Planting	4		1
Weeding and Spraying	1		1
Harvesting	2	2	4
Marketing		1	6
TOTAL LABOUR DAYS @ $24/DAY	11	**3**	**14**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$264.00
(K) Total Costs of family labour (I*H)			$72.00
Total labour requirement (days)			14
GROSS MARGIN - including Family labour costs (F-K)			**$20,445.00**

4. Vegetable Crops



4.1. Bell Pepper - *Capsicum annuum*

This gross margin budget represents a 1 acre fully commercial Sweet Pepper enterprise.

a) Production Information

Recommended Varieties:

- Alice Hybrid
- Olga hybrid
- Queen Star
- Yolo Wonder.

Seed Rate:

- 400g/acre.

Planting Materials:

- Bell Pepper seedlings are ready to be transplanted after 6 to 8 weeks when the seedlings are 150 to 200 mm tall.

Plant Spacing:

- Between rows: 0.4m x 0.3m
- Plants within rows: 0.4m x 0.3m

Cropping System:

- Capsicums are grown as a monocrop. In addition, staking and/or trellises are also recommended to avoid fruit losses when production per plant is high and the peppers are large.

Planting Time:

- All year around, however, the best yields are obtained in the dry season (April – October). However, in this season, bell peppers need to be irrigated; therefore, access to sufficient water and an efficient irrigation system are required.

Growth Period:

- 3 months

Number of Months to Harvesting:

- Fruits are ready for harvest at 3 months after planting and picking continues for 2-3 months.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 5000-6000kg/acre.

Markets: Frankie's Supermarket

Price: $3.00 per Kg

c) Direct Costs:

Planting Material:

- Seeds

Fertilizer:

- Poultry Manure: 4 tonnes. Broadcast and mix well with soil 2 weeks before planting.
- NPK 13:13:21 81kg/acre basal application before sowing.
- Soil analysis should be done before fertilizer application.

Product	Application	Price
Poultry Manure	4 tons – broadcast and mix well with soil 2 weeks before planting	
NPK 13:13:21	81kg/acre	$120 per 20k

Weed Control/ Management:

- Practice inter-row cultivation, hoeing or hand weeding. A small power tiller can be used for inter row cultivation.

Disease Control/Management:

- *Anthracnose (Occurs when mature capsicum begins to ripe):* Apply Mancozeb at 50g/15L of water.
- *Bacterial Wilt:* Use resistant varieties, uproot affected plants and pack in bags, bury and burn, practice crop rotation of non-host plants.
- *Soft Rot:* Avoid planting during wet weather. Remove all infected plants. Avoid damaging the crop during weeding. Use disease free seedling.

Product	Application	Price
Mancozeb	50g/15L of water	

Insect Control/ Management:

- *Mites and Aphids:* Apply Dimethioate 16ml/16L of water (Sold as Rogor), or Suncloprid at 4 to 8mls per 15L of water or Bifenthrin at 16-21ml/16L of water

Product	Application	Price
Dimethioate/ Rogor	16ml/16L of water	
Suncloprid	4-8ml/15L of water	
Bifenthrin	16-21ml/16L of water	

Selling Costs:

Selling Cost	Price
Transport to market	$450.00/ 3months
Hire of market stall	

d) Labour

Both hired labour and family labour is paid at an average rate of $24.00 per hour.

e) Capital Costs

Product	Price
Knapsack sprayer	$280.00
Mist blower	$2300.00

f) Food Value:

A rich source of Vitamin A and Vitamin C.

Enterprise Budget for Bell Pepper

GROSS MARGIN BUDGET FOR Bell Pepper

Varieties: : Alice Hybrid, Olga hybrid, Queen Star, Yolo Wonder

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	8,259
(B) Area (Acres):	1
Plant Spacing:	0.7m x 0.7m
Growth Period (months):	3-5months
Mortality (%)	5%
No. of plants harvested for sale:	8,259
Marketable yield deduction (%)	10%
Marketable yield:	8,259
Average yield per plant (no. of fruit)	1
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Bell Pepper	8,259	packet	$6.00	$49,554.00
(D) TOTAL INCOME ($)				**$49,554.00**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	24	pkt.(1500 seeds)	$10.00	$240.00
Crops Husbandry				
Decease &Weed Control				
Gramoxone	5	1L	$29.00	$145.00
Conqueror	5	200mls bottle	$35.00	$175.00
Slug Out	6	10kg/bag	$300.00	$18,000.00
Fertilizer				
NPK(12;5;20)	2	20kg	$60.00	$120.00
Chicken Manure	23	10kg bag	$10.00	$230.00
Irrigation				
Water	4	months	$50.00	$200.00
Selling Costs				
Transport to market	3	months	$150.00	$450.00
Labour				
Hired labour	8	9days @	$24.00	$1,728.00

CAPITAL COSTS ($)	
Knapsack sprayer	1	$280.00
Mist blower	1	$2,300.00
(E) TOTAL COSTS ($)	**$23,868.00**
(F) GROSS MARGIN ($) (D-E)	**$25,686.00**
Gross Margin per family labour input (F/H)	$1,834.71
Gross Margin per plant (F/A)	$3.11
Gross Margin per acre (F/B)	$25,686.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	**Price ($/)**		
	$4.00	**$6.00**	**$8.00**
7,756	$7,156.00	$22,668.00	$38,180.00

8,259	$9,168.00	$25,686.00	$42,204.00
8,756	$11,156.00	$28,668.00	$46,180.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Slashing	6	2	8
Planting	2	2	4
Pest/Disease Control		1	1
Weed Control		1	1
Fertilizing		2	2
Harvesting		3	3
Packing/ Sorting	1	2	3
Marketing		1	1
TOTAL LABOUR DAYS @ $24/DAY	9	**14**	**23**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$216.00
(K) Total Costs of family labour (I*H)			$336.00
Total labour requirement (days)			23

GROSS MARGIN - including Family labour costs (F-K) **$25,350.00**

4.2. Chinese cabbage - *Brassica rapa*

This gross margin budget represents a 0.3 acre fully commercial Chinese cabbage (Kaposi saina) enterprise.

a) Production Information

Recommended Varieties:

- White Pak Choi
- Green Stem Pak Choi
- Wongmoon
- Saladeer.

Seed Rate:

- 120g/acre

Planting Materials:

- Seeds are planted in boxes of compost and are raised in a nursery. Seedlings are transplanted into the plot after 3-4 weeks.

Plant Spacing:

- Between rows: 0.1x0.1m
- Plants within rows: 0.1x0.1m

Cropping System:

- Grown as a mono crop

Planting Time:

- All year around however, the best yields are obtained in the dry season (April – November), due to cooler temperatures resulting in reduced insect damage.

Growth Period:

- 3months

Number of Months to Harvesting:

- Approximately 12,000 Chinese cabbages are harvested and sold, after taking into account a 5 per cent loss (6000 plants) due to insect damage.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 8,000-10,000kg/acre

Markets: Frankie's Supermarket

Price: $2.50 per bundle

c) Direct Costs

Planting Material:

- Seeds

Fertilizer:

- Poultry Manure: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.
- NPK 13:13:21 80kg/ha basal application before transplanting.
- Soil analysis should be done before fertilizer application.

Product	Application	Price
Poultry Manure	2tons/acre	
NPK 13:13:21	80kg/ha	$120 per 20k

Weed Control/ Management:

- Hand weeding or hoeing is necessary. Practice manual weed control.

Disease Control/Management:

- *Soft Rot, White Rust:* Practice good crop rotation. Remove and destroy diseased plants by either burning

or burying, as soon as symptoms appear and select only healthy planting material.

Insect Control/ Management:

- *Diamond Backmoth, Large Cabbage Moth, Lepitopteran Pest, Center Grub, Greasy Cutworm:* Apply Super Guard @ 8ml/16L of Water or Steward @ 8ml/16L water only when recent damage is visible.
- *Aphids:* Dimethoate @ 16ml/16L (Sold Rogor) or Suncloprid@ 4ml - 8ml/15L of Water or Bifenthrin@ 15ml - 20ml/16L of Water

Product	**Application**	**Price**
Super Guard	8ml/16L of water	
Steward	8ml/16L of water	
Dimethoate	16ml/16L of water	
Suncloprid	4-8ml/15L of water	
Bifenthrin	15-20ml/16L of water	

Selling Costs:

Selling Cost	**Price**
Transport to market	$120.00 /12trips
Hire of market stall	$120.00/ 12days

d) Labour

Both hired labour and family labour is paid at an average rate of $24.00 per day.

e) Food Value

Source of Vitamin A, Vitamin B & Vitamin C.

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Enterprise Budget for Chinese Cabbage

GROSS MARGIN BUDGET FOR CHINESE CABBAGE

Varieties: White Pak Choi, Green Stem Pak Choi, Wongmoon, Saladeer.

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	12,000
(B) Area (Acres):	0.3
Plant Spacing:	0.1m x 0.1m
Growth Period (months):	3months
Mortality (%)	5%
No. of plants harvested for sale:	12,000
Marketable yield deduction (%)	10%
Marketable yield:	12,000
Average yield per plant (no. of fruit)	1
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Chinese Cabbage	12,000	kg	$5.90	$70,800.00
(D) TOTAL INCOME ($)				**$70,800.00**
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	30	Pkt.(400seeds)	$10.00	$300.00
Land Preparation				
Sting	1	5L bottle	$150.00	$150.00
Crops Husbandry				
Decease &Weed Control				
Insecticide (Match)	1	500ml bottle	$125.00	$125.00
Fertilizer				
NPK(12;5;20)	2	20kg	$60.00	$120.00
Chicken Manure	23	10kg bag	$10.00	$230.00
Selling Costs				
Transport to market	12	trips	$10.00	$120.00
Hire of Market stall	12	days @	$10.00	$120.00
Labour				
Hired labour	48	days @	$24.00	$1,152.00
(E) TOTAL COSTS ($)				**$2,317.00**
(F) GROSS MARGIN ($) (D-E)				**$68,483.00**
Gross Margin per family labour input (F/H)				$4,891.64
Gross Margin per plant (F/A)				$5.71
Gross Margin per acre (F/B)				$228,276.67

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	Price ($/)		
	$4.90	**$5.90**	**$7.90**
11,500	$54,033.00	$65,533.00	$88,533.00
12,000	$56,483.00	$68,483.00	$92,483.00
12,500	$58,933.00	$71,433.00	$96,433.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Slashing	6	2	8
Planting	2	2	4
Pest/Disease Control		1	1
Weed Control		1	1
Fertilizing		2	2
Harvesting		3	3
Packing/ Sorting	1	2	3
Marketing		1	1
TOTAL LABOUR DAYS @ $24/DAY	9	**14**	**23**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$216.00
(K) Total Costs of family labour (I*H)			$336.00
Total labour requirement (days)			23

GROSS MARGIN - including Family labour costs (F-K)

$68,147.00

4.3. Cucumber - *Cucumis sativus*

This gross margin budget represents a 0.1 acre fully commercial cucumber (local variety) (kukama) enterprise.

a) Production Information

Recommended Varieties:

- Money Maker
- Zipangu
- Bountiful
- Slice Master.

Seed Rate:

- 800g/acre.

Planting Material:

- Seeds are sown directly into well cultivated soil.

Plant Spacing:

- Between rows: 0.6m x 0.8
- Plants within rows: 0.5m x 0.6m

Cropping System:

- cucumbers are grown as a monocrop

Planting Time:

- All year around however, the best yields are obtained in the dry season (April – November).

Growth Period:

- 3-4months

Number of Months to Harvesting:

- Approximately, 8 cucumbers are harvested per plant, with 5 cucumbers per packet. A total of 912 packets are sold.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 12,000-15,000kg/acre.

Markets: Fugalei Market

Price: $5.00 per pkt

c) Direct Costs

Planting Material:

- Seeds

Fertilizer:

- Poultry Manure: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.
- NPK 13:13:21 80kg/acre basal application before sowing.
- Soil analysis should be done before fertilizer application.

Product	Application	Price
Poultry Manure	2tons/acre	
NPK 13:13:21	80kg/acre	$120/20k

Weed Control/ Management:

- Hand weeding or hoeing is necessary. Weeds are removed when plants are still standing.

Disease Control/Management:

- *Anthracnose:* Use healthy seeds of resistant varieties. Spray Manzate at 21g/16L of water.
- *Gummy Stem Blight, Mosaic Powdery Mildew:*
    - Apply Benomyl @ 11g/16L of Water.
    - Use Kocide at 32g/15L of Water to prevent fungal infections.

- Avoid planting at high density.

Product	Application	Price
Manzate	21g/16L of water.	$56.00/1kilo
Benomyl	11g/16L of Water.	
Kocide	32g/15L of Water	

Insect Control/ Management:

- *Aphids:* Dimethoate @ 16ml/16L (Sold Rogor) or Suncloprid@ 4ml - 8ml/15L of Water or Bifenthrin@ 15ml - 20ml/16L of Water or Suncloprid@ 8ml/16L of Water.

Product	Application	Price
Dimethoate	16ml/16L of water	
Suncloprid	4ml - 8ml/15L of Water	
	8ml/16L of Water.	
Bifenthrin	15ml - 20ml/16L of Water	

Selling Costs:

Selling Cost	Price
Transport to market	$60.00/ 12trips
Hire of market stall	$600.00/12days

d) <u>Labour</u>

Both hired labour and family labour is paid at an average rate of $24.00 per day

e) <u>Food Value</u>

Vitamin C

Enterprise Budget for Cucumber

GROSS MARGIN BUDGET FOR CUCUMBER

Varieties: : Money Maker, Zipangu, Bountiful, Slice Master

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	519
(B) Area (Acres):	0.1
Plant Spacing:	0.5m x 0.6m
Growth Period (months):	3-4months
Mortality (%)	5%
No. of plants harvested for sale:	519
Marketable yield deduction (%)	10%
Marketable yield:	519
Average yield per plant (no. of fruit)	8
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Cucumber	519	kg	$4.56	$2,366.64
(D) TOTAL INCOME ($)				**$2,366.64**
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	15	pkt(40seeds)	$10.00	$150.00
Land Preparation				
Sting	1	5L bottle	$150.00	$150.00
Crops Husbandry				
Decease &Weed Control				
Orthene	5	60g pkt	$7.00	$35.00
Talon	10	1Kg	$63.50	$635.00
Fertilizer				
NPK(12;5;20)	2	20kg	$60.00	$120.00
Selling Costs				
Transport to market	6	trips	$10.00	$60.00
Hire of Market stall	6	days @	$10.00	$60.00
Labour				
Hired labour	21	days @	$24.00	$504.00
(E) TOTAL COSTS ($)				**$1,714.00**
(F) GROSS MARGIN ($) (D-E)				**$652.64**
Gross Margin per family labour input (F/H)				$28.38
Gross Margin per plant (F/A)				$1.26
Gross Margin per acre (F/B)				$6,526.40

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	Price ($/)		
	$4.00	**$5.00**	**$6.00**
469	$162.00	$631.00	$1,100.00
519	$362.00	$881.00	$1,400.00
569	$562.00	$1,131.00	$1,700.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	**(G) HIRED LABOUR**	**(H) FAMILY LABOUR**	**TOTAL DAYS**
Slashing	6		6
Planting	7		7
Pest/Disease Control	2		2
Fertilizing	6		6
Harvesting/ Packing		13	18
Marketing		10	24
TOTAL LABOUR DAYS @ $24/DAY	21	**23**	**63**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$504.00
(K) Total Costs of family labour (I*H)			$552.00
Total labour requirement (days)			63

GROSS MARGIN - including Family labour costs (F-K) **$100.64**

4.4. Eggplant - *Solanum melongena*

This gross margin budget represents a 1 acre fully commercial Eggplant enterprise.

a) Production Information

Recommended Varieties:

- Black Beauty
- Black Bell
- Black Nite
- Ney York Purple
- Early Long.

Seed Rate:

- 100g/acre.

Planting Materials:

- Germination: 5 to 10 days after sowing
- Transplanting: Seedlings should be planted when plants are 3 leaf stages. Seedlings raised in seed trays can be planted any time of the day

Plant Spacing:

- Between rows: 1.5m
- Plants within rows: 0.6x0.7m

Cropping System:

- Grown as mono crop

Planting Time:

- All year around however, the best yields are obtained in the dry season (April – November).

Growth Period:

- 2-3 month growth period.

Number of Months to Harvesting:

- Harvest 60-90 days after planting and continue for over a year – local market.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: Fresh 15,000-18,000kg/acre.

Markets: Fugalei Market

Price: $5.00pkt

c) Direct Costs

Planting Material: Seeds

Fertilizer:

- Poultry Manure: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.
- NPK 13:13:21 80kg/ha basal application before transplanting.
- Soil analysis should be done before fertilizer application.

Production	Application	Price
Poultry Manure	2 tons/acre Broadcast and mix well with soil	
NPK 13:13:21	80kg/ha basal application before transplanting.	$120/20k

Weed Control/ Management:

- Apply Paraquat @ 100mls/15L of water.
- Hand weeding or hoeing is necessary. Practice manual weed control.

Production	Application	Price
Paraquat	100mls/15L of water	

Disease Control/Management:

- *Bacterial Wilt:* Practice good crop rotation with grain and avoid solanaceous crops (Tomatoes, Chilies, Bhindi, Capsicum and Potatoes), uproot infected plants and burn.
- *Damping off seedlings:* Plant on well drained soils. Treat seeds with Benomyl/Thiram.
- *Blossom blight:* Practice good field sanitation. Collect all mature fruits & disposed. Keep field area free of weeds.
- Weed and avoid soil infested with Root Knot Nematode
- Use Kocide @32g/16L of Water to prevent fungal infections

Insect Control/ Management:

- *Lygus Bug:* Apply Malathion 50EC@45ml/16L of Water
- *Tobacco Flea Beetle:* Apply Malathion @ 45ml/16L of Water
- *Thrips:* Apply Confidor at 8ml/16L of water

Production	Application	Price
Kocide	32g/16L of Water	
Malathion 50EC	45ml/16L of Water	
Malathion	45ml/16L of Water	
Confidor	8ml/16L of water	

Selling Costs:

Selling Cost	Price
Transport to market	$450.00/3months
Hire of market stall	

d) Labour

Both hired labour and family labour is paid at an average rate of $24.00 per day.

e) Food Value

Dietary Fiber, Vitamin C

Enterprise Budget for Eggplant

GROSS MARGIN BUDGET FOR EGGPLANT

Varieties: : Black Beauty, Black Bell, Black Nite, Ney York Purple, Early Long

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	9,635
(B) Area (Acres):	1
Plant Spacing:	0.6m x 0.7m
Growth Period (months):	2-3months
Mortality (%)	5%
No. of plants harvested for sale:	9,635
Marketable yield deduction (%)	10%
Marketable yield:	9,635
Average yield per plant kg	15
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Eggplant	9,635		$5.00	$48,175.00
(D) TOTAL INCOME ($)				**$48,175.00**
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	80	pkt(100seeds)	$10.00	$800.00
Crops Husbandry				
Decease &Weed Control				
Gramoxone	5	1L	$29.00	$145.00
Cusol	1	1L	$45.00	$45.00
Conqueror	5	200ml bottle	$35.00	$175.00
Slug Out	6	10kg bag	$300.00	$1,800.00
Fertilizer				
NPK(12;5;20)	2	20kg	$60.00	$120.00
Irrigation				
Water	4	months	$50.00	$200.00
Selling Costs				
Transport to market	3	months	$150.00	$450.00
Labour				
Hired labour	14	days @	$24.00	$336.00
(E) TOTAL COSTS ($)				**$4,071.00**
(F) GROSS MARGIN ($) (D-E)				**$44,104.00**
Gross Margin per family labour input (F/H)				$4,410.40
Gross Margin per plant (F/A)				$4.58
Gross Margin per acre (F/B)				$44,104.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	Price ($/)		
	$4.00	**$5.00**	**$6.00**
9,135	$32,469.00	$41,604.00	$50,739.00
9,635	$34,469.00	$44,104.00	$53,739.00
10,135	$36,469.00	$46,604.00	$56,739.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Slashing	2		2
Planting in nursery box	3	2	5
Pest/Disease Control	1		1
Weeding	2		2
Fertilizing	1	1	2
Harvesting		3	3
Processing / Packing		3	3
Marketing		1	1
TOTAL LABOUR DAYS @ $24/DAY	9	**10**	**19**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$216.00
(K) Total Costs of family labour (I*H)			$240.00
Total labour requirement (days)			19

GROSS MARGIN - including Family labour costs (F-K)	**$43,864.00**

4.5. Head Cabbage - *Brassica oleracea*

This gross margin budget represents a 1 acre fully commercial Head cabbage enterprise.

a) Production Information

Recommended Varieties:

- FS Cross
- KK Cross.

Seed Rate:

- 120g/acre.

Planting Materials:

- Seeds are planted in trays of compost and are raised in a nursery. Seedlings are transplanted into the plot after 3-4 weeks.

Plant Spacing:

- Between rows: 0.6m x 0.7m
- Plants within rows: 0.45m x 0.55m

Cropping System:

- Grown as a mono crop

Planting Time:

- All year around however, the best yields are obtained in the dry season (April – November). Also, the best time for planting is early hours of the morning and late in the evening.

Growth Period:

- 3 month growth period.

Number of Months to Harvesting:

- Head Cabbages for sale are harvested from approximately 17,100 plants, after taking into account a 5 per cent loss (900 plants) due to non-germinating seeds and insect damage.

- Approximately 17,100 cabbages are harvested, with 10% of rejects or non-marketable yield. A total of 15,390 cabbages are sold. Head Cabbages are sold by each depending on the size and the weight.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 12,000-20,000kg/acre.

Markets: Frankie's Supermarket

Price: $9.00/1kg

c) Direct Costs

Planting Material: Seeds

Fertilizer:

- Poultry Manure: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.
- NPK 13:13:21 80kg/ha basal application before sowing.
- Soil analysis should be done before fertilizer application.

Production	Application	Price
Poultry Manure	2 tons/acre	

NPK 13:13:21	80kg/ha basal application before sowing.	$120.00/20kg

Weed Control/ Management:

- Hand weeding or hoeing is necessary. Weeds are removed when plants are still standing.

Disease Control/Management:

- *Leaf Spot:* Brown or black spots on the leaves. Under favorable conditions spots merge causing leaf to dry and burn.
    - Remove, burn and bury diseased plants
    - Remove all remains of last crop. Practice crop rotation of non-host plants

Insect Control/ Management:

- *Diamond Backmoth, Large Cabbage Moth, Lepitopteran Pest, Center Grub, and Greasy Cutworm:* Apply Superguard @ 8ml/16L of Water or Steward @ 8ml/16L water only when recent damage is visible.

Production	Application	Price
Super guard	8ml/16L of Water	
Steward	8ml/16L water only when recent damage is visible.	

Selling Costs:

Selling Cost	Price
Transport to market	$400.00/40trips
Hire of market stall	$300.00/30days

d) Labour

Both hired labour and family labour is paid at an average rate of $24.00 per day

e) Capital Costs

Product	Price
Knapsack Sprayer	$280.00
Mist blower	$2,300.00

f) Food Value

Source of Vitamin A, Vitamin B and Vitamin C

Enterprise Budget for Head Cabbage

GROSS MARGIN BUDGET FOR HEAD CABBAGE

Varieties: : FS Cross, KK Cross

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	3,113
(B) Area (Acres):	1
Plant Spacing:	1.3m x1m
Growth Period (months):	2-3months
Mortality (%)	5%
No. of plants harvested for sale:	3,113
Marketable yield deduction (%)	10%
Marketable yield:	3,113
Average yield per plant (no. of fruit)	1
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Head Cabbage	3,113	kg	$7.57	$23,565.41
(D) TOTAL INCOME ($)				**$23,565.41**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	11	pkt(240seeds)	$10.00	$110.00
Crops Husbandry				
Decease &Weed Control				
Orthene	7	60g pkt	$6.00	$42.00
Sting	1	5L	$145.00	$145.00
Fertilizer				
NPK(12;5;20)	2	20kg	$60.00	$120.00
Selling Costs				
Transport to market	40	trips	$10.00	$400.00
	30	days @	$10.00	$300.00
Labour				
Hired labour	9	days @	$24.00	$216.00
				$1,333.00

CAPITAL COSTS ($)		
Knapsack Sprayer	$280.00	
Mist Blower	$2,300.00	
		$2,580.00
(E) TOTAL COSTS ($)		**$3,913.00**
(F) GROSS MARGIN ($) (D-E)		**$19,652.41**
Gross Margin per family labour input (F/H)		$1,965.24
Gross Margin per plant (F/A)		$6.31
Gross Margin per acre (F/B)		$19,652.41

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	Price ($/)		
	$6.57	**$7.57**	**$8.57**
2,613	$13,254.41	$15,867.41	$18,480.41
3,113	$16,539.41	$19,652.41	$22,765.41
3,613	$19,824.41	$23,437.41	$27,050.41

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Slashing	2		2
Planting in nursery box	3	2	5
Pest/Disease Control	1		1
Weeding	2		2
Fertilizing	1	1	2
Harvesting		3	3
Processing / Packing		3	3
Marketing		1	1
TOTAL LABOUR DAYS @ $24/DAY	9	**10**	**19**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$216.00
(K) Total Costs of family labour (I*H)			$240.00
Total labour requirement (days)			19

GROSS MARGIN - including Family labour costs (F-K) **$19,412.41**

4.6. Lettuce - *Lactuca sativa*

This gross margin budget represents a 1 acre fully commercial Lettuce enterprise.

a) Production Information

Recommended Varieties:

- Tropical
- Red Rapid
- Seven Wonder
- Kaiser

Seed Rate:

- 2,000g/acre or 66,800seeds/1arce

Planting Materials:

- Seeds are planted in trays of compost and are raised in a nursery.

Plant Spacing:

- Between rows: 0.2m x 0.2m
- Plants within rows: 0.15m x 0.15m

Cropping System:

- Seedlings are transplanted into the plot after 3-4 weeks. Further, there are 3,088 seedling trays of lettuce that needs to cover 1 acre.
- Seeds are grown as monocrop

Planting Time:

- All year around, however, the best yields are obtained in the dry season (April – November).

Growth Period:

- 2 to 3 months before harvest.

Number of Months to Harvesting:

- Lettuces for sale are harvested from approximately 66,500 plantlets after taking into account as 5 per cent loss (3,325 plants) due to non-germinating seeds and insect damage. Lettuces are harvested into containers or crates, and then placed in5" x 9" plastic packets for sale.

- Approximately 63,175 lettuces are harvested, with 10% of rejects or non-marketable yield. A total of 56,857 lettuces are sold.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Yield: 3,000-5,000kg.

Markets: Frankie's Supermarket

Price: $4.50 per bundle

c) Direct Cost

Planting Material: Seeds

Fertilizer:

- Poultry Manure: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.
- NPK: - 13:13:21 80kg/acre basal application before sowing.
- Urea: 40kg/acre. Side dressed in 2 split applications i.e. 2 -4 weeks after transplanting.
- Soil analysis should be done before fertilizer application.

Product	Application	Price
Poultry Manure	2tons/acre – Broadcast and mix well with soil 2 weeks before planting	

NKP 13:13:21	80kg/acre- basal application before sowing	$120.00/20kg
Urea	40kg/acre – side dressed in 2 split applications/ 2-4weeks after transplanting	

Weed Control/ Management:

- Hand weeding or hoeing is necessary.
- Inter row cultivation.

Disease Control/Management:

- *Soft Rot:* Practice crop rotation Benomyl @ 11g/16L water. Avoid planting with high density.
- *Downey Mildew:* Light green to yellow spots on the upper leaf, later turns brown, soft and limy.
- Use Kocide at 32g/15L of Water to prevent fungal infections.

Product	Application	Price
Benomyl	11g/16L water	
Kocide	32g/15L of Water	

Insect Control/ Management:

- *Thrips:* Apply Confidor @ 8mls/16L water
- *Cutworms Caterpillar:* Apply Malathion @ 45ml/16L water.
- *Slugs:* Keep surrounding clean, spread around Blitzem pellet as per instructions on the label.

Product	Application	Price
Confidor	8mls/16L water	
Malathion	45ml/16L water	
Blitzem	Spread around Blitzem pellet as per instructions on the label.	$24.00/1kg

Selling Costs:

Selling Cost	Price
Transport to market	$400.00/ 40trips
Hire of market stall	

d) Labour

Both hired labour and family labour is paid at an average rate of $24.00 per day.

e) Capital Costs

Product	Price
Knapsack sprayer	$280.00
Hiring of excavator	$7,000.00

f) Food Value

Vitamin C. Vitamin Bg, Iron and Beta-carotene

Enterprise Budget for Lettuce

GROSS MARGIN BUDGET FOR LETTUCE

Varieties: : Tropical, Red Rapid

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	134,895
(B) Area (Acres):	1
Plant Spacing:	0.15m x 0.2m
Growth Period (months):	2-3months
Mortality (%)	5%
No. of plants harvested for sale:	134,895
Marketable yield deduction (%)	10%
Marketable yield:	134,895
Average yield per plant (no. of fruit)	1
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Lettuce	138,495	bundle	$4.50	$623,227.50
(D) TOTAL INCOME ($)				**$623,227.50**
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	133	pkt(500seeds)	$10.00	$1,330.00
Crops Husbandry				
Decease &Weed Control				
Cusol	1	1L	$45.00	$45.00
Fertilizer				
Orchid food-liquid	18	500ml bottle	$25.00	$450.00
Chicken Manure	96	10kg	$10.00	$960.00
Urea	1	40Kg	$160.00	$160.00
Selling Costs				
Transport to market	40	trips	$10.00	$400.00
Labour				
Hired labour	8	12days @	$24.00	$2,304.00
				$5,649.00
CAPITAL COSTS ($)				
Knapsack Sprayer			$280.00	
Hiring of Excavator			$7,000.00	
				$7,280.00
(E) TOTAL COSTS ($)				**$12,929.00**
(F) GROSS MARGIN ($) (D-E)				**$610,298.50**
Gross Margin per family labour input (F/H)				$33,905.47
Gross Margin per plant (F/A)				$4.52
Gross Margin per acre (F/B)				$610,298.50

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	Price ($/)		
	$4.00	**$4.50**	**$5.00**
133,495	$521,051.00	$587,798.50	$654,546.00
138,495	$541,051.00	$610,298.50	$679,546.00
143,495	$561,051.00	$632,798.50	$704,546.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Slashing	2	2	4
Planting in nursery box	3	2	5
Pest/Disease Control	1	1	2
Weeding	2	3	5
Fertilizing	1	1	2
Harvesting		3	3
Processing / Packing		3	3
Marketing		3	3
TOTAL LABOUR DAYS @ $24/DAY	9	**18**	**27**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$216.00
(K) Total Costs of family labour (I*H)			$432.00
Total labour requirement (days)			27
GROSS MARGIN - including Family labour costs (F-K)			**$609,866.50**

4.7. Long Bean - *Vigna sesquipedalis*

This gross margin budget represents a 1 acre fully commercial Lettuce enterprise.

a) Production Information

Recommended Varieties:

- Mangere pole
- Kentucky Wonder
- Shiny Fardenlosa

Seed Rate:

- 3-5kg/acre

Planting Materials:

- Seeds are planted in boxes of compost and are raised in a nursery. Seedlings are transplanted into the plot after 3-4 weeks.

Plant Spacing:
For trellising

- Between rows: 0.5x0.6m
- Plants within rows: 0.4x0.5m

Cropping System:

- Grown as an interplant

Planting Time:

- All year around however, the best yields are obtained in the dry season (April – November), due to cooler temperatures resulting in reduced insect damage.

Growth period:

- 1month

Number of Months to Harvesting:

- Harvest at 50-60 days from planting, pick pods when still tender and harvesting continues for about 2-3 weeks.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

Germination:

- 3 to 6 days after sowing

b) Income

Yield: Fresh 5,000-7,000kg/acre.

Markets: Fugalei Market

Price: $5.00/ bundle

c) Direct Cost

Planting Materials: Seeds

Fertilizer:

- Soil analysis should be done before fertilizer application.

Production	Application	Price
NPK 13:13:21	80kg/ha- Bascla application before transplanting	$120.00/20kg
Urea	100kg/ha- top dress 2&4 weeks after planting	
Poultry Manure	2tons/acre 10tonnes/ha- Broadcast and mix well with soil 2 weeks before planting	

Weed Control/ Management:

- Hand weeding or hoeing is necessary. Practice manual weed control.

Disease Control/Management:

- *Rust:*
    - Apply Benomyl at 11g/16L of Water or Kocide @ 32g/16L of Water.
    - Plough plant remnants thoroughly after harvesting; rotate with vegetables like Cabbage, Eggplant or Tomatoes.

Product	Application	Price
Benomyl	11g/16L water	
Kocide	32g/16L water	

Insect Control/ Management:

- *Bean Pod Borer:* Spray Lannate @ 32ml/16L or Sundothrin @ 20ml/16L of Water
- *Aphids:* Dimethoate @ 16ml/16L (Sold Rogor)

Product	Application	Price
Lannate	32ml/16L water	
Sundothrin	20ml/16L water	
Dimethoate	16ml/16L water	

Selling Costs:

Selling Cost	Price
Transport to market	$300.00/ 30trips
Hire of market stall	$300.00/ 30days

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour.

e) Food Value

Dietary Fiber, Vitamin C, Niacin, Vitamin B Complex, Iron and Z

Enterprise Budget for Long Bean

GROSS MARGIN BUDGET FOR LONG BEAN

Varieties: : Mangere pole, Kentucky Wonder, Shiny Fardenlosa

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	20,234
(B) Area (Acres):	1
Plant Spacing:	0.4m x 0.5m
Growth Period (months):	1month
Mortality (%)	5%
No. of plants harvested for sale:	20,234
Marketable yield deduction (%)	10%
Marketable yield:	20,234
Average yield per plant (no. of fruit)	20
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Long Bean	20,234	bundle	$5.00	$101,170.00
(D) TOTAL INCOME ($)				**$101,170.00**
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
	100	pkt(50g)	$15.00	$1,500.00
Crops Husbandry				
Decease &Weed Control				
Cusol	1	1L	$45.00	$45.00
Fertilizer				
NPK 12:5:20	2	20kkg	$80.00	$160.00
Chicken Manure	96	10kg	$10.00	$960.00
Selling Costs				
Transport to market	30	trips	$10.00	$300.00
hiring of stall	30	days	$10.00	$300.00
(E) TOTAL COSTS ($)				**$3,265.00**
(F) GROSS MARGIN ($) (D-E)				**$97,905.00**
Gross Margin per family labour input (F/H)				$10,878.33
Gross Margin per plant (F/A)				$4.84
Gross Margin per acre (F/B)				$97,905.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield ()	**Price ($/)**		
	$4.00	**$5.00**	**$6.00**
19,734	$75,671.00	$95,405.00	$115,139.00
20,234	$77,671.00	$97,905.00	$118,139.00
20,734	$79,671.00	$100,405.00	$121,139.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Slashing		1	1
Pest/Disease Control		1	1
Fertilizing	1	1	2
Harvesting		3	3
Marketing		3	3
TOTAL LABOUR DAYS @ $24/DAY	1	**9**	**10**
(I) Average Wage Rate ($/days)			$24.00
(J) Total Cost of hired labour (I*G)			$24.00
(K) Total Costs of family labour (I*H)			$216.00
Total labour requirement (days)			10
GROSS MARGIN - including Family labour costs (F-K)			**$97,689.00**

4.8. Tomato - *Lycopersicon esculentum*

a) Production Information

Recommended Varieties:

- Roma
- Raising Sun
- Heat Master
- Real Gold
- Big Beef
- King Kong
- Tropical
- Beef Stake

Seed Rate:

- 120g/acre

Planting Material:

- Seeds are sewed directly into seedbeds.

Plant Spacing:

- Between Rows: 1m
- Between plants within Rows: 0.4m

Cropping System:

- Grown as a monocrop

Planting Time:

- All year around, however, the best yields are obtained in the dry season (May-October).

Growth Period:

- 3-5months

Harvest Time:

- 80-100days, 10 to 12 weeks after transplanting and picking continues for 5 weeks.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:

- 9,600 tomato plants are harvest for sale.
- Average yield of 0.59 kg tomatoes per plant.
- 5,090kgs of tomatoes are harvested for sale, inclusive of 10% marketable yield deduction.

Markets: Local flea market.

Price: Tomatoes range from $8.00-$10.00/packet.

c) Direct Costs

Planting Material:

- Seedling trays @$13.00 each.

Fertilizer:

- *NPK 12:5:20:* 80kg/acre - Basal at planting.
- *Urea:* 40kg/acre -Side dress 2 and 4 weeks after planting.
- *Poultry Manure:* 4800kg/acre - Side dress 2 and 4 weeks after planting.

Product	No. of Applications/Cycle	Application Rate	Price
NPK 12:5:20	4	20kg/app.	$120.00/20kg
Urea	2	20kg/app.	$150.00/20kg
Poultry Manure	480	10kg/app.	$10.00/10kg

Weed Control/Management:

- Hand weeding or hoeing is necessary.

- Practice mulching to control weeds and retain soil moisture.
- Application of *Sting* is also recommended.

Product	No. of Applications/Cycle	Application Rate	Price
Sting	1	5L/app.	$120.00/20kg

Disease Control/Management:

- *Alternaria leaf & fruit spot:* Use *CuSol* copper solution.
- *Anthracnose:* Apply *Manzate* @50g/15L of water.
- *Bacterial Wilt:* Avoid planting where solanaceous plants were previously planted. Dig, remove and destroy infected plant. Improve drainage. Use a two-year rotation and use resistant varieties. Use *CuSol* copper solution.
- *Basal rot:* Use *CuSol* copper solution.
- *Leaf Mould Mosaic/ Blossom end Root Rot:* Have your soil tested for corrective measures. Use *Kocide* @30g/15L of water or *CuSol* copper solution to prevent fungal infections.
- *Stem Rot:* Use a 2-year rotation.

Product	No. of Applications/Cycle	Application Rate	Price
CuSol	1	1L/app.	$45.00/1L
Manzatee	1	1kg/app.	$56.00/1kg
Orthene	10	60g/app.	$9.00/60g

Insect Control/Management:

- *Fruit worm or Fruit borer: Steward* @7.5ml/15L of water or *Delfin* @7.5ml/15L of water.
- *Piercing Moth, Nematodes & Cutworm:*
- *Spider (Tomato) Mite:* Apply *Malathion* @30ml/15L of water or *Manzate*.
- *Green semi looper: Endosulfan* @10ml/15L of water or *Suncis* @12ml/15L of water.
- Application of *Attack* is also recommended.

Product	No. of Applications/Cycle	Application Rate	Price
Steward	1	1L/app.	$700.00/L
Attack	1	5L/app/	$1,100.00/L
Manzate	5	1kg/app	$56.00/kg
Malathion			
Endosulfan Or Suncics			

Irrigation:

- $50.00 per month

Selling Costs:

Selling Cost	Price
Packaging	$10.00 for 100 packets
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2340.00

f) Food Value

Source of Potassium, Calcium, Sodium, Dietary Fiber and Protein

Enterprise Budget for Tomato

GROSS MARGIN BUDGET FOR TOMATO

Varieties: Roma, Raising Sun, Heat Master, Real Gold, Big Beef, King Kong, Tropical, Beef Stake

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	10,110
(B) Area (Acres):	1
Plant Spacing:	1m x 0.4m
Growth Period (months):	3-5 months
Mortality (%)	5%
No. of plants harvested for sale:	9,600
Average yield per plant (kg):	0.59
Yield of tomato harvested for sale (kg):	5,664
Marketable yield deduction (%)	10%
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Tomato	5,090	kg	$13.97	$71,107.30
(D) TOTAL INCOME ($)				$71,107.30
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
Seedlings	203	tray	$13.00	$2,639.00
Fertilizer				
NPK 12:5:20	4	20kg	$120.00	$480.00
Urea	2	20kg	$150.00	$300.00
Poultry Manure	480	10kg	$10.00	$4,800.00
Crops Husbandry				
Weed Control				
Sting	1	5L	$150.00	$150.00
Disease Control				
CuSol	5	1L	$45.00	$225.00
Manzate	5	1kg	$56.00	$280.00
Orthene	10	60g	$9.00	$90.00
Insect Control				
Attack	1	5L	$1,100.00	$1,100.00
Steward	1	1L	$700.00	$700.00
Irrigation				
Water	5	months	$50.00	$250.00
Selling Costs				
Packaging	51	100pkt	$10.00	$510.00
Transport to market	30	trips	$20.00	$600.00
Hire of market stall	30	days	$6.00	$180.00
Labour				
Hired labour	320	hours	$3.00/hour	$960.00
				$13,264.00
CAPITAL COSTS ($)	-	-	-	-
Knapsack Sprayer	1	unit	$360.00	$360.00
Mist blower	1	unit	$2,340.00	$2,340.00

	$2,700.00
(E) TOTAL COSTS ($)	**$15,964.00**
(F) GROSS MARGIN ($) (D-E)	**$55,143.30**
Gross Margin per family labour input (F/H)	$172.32
Gross Margin per plant (F/A)	$5.45
Gross Margin per acre (F/B)	$55,143.30

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (kg)	Price ($/kg)		
	$12.97	**$13.97**	**$14.97**
4,580	$43,438.60	$48,018.60	$52,598.60
5,090	$50,053.30	$55,143.30	$60,233.30
5,590	$56,538.30	$62,128.30	$67,718.30

LABOUR INPUTS (HOURS)

		HIRED LABOUR			FAMILY LABOUR	
TASK	**NO. OF WORKERS**	**HRS. PER WORKER**	**(G) TOTAL HOURS**	**NO. OF WORKERS**	**HRS. PER WORKER**	**(H) TOTAL HOURS**
Land Preparation	1	40	40	1	40	40
Planting						
Transplanting	1	40	40	1	40	40
Pest and Disease Control	1	40	40	1	40	40
Weeding	1	40	40	1	40	40
Fertilizing	1	40	40	1	40	40
Harvesting	1	40	40	1	40	40
Processing/Packing	1	40	40	1	40	40
Marketing	1	40	40	1	40	40
TOTAL HOURS			**320**			**320**
(I) Average Wage Rate ($/hour)						$3.00
(J) Total Cost of hired labour (I*G)						$960.00
(K) Total Costs of family labour (I*H)						$960.00
Total labour requirement (hours)						640
GROSS MARGIN - including costs of family labour (F-K)						**$54,183.30**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

4.9. Radish - *Raphine's sativus*

a) Production Information

Recommended Varieties:
- Long White Chinese
- Awa Cross
- Everest

Seed Rate:
- 4kg/acre

Planting Material:
- Seeds are sowed directly into seedbeds.

Plant Spacing:
- Between Rows: 0.5m
- Between plants within Rows: 0.5m

Cropping System:
- Grown as a monocrop.

Planting Time:
- Can be planted all year around.

Growth Period:
- 2-3 months.

Harvest Time:
- Harvest at 45-50 days from planting. It is important to harvest quickly before the plant gets too mature.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 15,370 radish plants are harvested for sale.
- Average yield of 1 radish per plant.
- 13,833 radishes are harvest for sale, inclusive of 10% marketable yield deduction.
- 10 radishes are sold per packet.
- 1,383 radish packets are sold.

Markets: Local flea markets.

Price: $6.00 per packet.

c) Direct Costs

Planting Material:
- Seeds @$10.00 per packet.

Fertilizer:
- *NPK 12-5-20:* 80kg/acre, after thinning for the third time when the roots have grown bigger (top dressing).
- *Poultry Manure:* 60-90kg/acre, after thinning for the third time when the roots have grown bigger (top dressing).

Product	No. of Applications/Cycle	Application Rate	Price
NPK 12-5-20	2	40kg/app.	$120.00/20kg
Poultry manure	6-9	10kg/app.	$10.00/10kg

Weed Control/Management:
- Practice manual weed control - pull out weeds or use a hoe.
- Application of *Gramoxone* is also recommended.

Product	No. of Applications/Cycle	Application Rate	Price
Gramoxone	1	5L/app.	$190.00/5L

Disease Control/Management:
- *Leaf Spot, Powdery Mildew:* Apply *CuSol* copper solution once each week.

- *Alternaria leaf spot (Alternaria leaf spot):* Promotes planting of radish during the dry season. It is also recommended to plant in areas where water is scarce.
- *Root Rot* - It is recommended to change area of the land where radish is planted but not to replant it in the area where it was planted before.
- *Cercospora leaf spot* - It is recommended to plant radish in a clear area without trees so that they are not in a shade.
- *Roots of Radishes;* It is recommended to remove the bottom of the plant using the recommended fertilizer or to use compost to spread around the bottom of the roots of the radish.

Product	No. of Applications/Cycle	Application Rate	Price
CuSol	1	1L/app.	$45.00/1L

Insect Control/Management:

- *Aphids:* Apply *Steward* @5ml/15L of water. Apply *Attack* @10ml/5L of water. Apply *Malathion* @20ml/7L of water.
- *Giant African Snail*: Apply *Blitzem* pellets.

Product	No. of Applications/Cycle	Application Rate	Price
Attack	5	200ml/app.	$45.00/200ml
Blitzem	2	1kg/app.	$25.00/kg
Malathion	1	5L/app.	$170.00/5L
Steward	1	1L/app.	$700/1L

Irrigation:

- $50.00 per month.

Selling Costs:

Selling Cost	Price
Packaging	$10.00/100bags
Transport to market	$10.00 per trip
Hire of market stall	$6.00 per day

d) Labour

- Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

No capital costs.

f) Food Value

Dietary Fiber & Vitamin C

Enterprise Budget for Radish

GROSS MARGIN BUDGET FOR RADISH

Varieties: Radish Red Brigade Hybrid

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	16,180
(B) Area (Acres):	1
Plant Spacing:	0.5m x 0.5m
Growth Period (months):	2-3 months
Mortality (%)	5%
No. of plants harvested for sale:	15,370
Average yield per plant:	1
Marketable yield deduction (%)	10%
Yield of radish harvested for sale:	13,833
No of radish sold per packet:	10
No of radish packets sold:	1,383
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
RADISH	1,383	pkt	$6.00	$8,298.00
(D) TOTAL INCOME ($)				**$8,298.00**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
Seeds	54	pkt	$10.00	$540.00
Fertilizer				
NPK 12:5:20	4	20kg	$120.00	$480.00
Poultry Manure	6	10kg	$10.00	$60.00
Crops Husbandry				
Weed Control				
Gramoxone	1	5L	$190.00	$190.00
Disease Control				
CuSol	1	1L	$45.00	$45.00
Insect Control				
Attack	5	200ml	$45.00	$225.00
Blitzem	2	kg	$25.00	$50.00
Malathion	1	5L	$170.00	$170.00
Steward	1	1L	$700.00	$700.00
Irrigation				
Water	3	months	$50.00	$150.00
Selling Costs				
Packaging	14	100bags	$10.00	$140.00
Transport to market	3	trips	$10.00	$30.00
Hire of market stall	3	days	$6.00	$18.00
Labour				
Hired labour	136	hours	$3.00/hour	$408.00
				$3,206.00
(E) TOTAL COSTS ($)				**$3,206.00**
(F) GROSS MARGIN ($) (D-E)				**$5,092.00**

Gross Margin per family labour input (F/H)	$31.83
Gross Margin per plant (F/A)	$0.31
Gross Margin per acre (F/B)	$5,092.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (pkt)	Price ($/pkt)		
	$5.00	**$6.00**	**$7.00**
1,244	$3,014.00	$4,258.00	$5,502.00
1,383	$3,709.00	$5,092.00	$6,475.00
1,521	$4,399.00	$5,920.00	$7,441.00

LABOUR INPUTS (HOURS)

		HIRED LABOUR			FAMILY LABOUR	
TASK	**NO. OF WORKERS**	**HRS. PER WORKER**	**(G) TOTAL HOURS**	**NO. OF WORKERS**	**HRS. PER WORKER**	**(H) TOTAL HOURS**
Land Preparation	1	16	16	1	16	16
Planting	1	16	16	1	16	16
Transplanting	1	16	16	1	16	16
Pest and Disease Control	1	24	24	1	24	24
Weeding	1	24	24	1	24	24
Fertilizing	1	24	24	1	24	24
Harvesting	1	8	8	1	8	8
Processing/Packing	1	8	8	1	8	8
Marketing				1	24	24
TOTAL HOURS			**136**			**160**
(I) Average Wage Rate ($/hour)						$3.00
(J) Total Cost of hired labour (I*G)						$408.00
(K) Total Costs of family labour (I*H)						$480.00
Total labour requirement (hours)						296
GROSS MARGIN - including costs of family labour (F-K)						**$4,612.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

4.10. Celery - *Apium graveolens*

a) Production Information

Recommended Varieties:
- Imperial Tall Utah

Seed Rate:
- 30-40g/acre

Planting Material:
- Seeds are sewed directly into the plot.

Plant Spacing:
- Between Rows: 0.6m
- Between plants within Rows: 0.3m

Cropping System:
- Grown as a monocrop.

Planting Time:
- All year around but better during cool months.

Growth Period:
- 2-3 months.

Harvest Time:
- Harvest at 35-40 days from planting.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 21,350 celery plants are harvest for sale.
- Average yield per plant is 1 celery bunch.
- 19,215 celery bunches are harvested for sale, inclusive of 10% marketable yield deduction.

Markets: Local flea markets.

Price: $1.00 per celery bunch.

c) Direct Costs

Planting Material:
- Seeds @$10.00 per packet.

Fertilizer:
- *Urea:* 2 to 3 times during growth period (top dressing).
- *Poultry Manure:* 24,000-30,000kg/acre (basal).

Product	No. of Applications/Cycle	Application Rate	Price
NPK 12:5:20	4	20kg/app.	$120.00/20kg
Urea	6	20kg/app.	$150.00/20kg
Poultry Manure	120	25kg/app/	$10.00/25kg

Weed Control/Management:
- Practice manual weed control - pull out weeds or use a hoe.

Disease Control/Management:
- *Leaf spot:* Apply *Conqueror.*

Product	No. of Applications/Cycle	Application Rate	Price
Conqueror	6	500ml/app.	$55.00/500ml

Insect Control/Management:
- No serious pests.

Irrigation:
- $50.00 per month.

Selling Costs:

Selling Cost	Price
Transport to market	$20.00 per trip

Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	**Price**
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Dietary Fiber, Potassium and Electrolytes

Enterprise Budget for Celery

GROSS MARGIN BUDGET FOR CELERY

Varieties: Tall Utah

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	22,480
(B) Area (Acres):	1
Plant Spacing:	0.6m x 0.3m
Growth Period (months):	2-3 months
Mortality (%)	5%
No. of plants harvested for sale:	21,350
Average yield per plant:	1
Marketable yield deduction (%)	10%
Yield of celery bunches harvested for sale:	19,215
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
Celery	19,215	bunch	$1.00	$19,215.00
(D) TOTAL INCOME ($)				**$19,215.00**
DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
Seeds	45	pkt	$10.00	$450.00
Fertilizer				
NPK 12:5:20	4	20kg	$120.00	$480.00
Urea	6	20kg	$150.00	$900.00
Poultry Manure	120	25kg	$10.00	$1,200.00
Crops Husbandry				
Weed Control				
Gramoxone	1	5L	$190.00	$190.00
Disease Control				
Conqueror	6	500ml	$55.00	$330.00
Irrigation				
Water	3	months	$50.00	$150.00
Selling Costs				
Transport to market	5	trips	$20.00	$100.00
Hire of market stall	5	days	$6.00	$30.00
Labour				
Hired labour	320	hours	$3.00/hour	$960.00
				$4,790.00
CAPITAL COSTS ($)	-	-	-	-
Knapsack Sprayer	1	unit	$360.00	$360.00
Mist blower	1	unit	$2,340.00	$2,340.00
				$2,700.00
(E) TOTAL COSTS ($)				**$7,490.00**
(F) GROSS MARGIN ($) (D-E)				**$11,725.00**
Gross Margin per family labour input (F/H)				$66.62
Gross Margin per plant (F/A)				$0.52
Gross Margin per acre (F/B)				$11,725.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR			
Yield (kg)	**Price ($/kg)**		
	$0.50	**$1.00**	**$1.50**
17,293	$1,156.50	$9,803.00	$18,449.50
19,215	$2,117.50	$11,725.00	$21,332.50
21,136	$3,078.00	$13,646.00	$24,214.00

LABOUR INPUTS (HOURS)						
		HIRED LABOUR			**FAMILY LABOUR**	
TASK	**NO. OF WORKERS**	**HRS. PER WORKER**	**(G) TOTAL HOURS**	**NO. OF WORKERS**	**HRS. PER WORKER**	**(H) TOTAL HOURS**
Land Preparation	1	16	16	1	16	16
Planting	1	16	16	1	16	16
Transplanting	1	16	16	1	16	16
Pest and Disease Control	1	24	24	1	24	24
Weeding	1	24	24	1	24	24
Fertilizing	1	24	24	1	24	24
Harvesting	1	8	8	1	8	8
Processing/Packing	1	8	8	1	8	8
Marketing	1	40	40	1	40	40
TOTAL HOURS			**176**			**176**
(I) Average Wage Rate ($/hour)						$3.00
(J) Total Cost of hired labour (I*G)						$528.00
(K) Total Costs of family labour (I*H)						$528.00
Total labour requirement (hours)						352
GROSS MARGIN - including costs of family labour (F-K)						**$11,197.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

4.11. Okra - *Abelmoschus esculentus*

a) Production Information

Recommended Varieties:
- Clemson Spineless
- Local Long White
- Dwarf Long pod

Seed Rate:
- 3.2kg/acre

Planting Material:
- Seeds

Plant Spacing:
- Between Rows: 1m
- Between plants within Rows: 0.3m

Cropping System:
- Grown as a monocrop

Planting Time:
- All year around but better during hot months

Growth Period:
- 3 months

Harvest Time:
- Harvesting of tender pods at 60-90 days from planting

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 12,800 plants are harvested for sale.
- Average of 20 okra pods per plants.
- 230,400 okra pods are harvested for sale inclusive of marketable yield deduction.
- 50 okra pods are sold per packet.
- 4,608 packets of okra pods are sold.

Markets: Local flea markets.

Price: $6.00 per packet.

c) Direct Costs

Planting Material:
- Seeds @ $10.00 per packet

Fertilizer:
- *NPK 12-5-20:* 120kg/acre (top dressing).
- *Urea:* 80kg/acre, two or three times a year (side dressing).
- *Poultry Manure:* 5,000-7,000kg/acre (basal).

Product	No. of Applications/Cycle	Application Rate	Price
NPK 12-5-20	4	20kg/app.	$120.00/20kg
Urea	2	20kg/app.	$150.00/20kg
Poultry Manure	160	25kg/app/	$10.00/25kg

Weed Control/Management:
- Practice manual weed control - pull out weeds or use a hoe.
- Application of *Gramoxone* or *Mulch* is also recommended.

Product	No. of Applications/Cycle	Application Rate	Price
Gramoxone	1	5L/app.	$190.00/5L

Disease Control/Management:
- *Powdery Mildew:* Apply *Benomyl* @11g/16L of water. Apply *Kocide* @32g/16L of water or *CuSol* copper solution once each week to prevent fungal infections.

Product	No. of	Application	Price

	Applications/Cycle	Rate	
Benomyl			
Kocide			
Cusol	3	1L/app/	$45.00/L

Insect Control/Management:

- *Spiny Ballworm, Leaf miner, Corn Ear Worm:* Spray *Attack* @40ml/20L of water or *Acephate (Sunthene or Orthene)* @21g/16L of water.
- *Aphids:* Apply *Rogor* @16ml/16L of water or *Suncloprid* @8ml/15L of water
- *Snail & Slugs:* Use *Blitzem* pellets. Burn crop residues.

Product	No. of Applications/Cycle	Application Rate	Price
Attack	1	5L/app.	$1,100.00/ 5L
Orthene	10	60g/app.	$9.00/g
Rogor or Suncloprid			
Blitzem	6	1kg/app.	$25.00/kg

Irrigation:

- $50.00 per month

Selling Costs:

Selling Cost	Price
Packaging	$10.00 for 100 bags
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Dietary Fiber, Potassium, Calcium, Magnesium, Vitamin C.

Enterprise Budget for Okra

GROSS MARGIN BUDGET FOR RADISH

Varieties: Clemson Spineless, Local Long White, Dwarf Long pod

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	13,480
(B) Area (Acres):	1
Plant Spacing:	1m x 0.3m
Growth Period (months):	2-3months
Mortality (%)	5%
No. of plants harvested for sale:	12,800
Average yield per plant (no. of pods)	20
Marketable yield deduction (%)	10%
Yield of okra harvested for sale:	230,400
No of okra sold per packet:	50
No of okra packets sold:	4,608
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
OKRA	4,608	pkt	$6.00	$27,648.00
(D) TOTAL INCOME ($)				**$27,648.00**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
Seeds	279	pkt	$10.00	$2,790.00
Fertilizer				
NPK 12:5:20	4	20kg	$120.00	$480.00
Urea	2	20kg	$150.00	$300.00
Poultry Manure	160	25kg	$10.00	$1,600.00
Crops Husbandry				
Weed Control				
Gramoxone	1	5L	$190.00	$190.00
Disease Control				
CuSol	3	1L	$45.00	$135.00
Insect Control				
Attack	1	5L	$1,100.00	$1,100.00
Orthene	10	60g	$9.00	$90.00
Blitzem	6	kg	$25.00	$150.00
Irrigation				
Water	3	months	$50.00	$150.00
Selling Costs				
Packaging	47	100packets	$10.00	$470.00
Transport to market	5	trips	$20.00	$100.00
Hire of market stall	5	days	$6.00	$30.00
Labour				
Hired labour	176	hours	$3.00/hour	$528.00
				$8,113.00

CAPITAL COSTS ($)	-	-	-	-
Knapsack Sprayer	1	unit	$360.00	$360.00

Mist blower	1	unit	$2,340.00	$2,340.00
				$2,700.00
(E) TOTAL COSTS ($)				**$10,813.00**
(F) GROSS MARGIN ($) (D-E)				**$16,835.00**
Gross Margin per family labour input (F/H)				$95.65
Gross Margin per plant (F/A)				$1.25
Gross Margin per acre (F/B)				$16,835.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (pkt)	Price ($/pkt)		
	$5.00	**$6.00**	**$7.00**
4,560	$11,987.00	$16,547.00	$21,107.00
4,608	$12,227.00	$16,835.00	$21,443.00
5,573	$17,052.00	$22,625.00	$28,198.00

LABOUR INPUTS (HOURS)

		HIRED LABOUR			FAMILY LABOUR	
TASK	**NO. OF WORKERS**	**HRS. PER WORKER**	**(G) TOTAL HOURS**	**NO. OF WORKERS**	**HRS. PER WORKER**	**(H) TOTAL HOURS**
Land Preparation	1	16	16	1	16	16
Planting	1	16	16	1	16	16
Transplanting	1	16	16	1	16	16
Pest and Disease Control	1	24	24	1	24	24
Weeding	1	24	24	1	24	24
Fertilizing	1	24	24	1	24	24
Harvesting	1	8	8	1	8	8
Processing/Packing	1	8	8	1	8	8
Marketing	1	40	40	1	40	40
TOTAL HOURS			**176**			**176**
(I) Average Wage Rate ($/hour)						$3.00
(J) Total Cost of hired labour (I*G)						$528.00
(K) Total Costs of family labour (I*H)						$528.00
Total labour requirement (hours)						352
GROSS MARGIN - including costs of family labour (F-K)						**$16,307.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

4.12. Sweet Corn - *Zea mays*

a) Production Information

Recommended Varieties:
- Madison 4.

Seed Rate:
- 7.2kg/acre.

Planting Material:
- Seeds.

Plant Spacing:
- Between Rows: 0.75m
- Between plants within Rows: 0.3m

Cropping System:
- Grown as a monocrop.

Planting Time:
- Can be planted all year around.

Growth Period:
- 2-3 months

Harvest Time:
- Harvest at 80-100 days from planting.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 17,080 sweet corn plants are harvested for sale.
- Average yield of 1 sweet corn cob per plant.
- 15,372 sweet corn cobs are harvested for sale inclusive of 10% marketable yield deduction.
- 4 sweet corn cobs are sold per packet.
- 3,843 sweet corn cob packets are sold.

Markets: Local flea markets.

Price: $7.00 for four pack packet.

c) Direct Costs

Planting Material:
- Seeds @$10.00 per packet.

Fertilizer:
- *NPK 12-5-20:* 80-120kg/acre at planting (top dressing).
- *Urea:* 60kg/acre (side dressing).
- *Poultry Manure:* 12,000-18,000kg/acre at 2 weeks before planting (basal).

Product	No. of Applications/Cycle	Application Rate	Price
NPK 12-5-20	6	20kg/app.	$120.00/20kg
Urea	3	20kg/app.	$150.00/20kg
Poultry Manure	160	25kg/app.	$10.00/25kg

.Weed Control/Management:
- Practice manual weed control - pull out weeds or use a hoe 1-2 times 2-4 weeks before planting.
- Application of pre-emergence *Atrazine* is also recommended @200ml/15L of water soon after planting or Round up.

Product	No. of Applications/Cycle	Application Rate	Price
Atrazine			
Round Up	1	5L/app.	$240.00/5L

Disease Control/Management:

- *Downey Mildew:* Remove and burn diseased plant. Or Spray *Kocide* at a rate of 32g/16L of water at 2 weeks interval, or apply *CuSol* copper solution.

Product	No. of Applications/Cycle	Application Rate	Price
Kocide			
Cusol	3	1L/app.	$45.00/L

Insect Control/Management:

- *Corn Earworm, Corn Leaf Hopper and Maize Aphids:* Spray *Acephaate (Sunthene* or *Orthene*) *@12g/16L.*

Product	No. of Applications/Cycle	Application Rate	Price
Orthene	6	60g/app.	$9.00/60g

Irrigation:

- $50.00 per month

Selling Costs:

Selling Cost	Price
Packaging	$10.00 for 100 packets
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Contains Vitamin A, Protein, Dietary Fiber and Complex Carbohydrates

Enterprise Budget for Sweet Corn

GROSS MARGIN BUDGET FOR SWEET CORN

Varieties: Madison 4

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	17,980
(B) Area (Acres):	1
Plant Spacing:	0.75m x 0.3m
Growth Period (months):	2-3 months
Mortality (%)	5%
No. of plants harvested for sale:	17,080
Average yield per plant:	1
Marketable yield deduction (%)	10
Yield of sweet corn harvested for sale:	15,372
No of sweet corn sold per packet:	4
No of sweet corn packets sold:	3,843
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
SWEET CORN	3,843	pkt	$7.00	$26,901.00
(D) TOTAL INCOME ($)				

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
Seeds	180	pkt	$10.00	$1,800.00
Fertilizer				
NPK 12:5:20	6	20kg	$120.00	$720.00
Urea	3	20kg	$150.00	$450.00
Poultry Manure	160	25kg	$10.00	$1,600.00
Crops Husbandry				
Weed Control				
Round Up	1	5L	$240.00	$240.00
Disease Control				
CuSol	3	1L	$45.00	$135.00
Insect Control				
Orthene	6	60g	$9.00	$54.00
Irrigation				
Water	3	months	$50.00	$150.00
Selling Costs				
Packaging	39	100packets	$10.00	$390.00
Transport to market	5	trips	$20.00	$100.00
Hire of market stall	5	days	$6.00	$30.00
Labour				
Hired labour	320	hours	$3.00/hour	$960.00
				$6,629.00

CAPITAL COSTS ($)	-	-	-	-
Knapsack Sprayer	1	unit	$360.00	$360.00
Mist blower	1	unit	$2,340.00	$2,340.00
				$2,700.00

(E) TOTAL COSTS ($)	**$9,329.00**
(F) GROSS MARGIN ($) (D-E)	**$17,572.00**
Gross Margin per family labour input (F/H)	$99.84
Gross Margin per plant (F/A)	$0.98
Gross Margin per acre (F/B)	$17,572.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (pkt)	Price ($/pkt)		
	$6.00	**$7.00**	**$8.00**
3,458	$11,419.00	$14,877.00	$18,335.00
3,843	$13,729.00	$17,572.00	$21,415.00
4,227	$16,033.00	$20,260.00	$24,487.00

LABOUR INPUTS (HOURS)

		HIRED LABOUR			FAMILY LABOUR	
TASK	**NO. OF WORKERS**	**HRS. PER WORKER**	**(G) TOTAL HOURS**	**NO. OF WORKERS**	**HRS. PER WORKER**	**(H) TOTAL HOURS**
Land Preparation	1	16	16	1	16	16
Planting	1	16	16	1	16	16
Transplanting	1	16	16	1	16	16
Pest and Disease Control	1	24	24	1	24	24
Weeding	1	24	24	1	24	24
Fertilizing	1	24	24	1	24	24
Harvesting	1	8	8	1	8	8
Processing/Packing	1	8	8	1	8	8
Marketing	1	40	40	1	40	40
TOTAL HOURS			**176**			**176**
(I) Average Wage Rate ($/hour)						$3.00
(J) Total Cost of hired labour (I*G)						$528.00
(K) Total Costs of family labour (I*H)						$528.00
Total labour requirement (hours)						352
GROSS MARGIN - including costs of family labour (F-K)						**$17,044.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

4.13. Pumpkin - *Cucurbita moschata*

a) Production Information

Recommended Varieties:
- Local Selection
- Queensland
- Blue Butternut
- Bell var
- Panderosa
- Sampson.

Seed Rate:
- 0.6kg/acre.

Planting Material:
- Seeds.

Plant Spacing:
- Between Rows: 1.8m
- Between plants within Rows: 1.8m

Cropping System:
- Grown as a monocrop.

Planting Time:
- Can be planted all year around.

Growth Period:
- 3-4 months.

Harvest Time:
- Harvest at 85-110 days from planting.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 1,186 pumpkin plants are harvest for sale.
- Average yield of 5kg of pumpkins per pumpkin plant.
- 5,930kg of pumpkins are harvested for sale, inclusive of 10% marketable yield deduction.

Markets: Local flea markets.

Price: Average price of $13.97 per kg of tomatoes.

c) Direct Costs

Planting Material:
- Seeds @$10.00 per packet

Fertilizer:
- *NPK:* 80kg/acre. Basal application at planting.
- *Urea:* 40kg/acre. Side dress 3-4 weeks after planting (top dressing).
- *Poultry Manure:* 4000kg/acre. Broadcast and mix well with soil 2 weeks before planting (basal).

Product	No. of Applications/Cycle	Application Rate	Price
NPK	4	20kg/app.	$120.00/20kg
Urea	2	20kg/app.	$150.00/20kg
Poultry Manure	160	25kg/app.	$10.00/25kg

Weed Control/Management:
- Hand weed or hoe when necessary but do not damage the stem. Manual weeding and cleaning is recommended within 2-3 weeks before the plants germinated from their seedbeds

Disease Control/Management:
- *Powdery Mildew:*

- Apply *Benomyl* @11g/16L of water, and *Kocide* @32g/16L of water or *CuSol* copper solution.

Product	No. of Applications/Cycle	Application Rate	Price
Kocide			
Cusol	4	1L/app.	$45.00/L

Insect Control/Management:

- *Pumpkin beetle:*
  - Apply *Acephate (Sunthene or Orthene)* at 12g/16L water.
  - Crop Rotation can also help reduce pest and disease attack.
- *Aphids & Red spider:*
  - The following chemicals are recommended for use: *Steward* at 7.5ml/15L water, *Attack* at 40ml/20L water, *Match* at 12ml/20L water.
  - Organic insecticides are also recommended (i.e. *Nimi* & *Avaniukini*).

Product	No. of Applications/ Cycle	Application Rate	Price
Attack	1	5L/app.	$1,100.00/5 L
Steward	1	1L/app.	$700.00/1L
Match	4	500ml/app.	$125.00/500 ml
Orthene	8	60g/app.	$9.00/g

Irrigation:

- $50.00 per month

Selling Costs:

Selling Cost	Price
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Dietary Fiber, Potassium, Vitamin C & Vitamin A

Enterprise Budget for Pumpkin

GROSS MARGIN BUDGET FOR PUMPKIN

Varieties: Local Selection, Queensland, Blue Butternut, Bell var, Panderosa, Sampson

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	1,249
(B) Area (Acres):	1
Plant Spacing:	1.8m x 1.8m
Growth Period (months):	3-4 months
Mortality (%)	5%
No. of plants harvested for sale:	1,186
Average yield per plant (kg):	5
Yield of pumpkin harvested for sale (kg):	5,930
Marketable yield deduction (%)	10%
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
PUMPKIN	5,337	kg	$3.39	$18,092.43
(D) TOTAL INCOME ($)				**$18,092.43**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
Seeds	13	pkt	$10.00	$130.00
Fertilizer				
NPK 12:5:20	4	20kg	$120.00	$480.00
Urea	2	20kg	$150.00	$300.00
Poultry Manure	160	25kg	$10.00	$1,600.00
Crops Husbandry				
Disease Control				
CuSol	4	1L	$45.00	$180.00
Insect Control				
Attack	1	5L	$1,100.00	$1,100.00
Steward	1	1L	$700.00	$700.00
Match	4	500ml	$125.00	$500.00
Orthene	8	60g	$9.00	$72.00
Irrigation				
Water	4	months	$50.00	$200.00
Selling Costs				
Transport to market	30	trips	$20.00	$600.00
Hire of market stall	30	days	$6.00	$180.00
Labour				
Hired labour	320	hours	$3.00/hour	$960.00
				$7,002.00

CAPITAL COSTS ($)				
Knapsack Sprayer	1	unit	$360.00	$360.00
Mist blower	1	unit	$2,340.00	$2,340.00
				$2,700.00

(E) TOTAL COSTS ($)	**$9,702.00**
(F) GROSS MARGIN ($) (D-E)	**$8,390.43**
Gross Margin per family labour input (F/H)	$23.31
Gross Margin per plant (F/A)	$6.72
Gross Margin per acre (F/B)	$8,390.43

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (kg)	Price ($/kg)		
	$2.39	**$3.39**	**$4.39**
4,803	$1,777.17	$6,580.17	$11,383.17
5,337	$3,053.43	$8,390.43	$13,727.43
5,870	$4,327.30	$10,197.30	$16,067.30

LABOUR INPUTS (HOURS)

		HIRED LABOUR			FAMILY LABOUR	
TASK	**NO. OF WORKERS**	**HRS. PER WORKER**	**(G) TOTAL HOURS**	**NO. OF WORKERS**	**HRS. PER WORKER**	**(H) TOTAL HOURS**
Land Preparation	1	40	40	1	40	40
Planting	1	40	40	1	40	40
Transplanting	1	40	40	1	40	40
Pest and Disease Control	1	40	40	1	40	40
Weeding	1	40	40	1	40	40
Fertilizing	1	40	40	1	40	40
Harvesting	1	40	40	1	40	40
Processing/Packing	1	40	40	1	40	40
Marketing	1	40	40	1	40	40
TOTAL HOURS			**360**			**360**
(I) Average Wage Rate ($/hour)						$3.00
(J) Total Cost of hired labour (I*G)						$1,080.00
(K) Total Costs of family labour (I*H)						$1,080.00
Total labour requirement (hours)						720
GROSS MARGIN - including costs of family labour (F-K)						$7,310.43

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

5. Tree & Fruit Crops

5.1. Banana - *Musa*

a) Production Information

Recommended Varieties:

- Fa'i Palagi
- Fa'i Fiha
- Fa'i Samoa
- Fa'i misiluki
- Fa'i Pata
- Tausoa
- Au mamae

Seed Rate:

- 449corms/acre

Planting Materials:

- Corms are used as planting material.

Plant Spacing:

- Between Rows: 3m
- Between plants within Rows: 3m

Cropping System:

- Grown as a monocrop.

Planting Time:

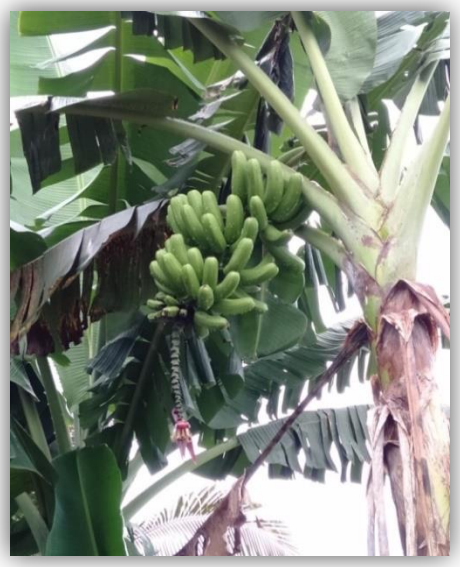
- Bananas can be planted all year round; however, the best yields are obtained in the Wet Season (November to April).

Growth Period:

- In this instance, bananas are grown over a four year period (48 months). Following the plant crop, four ratoon's are harvested prior to plant removal.

Harvest Time:

- The first crop (plant crop) can be harvested after 12 months and is followed by ratoon crops harvested on a nine month cycle, giving five harvests in four years.



Plant Crop	1-12 months
1st ratoon	13-21 months
2nd ratoon	22-30 months
3rd ratoon	31-39 months
4th ratoon	40-48 months

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:

- 426 banana plants are harvested for sale.
- 1 bunch per plant crop and 1 bunch per ratoon.
- As the banana plants age, the number of bunches remains the same, while the number of bananas per bunch reduces.
- In Year 1, the yield from the plant crop is harvested and sold (426 bunches).
- In Year 2, yield from the first ratoon is sold (426 bunches) plus half of the yield from the second ratoon (213 bunches).
- Similarly in Year 3, the remaining half of the second ratoon's yield (213 bunches) plus the yield from the third ratoon (426 bunches).

- In Year 4, the yield from the fourth ratoon (426 bunches) is harvested and sold.

Markets: Local flea markets.

Price: The price for Cavendish bananas is $30.00 per bunch in Years 1 and 2, $25.00 per bunch in Year 3 and $20.00 per bunch in Year 4. The reduction in price over the production period reflects a decrease in the size of bunches.

c) Direct Costs

Planting Materials:

- Corms @$1.00 per corm.

Fertilizer:

- *NPK 12:5:20*

Product Name	No. of Applications/Cycle	Application Rate	Price
NPK 12:5:20	Year 1-4: 4	20kg/app.	$120.00/20kg

Weed Control/Management:

- Ring weeding, spray with Glyphosate between plants @150-200ml/15L of Water.

Product Name	No. of Applications/Cycle	Application Rate	Price
Gramoxone	Year 1-4: 1	5L/app.	$190.00/5L

Disease Control/Management:

- *Black leaf streak:* Use *Tilt* and *Misting oil.*
- *Scab moth:* Use *Tridex.*
- *Bunchy top virus:* Remove diseased parts and burn.

Product Name	No. of Applications/Cycle	Application Rate	Price
Tilt	Year 1-4: 2	500ml/app.	$90.00/500ml
Misting Oil	Year 1-4: 1	5L/app.	$125.00/5L
Tridex	Year 1-4: 1	1L/app.	$45.00/L

Insect Control/Management:

- *Banana Aphids:* (Vector for transmitting virus). Spray *Rogor* @ 16ml/16L of Water or *Attack* or *Steward*.
- *Banana Weevil:* Keep plantation clear of any plant debris & weeds. Or Spray with *Bifenthrin* @15-20ml/16L of Water.
- *Banana Root Nematodes:* Use suckers from non-infected areas. Practice good husbandry practices. Application of *Vydate* is also recommended.

Product Name	No. of Applications/Cycle	Application Rate	Price
Attack	Year 1-4: 1	5L/app.	$1,100.00/5L
Steward	Year 1-4: 1	1L/app.	$700.00/1L
Vydate	Year 1-4: 1	3.87L/app.	$318.00/3.87L

Selling Costs:

Selling Cost	Price
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Potassium, Vitamin A & Vitamin C

Enterprise Budget for Banana

GROSS MARGIN BUDGET FOR BANANA

Variety: Cavendish

ASSUMPTIONS-ONE PRODUCTION CYCLE				
(A) Average number of plants:	449			
(B) Area (Acres):	1			
Plant Spacing:	3m x 3m			
Growth Period (years):	4			
Mortality (%)	5%			
No. of plants harvested for sale:	426			
Yield of banana harvested for sale (bunches):	Year 1	Year 2	Year 3	Year 4
Plant Crop (1-12 months)	426			
1st Ratoon (13-21 months)		426		
2nd Ratoon (22-30 months)		213	213	
3rd Ratoon (31-39 months)			426	
4th Ratoon (40-48 months)				426
Marketable yield deduction (%)	n/a			
(C) No. of working hours per day:	8			
INCOME ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Quantity				
Plant crop	426			
1st Ratoon		426		
2nd Ratoon		213	213	
3rd Ratoon			426	
4th Ratoon				426
Total	**426**	**639**	**639**	**426**
Unit	bunches	bunches	bunches	bunches
Unit Price	$30.00	$30.00	$25.00	$20.00
(D) TOTAL INCOME ($)	**$12,780.00**	**$19,170.00**	**$15,975.00**	**$8,520.00**
DIRECT COSTS ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Planting materials				
Corms				
Quantity	449	0	0	0
Unit	corm	corm	corm	corm
Unit Price	$1.00	$1.00	$1.00	$1.00
Total	**$449.00**	**$0.00**	**$0.00**	**$0.00**
Fertilizer				
NPK				
Quantity	4	4	4	4
Unit	20kg	20kg	20kg	20kg
Unit Price	$120.00	$120.00	$120.00	$120.00
Total	**$480.00**	**$480.00**	**$480.00**	**$480.00**
Crops Husbandry				
(Weed Control)				
Gramoxone				
Quantity	1	1	1	1

Unit	5L	5L	5L	5L
Unit Price	$190.00	$190.00	$190.00	$190.00
Total	**$190.00**	**$190.00**	**$190.00**	**$190.00**
(Disease Control)				
Tilt				
Quantity	2	2	2	2
Unit	500ml	500ml	500ml	500ml
Unit Price	$90.00	$90.00	$90.00	$90.00
Total	**$180.00**	**$180.00**	**$180.00**	**$180.00**
Misting Oil				
Quantity	1	1	1	1
Unit	5L	5L	5L	5L
Unit Price	$125.00	$125.00	$125.00	$125.00
Total	**$125.00**	**$125.00**	**$125.00**	**$125.00**
Tridex				
Quantity	1	1	1	1
Unit	1L	1L	1L	1L
Unit Price	$45.00	$45.00	$45.00	$45.00
Total	**$45.00**	**$45.00**	**$45.00**	**$45.00**
(Pest Control)				
Attack				
Quantity	1	1	1	1
Unit	5L	5L	5L	5L
Unit Price	$1,100.00	$1,100.00	$1,100.00	$1,100.00
Total	**$1,100.00**	**$1,100.00**	**$1,100.00**	**$1,100.00**
Vydate				
Quantity	1	1	1	1
Unit	3.87L	3.87L	3.87L	3.87L
Unit Price	$318.00	$318.00	$318.00	$318.00
Total	**$318.00**	**$318.00**	**$318.00**	**$318.00**
Selling Costs				
Transport to market				
Quantity	8	12	12	12
Unit	trips	trips	trips	trips
Unit Price	$20.00	$20.00	$20.00	$20.00
Total	**$160.00**	**$240.00**	**$240.00**	**$240.00**
Hire of market stall				
Quantity	8	12	12	12
Unit	days	days	days	days
Unit Price	$6.00	$6.00	$6.00	$6.00
Total	**$48.00**	**$72.00**	**$72.00**	**$72.00**
Labour				
Hired labour				
Quantity	224	256	256	256
Unit	hours	hours	hours	hours
Unit Price	$3.00	$3.00	$3.00	$3.00
Total	**$672.00**	**$768.00**	**$768.00**	**$768.00**
	$3,767.00	**$3,518.00**	**$3,518.00**	**$3,518.00**

CAPITAL COSTS ($)	Year 1	Year 2	Year 3	Year 4
Knapsack Sprayer				
Quantity	1	0	0	0
Unit	unit	unit	unit	unit
Unit Price	$360.00	**$0.00**	**$0.00**	**$0.00**
Total	**$360.00**	**$0.00**	**$0.00**	**$0.00**
Mist blower				
Quantity	1	0	0	0
Unit	unit	unit	unit	unit
Unit Price	$2,340.00	$2,340.00	$2,340.00	$2,340.00
Total	**$2,340.00**	**$0.00**	**$0.00**	**$0.00**
	$2,700.00	**$0.00**	**$0.00**	**$0.00**
(E) TOTAL COSTS ($)	**$6,467.00**	**$3,518.00**	**$3,518.00**	**$3,518.00**
(F) GROSS MARGIN ($) (D-E)	**$6,313.00**	**$15,652.00**	**$12,457.00**	**$5,002.00**
Gross Margin per family labour input (F/H)	$28.18	$61.14	$48.66	$19.54
Gross Margin per plant (F/A)	$14.06	$34.86	$27.74	$11.14
Gross Margin per acre (F/B)	$6,313.00	$15,652.00	$12,457.00	$5,002.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Average Yield (bunches)	Average Price ($/bunch)		
	$20.00	**$25.00**	**$30.00**
430	$4,344.75	$6,494.75	$8,644.75
530	$6,344.75	$8,994.75	$11,644.75
630	$8,344.75	$11,494.75	$14,644.75

LABOUR INPUTS (HOURS)									
HIRED LABOR	**NO. OF LABOURERS**		**Year 1**		**Year 2**		**Year 3**		**Year 4**
TASK		**HOURS**	**TOTAL**	**HOURS**	**TOTAL**	**HOURS**	**TOTAL**	**HOURS**	**TOTAL**
Land preparation	2	8	8						
Planting	2	16	16						
Re-planting	1	16	16						
Disease Control	1	24	24	36	36	36	36	36	36
Pest Control	1	24	24	36	36	36	36	36	36
Weed control	1	8	8	8	8	8	8	8	8
Fertilising	1	16	16	16	16	16	16	16	16
Desuckering	1	16	16	16	16	16	16	16	16
Deleafing	1	32	32	48	48	48	48	48	48
Propping	1	32	32	48	48	48	48	48	48
Harvesting	1	32	32	48	48	48	48	48	48
Marketing									
TOTAL HOURS (G)			**224**		**256**		**256**		**256**
FAMILY LABOUR	**NO. OF LABOURERS**		**Year 1**		**Year 2**		**Year 3**		**Year 3**
TASK		**HOURS**	**TOTAL**	**HOURS**	**TOTAL**	**HOURS**	**TOTAL**	**HOURS**	**TOTAL**
Land preparation	1	8	8						
Planting	1	16	16						
Re-planting	1	16	16						
Disease Control									
Pest Control									
Weed control									
Fertilising									
Desuckering	1	16	16	16	16	16	16	16	16
Deleafing									
Propping									
Harvesting	1	32	32	48	48	48	48	48	48
Marketing	1	64	64	96	96	96	96	96	96
TOTAL HOURS (H))			**152**		**160**		**160**		**160**
(I) Average Wage Rate ($/hour)			$3.00		$3.00		$3.00		$3.00
(J) Total Cost of hired labour (I*G)			$672.00		$768.00		$768.00		$768.00
(K) Total Costs of family labour (I*H)			$456.00		$480.00		$480.00		$480.00
Total labour requirement (hours)			376		416		416		416
GROSS MARGIN - including costs of family labour (F-K)			**$5,857.00**		**$15,172.00**		**$11,977.00**		**$4,522.00**
Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.									

5.2. Cocoa - *Theobroma cacao*

a) Production Information

Recommended Varieties:
- Trinitario
- Forastero/Amelonado
- Criollo.

Seed Rate:
- 449 seedlings per acre.

Planting Materials:
- Seeds are germinated in seedbeds. Farmers are provided with 8-10 week old seedlings (6-8 leaves) which are then transplanted into the farmers plot.

Plant Spacing:
- Between Rows: 3m
- Between plants within Rows: 3m

Cropping System:
- Grown as a monocrop.

Planting Time:
- Can be planted all year around.

Growth Period:
- Cocoa trees have a productive life of up to 50 years and commence bearing cocoa pods between 2-4 years after planting. Cocoa trees generally reach full production at 11-15 years.

Harvest Time:
- 4 years after planting.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 1025kg/acre wet beans or 820kg/acre dry beans.
- 426 plants are harvested for sale.

- 15 cocoa pods per basket.
- Year 4: Average yield of 30 cocoa pods per plant; 11,502 cocoa pods are harvested for sale inclusive of 10% marketable yield deduction; 766 baskets of cocoa pods are sold.

Markets: Local flea markets.

Price: $20.00 per basket of cocoa pods.

c) Direct Costs

Planting Material:
- Seedlings @$0.20 each.

Fertilizer:
- *NPK 12:5:20:* Use for mature cocoa. If the cocoa was directly planted, use the fertilizer at 5 months, then every 3 months it is sown.

Product Name	No. of Applications/Cycle	Application Rate	Price
NPK 12:5:20	Year 1-4: 1	20kg/app.	$120.00/20kg

Weed Control/Management:
- Ring Weeding.
- Spray with *Round Up* between plants @150-200ml/15L of water.

Product Name	No. of Applications/Cycle	Application Rate	Price
Round Up	Year 1-4: 1	5L/app.	$240.00/5L

Disease Control/Management:
- *Black Pod & Canker:* Remove disease affected parts (i.e. pods and branches) away from the

Cocoa field, burn & bury. Prune shade trees and overgrown Cocoa branches. Apply *Kocide* @53g/16L of water every 2 weeks or *CuSol* copper solution.

Product Name	No. of Applications/Cycle	Application Rate	Price
CuSol	Year 1-4: 2	1L/app.	$45.00/L

Insect Control/Management:

- *Rose Beetle:* It is important to properly prune so that it is not easily affected by the grubs.
- *Longicorn:* It is important to keep the ground free of weeds or dig out the grub if seen and use recommended chemical.
- *Rat:* It is recommended to harvest the ripened cocoa beans every 2 weeks and use rat poison.
- *Green Semi Hopper:* Spray *Acephate* (sold as *Sunthene* or *Orthene*) @ 12g/16L Water

Product Name	No. of Applications/Cycle	Application Rate	Price
Conqueror	Year 1-4: 4	500ml/app.	$55.00/500ml
Orthene	Year 1-4: 4	60g/app.	$36.00/60g

Selling Costs:

Selling Cost	Price
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Source of Thiamin, Niacin and Vitamin B12

Enterprise Budget for Cocoa

GROSS MARGIN BUDGET FOR COCOA

Varieties: Trinitario (Koko Samoa), Forastero/Amelonado (Koko Amelonato), Criollo

ASSUMPTIONS-ONE PRODUCTION CYCLE					
(A) Average number of plants:	449				
(B) Area (Acres):	1				
Plant Spacing:	3m x 3m				
Growth Period (years):	4				
Mortality (%)	5%				
No. of plants harvested for sale:	426				
Average yield per plant (pods):					
Year 1	0				
Year 2	0				
Year 3	0				
Year 4	30				
Yield of cocoa harvested for sale (pods):					
Year 1	0				
Year 2	0				
Year 3	0				
Year4	12,780				
Marketable yield deduction (%)	10%				
No. of pods sold per basket (pods):	15				
(C) No. of working hours per day:	8				
INCOME ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	
Quantity	0	0	0	766	
Unit	baskets	baskets	baskets	baskets	
Unit Price	$20.00	$20.00	$20.00	$20.00	
(D) TOTAL INCOME ($)	**$0.00**	**$0.00**	**$0.00**	**$15,320.00**	
DIRECT COSTS ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	
Planting materials					
Seedlings					
Quantity	449	0	0	0	
Unit	seedling	seedling	seedling	seedling	
Unit Price	$0.20	$0.20	$0.20	$0.20	
Total	**$89.80**	**$0.00**	**$0.00**	**$0.00**	
Fertilizer					
NPK					
Quantity	1	1	1	1	
Unit	20kg	20kg	20kg	20kg	
Unit Price	$120.00	$120.00	$120.00	$120.00	
Total	**$120.00**	**$120.00**	**$120.00**	**$120.00**	
Crops Husbandry					
(Weed Control)					
Round Up					
Quantity	1	1	1	1	

Unit	5L	5L	5L	5L
Unit Price	$240.00	$240.00	$240.00	$240.00
Total	**$240.00**	**$240.00**	**$240.00**	**$240.00**
(Disease Control)				
Cusol				
Quantity	2	2	2	2
Unit	1L	1L	1L	1L
Unit Price	$45.00	$45.00	$45.00	$45.00
Total	**$90.00**	**$90.00**	**$90.00**	**$90.00**
(Pest Control)				
Conqueror				
Quantity	4	4	4	4
Unit	500ml	500ml	500ml	500ml
Unit Price	$55.00	$55.00	$55.00	$55.00
Total	**$220.00**	**$220.00**	**$220.00**	**$220.00**
Orthene				
Quantity	4	4	4	4
Unit	60g	60g	60g	60g
Unit Price	$9.00	$9.00	$9.00	$9.00
Total	**$36.00**	**$36.00**	**$36.00**	**$36.00**
Selling Costs				
Transport to market				
Quantity	0	0	0	26
Unit	trips	trips	trips	trips
Unit Price	$20.00	$20.00	$20.00	$20.00
Total	**$0.00**	**$0.00**	**$0.00**	**$520.00**
Hire of market stall				
Quantity	0	0	0	26
Unit	days	days	days	days
Unit Price	$6.00	$6.00	$6.00	$6.00
Total	**$0.00**	**$0.00**	**$0.00**	**$156.00**
Labour				
Hired labour				
Quantity	144	96	96	184
Unit	hours	hours	hours	hours
Unit Price	$3.00	$3.00	$3.00	$3.00
Total	**$432.00**	**$288.00**	**$288.00**	**$552.00**
	$1,227.80	**$994.00**	**$994.00**	**$1,934.00**
(E) TOTAL COSTS ($)	**$1,227.80**	**$994.00**	**$994.00**	**$1,934.00**
(F) GROSS MARGIN ($) (D-E)	**-$1,227.80**	**-$994.00**	**-$994.00**	**$13,386.00**
Gross Margin per family labour input (F/H)	-$8.53	-$10.35	-$10.35	$72.75
Gross Margin per plant (F/A)	-$1,227.80	-$994.00	-$994.00	$13,386.00
Gross Margin per acre (F/B)	-$1,227.80	-$994.00	-$994.00	$13,386.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR			
Average Yield (baskets)	Average Price ($/basket)		
	$15.00	$20.00	$25.00
689	$9,047.55	$12,492.55	$15,937.55
766	$10,202.55	$14,032.55	$17,862.55
842	$11,342.55	$15,552.55	$19,762.55

LABOUR INPUTS (HOURS)									
HIRED LABOR	NO. OF LABOURERS	Year 1		Year 2		Year 3		Year 4	
TASK		HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL
Land Preparation	1	24	24						
Planting									
Transplanting	1	24	24						
Pest and Disease Control	1	32	32	32	32	32	32	32	32
Weeding	1	32	32	32	32	32	32	32	32
Fertilizing	1	32	32	32	32	32	32	32	32
Harvesting	1								24
Processing/Packing	1								24
Marketing	1								40
TOTAL HOURS (G)			**144**		**96**		**96**		**184**
FAMILY LABOUR	NO. OF LABOURERS	Year 1		Year 2		Year 3		Year 3	
TASK		HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL
Land Preparation	1	24	24						
Planting									
Transplanting	1	24	24						
Pest and Disease Control	1	32	32	32	32	32	32	32	32
Weeding	1	32	32	32	32	32	32	32	32
Fertilizing	1	32	32	32	32	32	32	32	32
Harvesting	1								24
Processing/Packing	1								24
Marketing	1								40
TOTAL HOURS (H))			**144**		**96**		**96**		**184**
(I) Average Wage Rate ($/hour)			$3.00		$3.00		$3.00		$3.00
(J) Total Cost of hired labour (I*G)			$432.00		$288.00		$288.00		$552.00
(K) Total Costs of family labour (I*H)			$432.00		$288.00		$288.00		$552.00
Total labour requirement (hours)			288		192		192		368
GROSS MARGIN - including costs of family labour (F-K)			**-$1,659.80**		**-$1,282.00**		**-$1,282.00**		**$12,834.00**
Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.									

5.3. Lime - *Citrus x aurantiifolia*

a) Production Information

Recommended Varieties:
- Tahitian lime
- Bush lemon
- Meyer lemon
- West Indian limes.

Seed Rate:
- 130 seedlings in 1 acre

Planting Materials:
- Grafted seedlings.

Plant Spacing:
- Between Rows: 6m
- Between plants within Rows: 5m

Cropping System:
- Grown as a monocrop

Planting Time:
- Can be planted all year round, but best during wet season.

Growth Period:
- 10-20 years.

Harvest Time:
- 3-4 years after planting.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 130 plants are harvested for sale.
- Year 3: Average yield of 10kg of lime per plant; 1,170kg of lime for sale inclusive of 10% marketable yield deduction.
- Year 4: Average yield of 30kg per plant; 3,510kg of lime for sale inclusive of 10% marketable yield deduction.

- Year 5: Average yield of 50kg per plant; 5,850kg of lime for sale inclusive of 10% marketable yield deduction.
- Year 6: Average yield of 70kg per plant; 8,190kg of lime for sale inclusive of 10% marketable yield deduction.
- Year 7: Average yield of 70kg per plant; 8,190kg of lime for sale inclusive of 10% marketable yield deduction.
- Year 8: Average yield of 70kg per plant; 8,190kg of lime for sale inclusive of 10% marketable yield deduction.
- Year 9: Average yield of 70kg per plant; 8,190kg of lime for sale inclusive of 10% marketable yield deduction.
- Year 10: Average yield of 70kg per plant; 8,190kg of lime for sale inclusive of 10% marketable yield deduction.

Markets: Local flea markets.

Price: Average price of $4.00 per kg of lime.

c) Direct Costs

Planting Material:
- Grafted Seedlings @$0.20 each

Fertilizer:
- *NPK*

Product Name	No. of Applications/Cycle	Application Rate	Price
NPK	Year 1-10: 4	20kg/app.	$120.00/20kg

Weed Control/Management:

- Ring Weeding.

Disease Control/Management:

- *Citrus Scab:* If signs of the disease are seen on the fruits, leaves and branches, it is advised to immediately remove the whole plant and burn it. It is also advised to clean the block well from the weeds. Or spray using CuSol copper solution.
- *Black Rot:* Collect all the affected fruits and throw as far away from the plant or spray using recommended chemical, CuSol copper solution.

Product Name	No. of Applications/Cycle	Application Rate	Price
CuSol	Year 1-10: 1	1L/app.	$45.00/L

Insect Control/Management:

- *Fruit Piercing Moth:* Immediate removal of the overripe fruit or cover the fruits with a recommended bag or net
- *Aphids:* Remove the affected branches or use insecticide to spray, or contact the Research Section of the Crops Division for more details on insect treatment.
- *Psyllid:* To treat Psyllid, it is advised to immediately contact the Research Section of the Crops Division for a recommended chemical treatment and controls
- *P. minor:* Application of *Attack*, *Conqeueor*, *Claw Icon* or *Orthene* is recommended.

Product Name	No. of Applications/Cycle	Application Rate	Price
CuSol	Year 1-10: 1	1L/app.	$45.00/L
Attack	Year 1-10: 4	200ml/app.	$45.00/200ml
Conqeuror	Year 1-10: 2	500ml/app.	$55.00/500ml
Claw Icon	Year 1-10: 1	1L/app.	$130.00/1L
Orthene	Year 1-10: 5	60g/app.	$6.00/60g

Irrigation:

- $50.00 per month.

Selling Costs:

Selling Cost	Price
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Excellent Source of Vitamin C, Calcium, Iron and Vitamin A

Enterprise Budget for Tahitian Lime

GROSS MARGIN BUDGET FOR TAHITIAN LIME

Variety: Tahitian Lime

ASSUMPTIONS-ONE PRODUCTION CYCLE	
(A) Average number of plants:	130
(B) Area (Acres):	1
Plant Spacing:	6m x 5m
Growth Period (years):	10
Mortality (%)	n/a
No. of plants harvested for sale:	130
Average yield per plant (kg):	
Year 1	0
Year 2	0
Year 3	10
Year 4	30
Year 5	50
Year 6	70
Year 7	70
Year 8	70
Year 9	70
Year 10	70
Yield of lime harvested for sale (kg):	
Year 1	0
Year 2	0
Year 3	1,300
Year 4	3,900
Year 5	6,500
Year 6	9,100
Year 7	9,100
Year 8	9,100
Year 9	9,100
Year 10	9,100

Marketable yield deduction (%)	10%									
(C) No. of working hours per day:	8									
INCOME ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Quantity	0	0	1,170	3,510	5,850	8,190	8,190	8,190	8,190	8,190
Unit	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
Unit Price	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00	$4.00
(D) TOTAL INCOME ($)	**$0.00**	**$0.00**	**$4,680.00**	**$14,040.00**	**$23,400.00**	**$32,760.00**	**$32,760.00**	**$32,760.00**	**$32,760.00**	**$32,760.00**
DIRECT COSTS ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Planting materials										
Seeds										
Quantity	130	-	-	-	-	-	-	-	-	-
Unit	grafted seedling	-	-	-	-	-	-	-	-	-
Unit Price	$0.20	-	-	-	-	-	-	-	-	-
Total	**$26.00**	-	-	-	-	-	-	-	-	-
Fertilizer										
NPK										
Quantity	4	4	4	4	4	4	4	4	4	4
Unit	20kg	20kg	20kg	20kg	20kg	20kg	20kg	20kg	20kg	20kg
Unit Price	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00	$120.00
Total	**$480.00**	**$480.00**	**$480.00**	**$480.00**	**$480.00**	**$480.00**	**$480.00**	**$480.00**	**$480.00**	**$480.00**
Crops Husbandry										
(Disease Control)										
CuSol										
Quantity	1	1	1	1	1	1	1	1	1	1
Unit	1L	1L	1L	1L	1L	1L	1L	1L	1L	1L
Unit Price	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00
Total	**$45.00**	**$45.00**	**$45.00**	**$45.00**	**$45.00**	**$45.00**	**$45.00**	**$45.00**	**$45.00**	**$45.00**
(Insect Control)										
Attack										
Quantity	4	4	4	4	4	4	4	4	4	4
Unit	200ml	200ml	200ml	200ml	200ml	200ml	200ml	200ml	200ml	200ml
Unit Price	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00

Total	**$220.00**	**$220.00**	**$220.00**	**$220.00**	**$220.00**	**$220.00**	**$220.00**	**$220.00**	**$220.00**	**$220.00**
Conqueror										
Quantity	2	2	2	2	2	2	2	2	2	2
Unit	500ml	500ml	500ml	500ml	500ml	500ml	500ml	500ml	500ml	500ml
Unit Price	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00
Total	**$110.00**	**$110.00**	**$110.00**	**$110.00**	**$110.00**	**$110.00**	**$110.00**	**$110.00**	**$110.00**	**$110.00**
Claw Icon										
Quantity	1	1	1	1	1	1	1	1	1	1
Unit	1L	1L	1L	1L	1L	1L	1L	1L	1L	1L
Unit Price	$130.00	$130.00	$130.00	$130.00	$130.00	$130.00	$130.00	$130.00	$130.00	$130.00
Total	**$130.00**	**$130.00**	**$130.00**	**$130.00**	**$130.00**	**$130.00**	**$130.00**	**$130.00**	**$130.00**	**$130.00**
Orthene										
Quantity	5	5	5	5	5	5	5	5	5	5
Unit	6g	6g	6g	6g	6g	6g	6g	6g	6g	6g
Unit Price	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00
Total	**$30.00**	**$30.00**	**$30.00**	**$30.00**	**$30.00**	**$30.00**	**$30.00**	**$30.00**	**$30.00**	**$30.00**
Harvesting & Pruning Equipment										
Stick Pickers	-	-	**$300.00**	-	-	-	-	-	-	-
Seceteurs	-	-	**$100.00**	-	-	-	-	-	-	-
Pruning Saw	-	-	**$50.00**	-	-	-	-	-	-	-
Pruning Lopper	-	-	**$150.00**	-	-	-	-	-	-	-
Ladder	-	-	**$600.00**	-	-	-	-	-	-	-
Irrigation										
Water										
Quantity	12	12	12	12	12	12	12	12	12	12
Unit	months	months	months	months	months	months	months	months	months	months
Unit Price	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00	$50.00
Total	**$600.00**	**$600.00**	**$600.00**	**$600.00**	**$600.00**	**$600.00**	**$600.00**	**$600.00**	**$600.00**	**$600.00**
Selling Costs										
Transport to market										
Quantity	-	-	12	36	60	82	82	82	82	82
Unit	-	-	trips	trips	trips	trips	trips	trips	trips	trips

Unit Price	-	-	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00	$20.00
Total	-	-	**$240.00**	**$720.00**	**$1,200.00**	**$1,640.00**	**$1,640.00**	**$1,640.00**	**$1,640.00**	**$1,640.00**
Hire of market stall	-	-								
Quantity		-	12	36	60	82	82	82	82	82
Unit	-	-	days	days	days	days	days	days	days	days
Unit Price	-	-	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00
Total	-	-	**$120.00**	**$360.00**	**$600.00**	**$820.00**	**$820.00**	**$820.00**	**$820.00**	**$820.00**
Labour										
Hired labour										
Quantity	200	120	280	424	584	712	712	712	712	712
Unit	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours
Unit Price	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00
Total	**$600.00**	**$360.00**	**$840.00**	**$1,272.00**	**$1,752.00**	**$2,136.00**	**$2,136.00**	**$2,136.00**	**$2,136.00**	**$2,136.00**
	$2,241.00	**$1,975.00**	**$4,015.00**	**$3,967.00**	**$5,167.00**	**$6,211.00**	**$6,211.00**	**$6,211.00**	**$6,211.00**	**$6,211.00**
CAPITAL COSTS ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Knapsack Sprayer										
Quantity	1	-	-	-	-	-	-	-	-	-
Unit	unit	-	-	-	-	-	-	-	-	-
Unit Price	$360.00	-	-	-	-	-	-	-	-	-
Total	**$360.00**	-	-	-	-	-	-	-	-	-
Mist blower		-	-	-	-	-	-	-	-	-
Quantity	1	-	-	-	-	-	-	-	-	-
Unit	unit	-	-	-	-	-	-	-	-	-
Unit Price	$2,340.00	-	-	-	-	-	-	-	-	-
Total	**$2,340.00**	-	-	-	-	-	-	-	-	-
	$2,700.00	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**
(E) TOTAL COSTS ($)	**$4,941.00**	**$1,975.00**	**$4,015.00**	**$3,967.00**	**$5,167.00**	**$6,211.00**	**$6,211.00**	**$6,211.00**	**$6,211.00**	**$6,211.00**
(F) GROSS MARGIN ($) (D-E)	**-$4,941.00**	**-$1,975.00**	**$665.00**	**$10,073.00**	**$18,233.00**	**$26,549.00**	**$26,549.00**	**$26,549.00**	**$26,549.00**	**$26,549.00**
Gross Margin per family labour input (F/H)	-$24.71	-$16.46	$2.38	$43.00	$45.46	$37.29	$37.29	$37.29	$37.29	$37.29
Gross Margin per plant (F/A)	-$38.01	-$15.19	$5.12	$77.48	$140.25	$204.22	$204.22	$204.22	$204.22	$204.22
Gross Margin per acre (F/B)	-$4,941.00	-$1,975.00	$665.00	$10,073.00	$18,233.00	$26,549.00	$26,549.00	$26,549.00	$26,549.00	$26,549.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR			
Average Yield (kg)	Average Price ($/kg)		
	$3.50	$4.00	$4.50
5,791	$15,156.50	$23,164.00	$20,947.50
6,435	$17,410.50	$20,628.00	$23,845.50
7,078	$19,661.00	$23,200.00	$26,739.00

LABOUR INPUTS (HOURS)																					
HIRED LABOR	NO. OF LABOURERS	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
TASK		HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL
Land Preparation	1	40	40																		
Planting																					
Transplanting	1	40	40																		
Pest and Disease Control	1	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Weeding	1	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Fertilizing	1	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Pruning	1					40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Harvesting	1					40	40	112	112	192	192	256	256	256	256	256	256	256	256	256	256
Processing/Packing	1					40	40	112	112	192	192	256	256	256	256	256	256	256	256	256	256
Marketing	1					40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
TOTAL HOURS (G)			**200**		**120**		**280**		**424**		**584**		**712**		**712**		**712**		**712**		**712**
FAMILY LABOUR	NO. OF LABOURERS	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
TASK		HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL
Land Preparation	1	40	40																		
Planting																					
Transplanting	1	40	40																		
Pest and Disease Control	1	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Weeding	1	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Fertilizing	1	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Pruning	1					40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Harvesting	1					40	40	112	112	192	192	256	256	256	256	256	256	256	256	256	256
Processing/Packing	1					40	40	112	112	192	192	256	256	256	256	256	256	256	256	256	256
Marketing	1					40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
TOTAL HOURS (H)			**200**		**120**		**280**		**424**		**584**		**712**		**712**		**712**		**712**		**712**
(I) Average Wage Rate ($/hour)			$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00
(J) Total Cost of hired labour (I*G)			$600.00		$360.00		$840.00		$1,272.00		$1,752.00		$2,136.00		$2,136.00		$2,136.00		$2,136.00		$2,136.00
(K) Total Costs of family labour (I*H)			$600.00		$360.00		$840.00		$1,272.00		$1,752.00		$2,136.00		$2,136.00		$2,136.00		$2,136.00		$2,136.00
Total labour requirement (hours)			400		240		560		848		1168		1424		1424		1424		1424		1424
GROSS MARGIN - including costs of family labour (F-K)			**-$5,541.00**		**-$2,335.00**		**-$175.00**		**$8,801.00**		**$18,233.00**		**$24,413.00**		**$24,413.00**		**$24,413.00**		**$24,413.00**		**$24,413.00**

5.4. Coconut - *Cocos nucifer*

a) Production Information

Recommended Varieties:

- Tall Samoan Coconut
- Hybrid Coconut

Seed Rate:

- 50 tree plants/acre. Seed nuts are germinated in nursery seedbeds and transplanted as seedlings in the field, about 30 weeks after germination when tree leaves have dropped.

Planting Materials:

- Seedlings.

Plant Spacing:

- Between Rows: 9m
- Between plants within Rows: 9m

Cropping System:

- Intercropping is commonly practiced, with crops such as banana and cocoa planted under coconuts. Cattle are often grazed under coconuts as well.

Planting Time:

- Can be planted all year round, but best during wet season.

Growth Period:

- Coconut trees have a productive life of up to 60 years and commence bearing nuts between 5-7 years after planting. Coconut palms generally reach full production at 15-20 years after planting.

Harvest Time:

- Tall Samoan Coconuts take 5-7 years to bear nuts, while Hybrids take 4-5 years to bear nuts.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:

- 50 coconut plants are harvested for sale. 10 coconuts sold per basket.
- *Tall Samoan Coconut*
    - Year 6: 3 coconuts per tree, 150 coconuts are harvested for sale; 15 baskets are sold
    - Year 7: 16 coconuts per tree, 800 coconuts are harvested for sale; 80 baskets are sold
    - Year 8: 27 coconuts per tree, 1,350 coconuts are harvested for sale; 135 baskets are sold
    - Year 9: 31 coconuts per tree, 1,550 coconuts are harvested for sale; 155 baskets are sold
    - Year 10: 40 coconuts per tree, 2,000 coconuts are harvested for sale; 200 baskets are sold
- *Hybrid Coconut*
    - Year 5: 19 coconuts per tree, 950 coconuts are harvested for sale; 95 baskets are sold
    - Year 6: 47 coconuts per tree, 2,350 coconuts are harvested for sale; 235 baskets are sold

- Year 7: 70 coconuts per tree, 3,500 coconuts are harvested for sale; 350 baskets are sold
- Year 8: 78 coconuts per tree, 3,900 coconuts are harvested for sale; 390 baskets are sold
- Year 9: 80 coconuts per tree, 4,000 coconuts are harvested for sale; 400 baskets are sold
- Year 10: 100 coconuts per tree, 5,000 coconuts are harvested for sale; 500 baskets are sold

Markets: Local flea markets.

Price: Average price of $5.00 per basket of coconuts.

c) Direct Costs

Planting Material:

- Seedlings

Fertilizer:

- *Ammonium Sulphate:* - Year 1 - 0.3kg/tree, Year 2: 0.6kg/tree, Year 3: 0.9kg/tree, Year 4: 0.9kg/tree
- *Triple Superphosphate:* Year 1: 0.1kg/ tree, Year 2: 0.2kg/tree, Year 3: 0.3kg/tree, Year 4: 0.4kg/tree;
- *Muriate of Potash:* Year 1: 0.4kg/ tree; Year 2: 0.8kg/tree; Year 3: 1.2kg/tree; Year 4: 1.2kg/tree; Year 5:1.2kg/tree; Year 6 1.2kg/tree.

Weed Control/Management:

- Ring Weeding
- Spray with *Round Up* between plants @100ml/15L of water.

Disease Control/Management:

- *Bud Rot:* The disease affects palms of all ages and all varieties of coconuts
    - For seedlings: Monthly spray *Kocide* @32g in 16L of water or remove and destroy diseased seedlings or *CuSol* cooper solution.
    - For older plants: Remove and destroy diseased plants.

Insect Control/Management:

- *Rhinoceros Beetle:* controlled by biological control methods, using virus, fungus & pheromone traps.
- *Stick Insect:* controlled by Cultural method, Good field sanitation, Parasitoid - Paranastatus nigriscutilatus.

Selling Costs:

Selling Cost	Price
Transport to market	$10.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

No capital costs.

f) Food Value

Vitamin C, Vitamin B1, B2 and Iron.

Enterprise Budget for Coconut

GROSS MARGIN BUDGET FOR COCONUT

Variety: Hybrid Coconut

ASSUMPTIONS-ONE PRODUCTION CYCLE	
(A) Average number of plants:	50
(B) Area (Acres):	1
Plant Spacing:	9m x 9m
Growth Period (years):	10
Mortality (%)	n/a
No. of plants harvested for sale:	50
Average yield per plant (nuts):	
Year 1	0
Year 2	0
Year 3	0
Year 4	0
Year 5	19
Year 6	47
Year 7	70
Year 8	78
Year 9	80
Year 10	100
Yield of coconuts harvested for sale (nuts):	
Year 1	0
Year 2	0
Year 3	0
Year 4	0
Year 5	950
Year 6	2,350
Year 7	3,500
Year 8	3,900
Year 9	4,000
Year 10	5,000

Average no. of nuts sold per basket (baskets):	10
Marketable yield deduction (%)	n/a
(C) No. of working hours per day:	8

INCOME ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Quantity	0	0	0	0	95	235	350	390	400	500
Unit	basket	basket	basket	basket	basket	basket	basket	basket	basket	basket
Unit Price	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
(D) TOTAL INCOME ($)	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$475.00**	**$1,175.00**	**$1,750.00**	**$1,950.00**	**$2,000.00**	**$2,500.00**
DIRECT COSTS ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
Planting Materials										
Seedlings										
Quantity	50	-	-	-	-	-	-	-	-	-
Unit	seedling	-	-	-	-	-	-	-	-	-
Unit Price	$0.20	-	-	-	-	-	-	-	-	-
Total	**$10.00**	-	-	-	-	-	-	-	-	-
Selling Costs										
Transport to market										
Quantity	-	-	-	-	1	2	3	4	4	5
Unit	-	-	-	-	trips	trips	trips	trips	trips	trips
Unit Price	-	-	-	-	$10.00	$10.00	$10.00	$10.00	$10.00	$10.00
Total	-	-	-	-	**$10.00**	**$20.00**	**$30.00**	**$40.00**	**$40.00**	**$50.00**
Hire of market stall										
Quantity	-	-	-	-	1	2	3	4	4	5
Unit	-	-	-	-	days	days	days	days	days	days
Unit Price	-	-	-	-	$6.00	$6.00	$6.00	$6.00	$6.00	$6.00
Total	-	-	-	-	**$6.00**	**$12.00**	**$18.00**	**$24.00**	**$24.00**	**$30.00**
	$10.00	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$32.00**	**$48.00**	**$64.00**	**$64.00**	**$80.00**
(E) TOTAL COSTS ($)	**$10.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$32.00**	**$48.00**	**$64.00**	**$64.00**	**$80.00**
(F) GROSS MARGIN ($) (D-E)	**-$10.00**	**$0.00**	**$0.00**	**$0.00**	**$475.00**	**$1,143.00**	**$1,702.00**	**$1,886.00**	**$1,936.00**	**$2,420.00**
Gross Margin per family labour input (F/H)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Gross Margin per plant (F/A)	$0.00	$0.00	$0.00	$0.00	$0.00	$22.86	$34.04	$37.72	$38.72	$48.40
Gross Margin per acre (F/B)	$0.00	$0.00	$0.00	$0.00	$0.00	$1,143.00	$1,702.00	$1,886.00	$1,936.00	$2,420.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR			
Average Yield (basket)	Average Price ($/basket)		
	$4.00	$5.00	$6.00
337	$1,290.40	$1,627.40	$1,964.40
375	$1,442.40	$1,817.40	$2,192.40
412	$1,590.40	$2,002.40	$2,414.40

LABOUR INPUTS (HOURS)																					
HIRED LABOR	NO. OF LABOURERS	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
TASK		HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL
Land Preparation																					
Transplanting																					
Weeding																					
Harvesting																					
Dehusking																					
Packing																					
Marketing																					
TOTAL HOURS (G)																					
FAMILY LABOUR	NO. OF LABOURERS	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10	
TASK		HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL	HOURS	TOTAL
Land Preparation	1	16	16																		
Transplanting	1	16	16																		
Weeding	1	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Harvesting	1									8	8	8	8	8	8	8	8	8	8	8	8
Dehusking	1									8	8	8	8	8	8	8	8	8	8	8	8
Packing	1									8	8	8	8	8	8	8	8	8	8	8	8
Marketing	1									8	8	16	16	24	24	32	32	32	32	40	40
TOTAL HOURS (H)			**40**		**8**		**8**		**8**		**40**		**48**		**56**		**64**		**64**		**72**
(I) Average Wage Rate ($/hour)			$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00		$3.00
(J) Total Cost of hired labour (I*G)			$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00		$0.00
(K) Total Costs of family labour (I*H)			$120.00		$24.00		$24.00		$24.00		#######		$144.00		$168.00		$192.00		$192.00		$216.00
Total labour requirement (hours)			40		8		8		8		40		48		56		64		64		72
GROSS MARGIN - including costs of family labour (F-K)			**-$130.00**		**-$24.00**		**-$24.00**		**-$24.00**		#######		**$1,095.00**		**$1,534.00**		**$1,694.00**		**$1,744.00**		**$2,204.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

5.5. Papaya - *Carica papaya*

a) Production Information

Recommended Varieties:

- Local Samoan, Waimanalo Hawaiian & Sunrise.

Seed Rate:

- 674 seedlings in 1 acre.

Planting Materials:

- Seedlings.

Plant Spacing:

- Between Rows: 3m
- Between plants within Rows: 2m

Cropping System:

- Grown as a monocrop.

Planting Time:

- Can be planted all year round, but best during wet season.

Growth Period:

- 5-7months

Harvest Time:

- Flowers and fruit setting after 5-7 months from planting and fruit ripen at 8 to 10 weeks after flowering. Economic life of 3 years from planting to get quality fruits for the local market.

Mortality Rate of Plants:

- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:

- 640 papaya plants are harvested for sale

- Year 1 - Average yield of 17.8kgs of papaya per plant; 10,252kgs of papaya harvested for sale, inclusive of marketable yield deduction.
- Year 2 - Average yield of 23.7kgs of papaya per plant; 13,651kgs of papaya harvested for sale, inclusive of marketable yield deduction.
- Year 3 – Average yield of 17.8kgs of papaya per plant; 10,252 kg of papaya harvested for sale, inclusive of marketable yield deduction.

Markets: Local flea markets.

Price: Average price of $4.00 per kg of papaya.

c) Direct Costs

Planting Material:

- Seedlings @$1.00 each.

Fertilizer:

- *NPK*

Product	No. of	Application	Price

Name	Applications/Cycle	Rate	
NPK	Year 1 - 1 Year 2 - 1 Year 3 - 1	20kg/app.	$120.00/20kg

Weed Control/Management:

- Ring Weeding
- Apply *Round up* @100ml/15L of water.

Product Name	No. of Applications/Cycle	Application Rate	Price
Round Up	Year 1 - 1 Year 2 - 1 Year 3 - 1	5L/app.	$240.00/5L

Disease Control/Management:

- *Anthracnose:* Attacks ripe fruits, sunken brown spots that enlarge and results in rot as fruits ripen. Apply *Manzate* @50g/15L of water.
- *Phytophora stem and fruit rot:* Apply *Manzate* @50g/15L or or *Kocide* at 30g/15L of water or *CuSol* copper solution to prevent fungal infections or *Sundomil* at 50g/15L of water on the ground around the root area.
- *Black Leaf Spot:* Apply *Manzate* @50g/15L of water.

Product Name	No. of Applications/Cycle	Application Rate	Price
CuSol	Year 1 - 6 Year 2 – 6 Year 3 - 6	1L/app.	$45.00/1L
Manzate	Year 1 - 4 Year 2 - 4 Year 3 - 4	1kg/app.	$56.00/1kg.

Insect Control/Management:

- *Fruit fly:* Female flies lay eggs under the skin of ripe, fallen, damaged or rotten fruits and deteriorate the quality of fruits. Harvest at color break, spray protein bait & *Malathion* at 30ml/15L of water on plants. Good field sanitation, remove and bury fallen fruits.

Product Name	No. of Applications/Cycle	Application Rate	Price
Malathion	Year 1 - 1 Year 2 - 1 Year 3 -1	5L/app.	$170.00./5L

Irrigation:

- $50.00 per month.

Selling Costs:

Selling Cost	Price
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Excellent Source of Vitamin A & Vitamin C.

Enterprise Budget for Papaya

GROSS MARGIN BUDGET FOR PAPAYA

Varieties: Local Samoan, Waimanalo Hawaiian & Sunrise

ASSUMPTIONS-ONE PRODUCTION CYCLE			
(A) Average number of plants:	674		
(B) Area (Acres):	1		
Plant Spacing:	3m x 2m		
Growth Period (months):	5-7 months		
Mortality (%)	5%		
No. of plants harvested for sale:	640		
Average yield per plant (kg):			
Year 1	17.8kg		
Year 2	23.7kg		
Year 3	17.8kg		
Yield of papaya harvested for sale (kg):			
Year 1	11,392		
Year 2	15,168		
Year 3	11,392		
Marketable yield deduction (%)	10%		
(C) No. of working hours per day:	8		
INCOME ($)	**Year 1**	**Year 2**	**Year 3**
Quantity	10,252	13,651	10,252
Unit	kg	kg	kg
Unit Price	$4.00	$4.00	$4.00
(D) TOTAL INCOME ($)	**$41,008.00**	**$54,604.00**	**$41,008.00**
DIRECT COSTS ($)	**Year 1**	**Year 2**	**Year 3**
Planting materials			
Seeds			
Quantity	674	0	0
Unit	Seedling	-	-
Unit Price	$1.00	$0.00	$0.00
Total	**$674.00**	**$0.00**	**$0.00**
Fertilizer			
NPK			
Quantity	1	1	1
Unit	20kg	20kg	20kg
Unit Price	$120.00	$120.00	$120.00
Total	**$120.00**	**$120.00**	**$120.00**
Crops Husbandry			
(Weed Control)			
Round Up			
Quantity	1	1	1
Unit	5L	5L	5L
Unit Price	$240.00	$240.00	$240.00
Total	**$240.00**	**$240.00**	**$240.00**
(Disease Control)			

Cusol			
Quantity	6	6	6
Unit	1L	1L	1L
Unit Price	$45.00	$45.00	$45.00
Total	**$270.00**	**$270.00**	**$270.00**
Manzate			
Quantity	4	4	4
Unit	1kg	1kg	1kg
Unit Price	$56.00	$56.00	$56.00
Total	**$224.00**	**$224.00**	**$224.00**
(Insect Control)			
Malathion			
Quantity	1	1	1
Unit	5L	5L	5L
Unit Price	$170.00	$170.00	$170.00
Total	**$170.00**	**$170.00**	**$170.00**
Irrigation			
Water			
Quantity	12	12	12
Unit	months	months	months
Unit Price	$50.00	$50.00	$50.00
Total	**$600.00**	**$600.00**	**$600.00**
Selling Costs			
Transport to market			
Quantity	30	38	30
Unit	trips	trips	trips
Unit Price	$20.00	$20.00	$20.00
Total	**$600.00**	**$760.00**	**$600.00**
Hire of market stall			
Quantity	30	38	30
Unit	days	days	days
Unit Price	$6.00	$6.00	$6.00
Total	**$180.00**	**$228.00**	**$180.00**
Labour			
Hired labour			
Quantity	320	288	240
Unit	hours	hours	hours
Unit Price	$3.00	$3.00	$3.00
Total	**$960.00**	**$864.00**	**$720.00**
	$3,768.00	**$3,206.00**	**$3,124.00**

CAPITAL COSTS ($)	**Year 1**	**Year 2**	**Year 3**
Knapsack Sprayer			
Quantity	1	0	$0.00
Unit	unit	-	-
Unit Price	$360.00	$0.00	$0.00
Total	**$360.00**	**$0.00**	**$0.00**
Mist blower			
Quantity	1	1	1

Unit	unit	-	-
Unit Price	$2,340.00	$0.00	$0.00
Total	**$2,340.00**	$0.00	$0.00
	$2,700.00	**$0.00**	**$0.00**
(E) TOTAL COSTS ($)	**$6,468.00**	**$3,206.00**	**$3,124.00**
(F) GROSS MARGIN ($) (D-E)	**$34,540.00**	**$51,398.00**	**$37,884.00**
Gross Margin per family labour input (F/H)	$107.94	$178.47	$157.85
Gross Margin per plant (F/A)	$51.25	$76.26	$56.21
Gross Margin per acre (F/B)	$34,540.00	$51,398.00	$37,884.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Average Yield (kg)	Average Price ($/kg)		
	$3.50	**$4.00**	**$4.50**
10,246	$31,595.00	$36,718.00	$41,841.00
11,385	$35,581.50	$41,274.00	$46,966.50
12,523	$39,564.50	$45,826.00	$52,087.50

LABOUR INPUTS (HOURS)

HIRED LABOR	**NO. OF LABOURERS**	**Year 1**		**Year 2**		**Year 3**	
TASK		**HOURS**	**TOTAL**	**HOURS**	**TOTAL**	**HOURS**	**TOTAL**
Land Preparation	1	40	40				
Planting							
Transplanting	1	40	40				
Pest and Disease Control	1	40	40	48	48	40	40
Weeding	1	40	40	48	48	40	40
Fertilizing	1	40	40	48	48	40	40
Harvesting	1	40	40	48	48	40	40
Processing/Packing	1	40	40	48	48	40	40
Marketing	1	40	40	48	48	40	40
TOTAL HOURS (G)			**320**		**288**		**240**
FAMILY LABOUR	**NO. OF LABOURERS**	**Year 1**		**Year 2**		**Year 3**	
TASK		**HOURS**	**TOTAL**	**HOURS**	**TOTAL**	**HOURS**	**TOTAL**
Land Preparation	1	40	40				
Planting							
Transplanting	1	40	40				
Pest and Disease Control	1	40	40	48	48	40	40
Weeding	1	40	40	48	48	40	40
Fertilizing	1	40	40	48	48	40	40
Harvesting	1	40	40	48	48	40	40
Processing/Packing	1	40	40	48	48	40	40
Marketing	1	40	40	48	48	40	40
TOTAL HOURS (H))			**320**		**288**		**240**
(I) Average Wage Rate ($/hour)			$3.00		$3.00		$3.00
(J) Total Cost of hired labour (I*G)			$960.00		$864.00		$720.00
(K) Total Costs of family labour (I*H)			$960.00		$864.00		$720.00
Total labour requirement (hours)			640		576		480
GROSS MARGIN - including costs of family labour (F-K)			**$33,580.00**		**$50,822.00**		**$37,164.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

5.6. Watermelon - *Cirtullus lanatus*

a) Production Information

Recommended Varieties:
- Sugar Baby
- War Paints.

Seed Rate:
- 810g/acre

Planting Materials:
- Seeds

Plant Spacing:
- Between Rows: 3m
- Between plants within Rows: 1m

Cropping System:
- Grown as a mono crop

Planting Time:
- April to September during the cool season but can be grown all year round.

Growth Period:
- 3-4months.

Harvest Time:
- Harvest at 80-95 days from planting.

Mortality Rate of Plants:
- Approximately 5% of plants do not survive.

b) Income

Harvestable/Saleable Yield:
- 1,270 watermelon plants are harvested for sale.
- Average yield of 5.97kg per watermelon plant.
- 6,820kgs of watermelon fruits are harvested for sale, inclusive 10% marketable yield deduction.

Markets: Local flea markets.

Price: Average price of $8.00 per kg of watermelon.

c) Direct Costs

Planting Material:
- Seedlings @$10.00 per packet.

Fertilizer:
- *NPK 12-5-20:* 80kg/acre (basal). 120-130kg/acre. Apply 1-2 times (top dressing).
- *Urea:* 40kg/acre. Spray 2-3 times a day for 2-4 weeks before transplanting (basal).
- *Poultry Manure:* 4000kg/acre (basal).

Product Name	No. of Applications/Cycle	Application Rate	Price
NPK 12-5-20	4	20kg/app.	$120.00/20kg
Urea	2	20kg/app.	$150.00/20kg
Poultry Manure	16	25kg/app.	$10.00/25kg

Weed Control/Management:
- Practice manual weed control - pull out weeds or use a hoe. Practice of mulching to retain moisture and control weeds.
- Application of *Gramoxone* is also recommended.

Product Name	No. of Applications/Cycle	Application Rate	Price
Gramoxone	2	5L/app.	$190.00/5L

Disease Control/Management:

- *Powdery mildew, Botrytis:* Apply *CuSol* copper solution or *Bravo*.

Product Name	No. of Applications/Cycle	Application Rate	Price
CuSol	4	1L/app.	$45.00/L

Insect Control/Management:

- *Mites:* Use Attack at 40ml/20L water.

Product Name	No. of Applications/Cycle	Application Rate	Price
Attack	1	5L/app.	$1,100.00/5L

Irrigation:

- $50.00 per month

Selling Costs:

Selling Cost	Price
Transport to market	$20.00 per trip
Hire of market stall	$6.00 per day

d) Labour

Both hired labour and family labour is paid at an average rate of $3.00 per hour. Refer to labour inputs section of budget for breakdown of time spent on individual tasks.

e) Capital Costs

Product	Price
Knapsack sprayer	$360.00
Mist blower	$2,340.00

f) Food Value

Vitamin C.

Enterprise Budget for Watermelon

GROSS MARGIN BUDGET FOR WATERMELON

Varieties: Sugar Baby, War Paints

ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	1,340
(B) Area (Acres):	1
Plant Spacing:	3m x 1m
Growth Period (months):	3-4 months
Mortality (%)	5%
No. of plants harvested for sale:	1,270
Average yield per plant (kg):	5.97
Yield of radish harvested for sale (kg):	7,580
Marketable yield deduction (%)	10%
(C) No. of working hours per day:	8

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL**
WATERMELON	6,820	kg	$8.00	$54,560.00
(D) TOTAL INCOME ($)				**$54,560.00**

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Planting materials				
Seeds	14	pkt	$10.00	$140.00
Fertilizer				
NPK 12:5:20	4	20kg	$120.00	$480.00
Urea	2	20kg	$150.00	$300.00
Poultry Manure	160	25kg	$10.00	$1,600.00
Crops Husbandry				
Weed Control				
Gramoxone	2	5L	$190.00	$380.00
Disease Control				
CuSol	4	1L	$45.00	$180.00
Insect Control				
Atack	1	5L	$1,100.00	$1,100.00
Steward	1	1L	$700.00	$700.00
Match	4	500ml	$125.00	$500.00
Orthene	8	60g	$9.00	$72.00
Irrigation				
Water	4	months	$50.00	$200.00
Selling Costs				
Transport to market	5	trips	$20.00	$100.00
Hire of market stall	5	days	$6.00	$30.00
Labour				
Hired labour	320	hours	$3.00/hour	$960.00
				$6,742.00
CAPITAL COSTS ($)	-	-	-	-
Knapsack Sprayer	1	unit	$360.00	$360.00

Mist blower	1	unit	$2,340.00	$2,340.00
				$2,700.00
(E) TOTAL COSTS ($)				**$9,442.00**
(F) GROSS MARGIN ($) (D-E)				**$45,118.00**
Gross Margin per family labour input (F/H)				$125.33
Gross Margin per plant (F/A)				$33.67
Gross Margin per acre (F/B)				$45,118.00

SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (kg)	Price ($/kg)		
	$7.00	**$8.00**	**$9.00**
6,130	$33,468.00	$39,598.00	$45,728.00
6,820	$38,298.00	$45,118.00	$51,938.00
7,500	$43,058.00	$50,558.00	$58,058.00

LABOUR INPUTS (HOURS)

		HIRED LABOUR			FAMILY LABOUR	
TASK	**NO. OF WORKERS**	**HRS. PER WORKER**	**(G) TOTAL HOURS**	**NO. OF WORKERS**	**HRS. PER WORKER**	**(H) TOTAL HOURS**
Land Preparation	1	40	40	1	40	40
Planting	1	40	40	1	40	40
Transplanting	1	40	40	1	40	40
Pest and Disease Control	1	40	40	1	40	40
Weeding	1	40	40	1	40	40
Fertilizing	1	40	40	1	40	40
Harvesting	1	40	40	1	40	40
Processing/Packing	1	40	40	1	40	40
Marketing	1	40	40	1	40	40
TOTAL HOURS			**360**			**360**
(I) Average Wage Rate ($/hour)						$3.00
(J) Total Cost of hired labour (I*G)						$1,080.00
(K) Total Costs of family labour (I*H)						$1,080.00
Total labour requirement (hours)						720
GROSS MARGIN - including costs of family labour (F-K)						**$44,038.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

6. Livestock

LIVESTOCK
PERFORMANCE
IN SAMOA

CATTLE
SHEEP
PIGS
CHICKEN

6.1 Beef Cattle

Enterprise Background for Beef Cattle – 10 Cows Building to 30 Cows

The following budgets represent two scenarios for a fully commercial beef cattle enterprise:

- Development budget for a new beef herd starting with 10 weaner heifers (5-6 months old) and building to 30 cows (approx. herd size - 70 head) over a 15-year timeframe;
- Gross margins budget for a 30 cow herd (approx. herd size - 70 head).

Both scenarios assumes that the beef herd is self-replacing (i.e. females are retained for developing the herd and once the herd reaches steady state, female calves are retained to replace cull cows).

Eighty acres of pasture are available for the cattle enterprise (i.e. the carrying capacity of 80 livestock units[1] (LSU)).

a) Production Information

Calving percentage:

The calving percentage is 60% (e.g. for every 10 cows joined, 6 calves will be born). It is assumed that for each calving, approximately 50 per cent of calves born are bulls and 50 per cent are heifers.

Mortality rate:

For calves aged 0-6 months, the mortality rate is 5 per cent (i.e. 1 calf in 20 calves born will not survive). For the remainder of the herd (i.e. animals over 6 months of age), the mortality rate is 2 per cent (i.e. 1 animal in 50 will not survive).

Breeding Life of Cows and Bulls:

Heifers are first mated at 16 -24 months of age and calve the following year (i.e. heifer weaners purchased in Year 1 will be joined in Year 2 and calve in Year 3).

Due to the small number of breeding cows available for developing the herd, cows are retained for a maximum breeding life of 10 years (culled at 14 years old).

Bulls are first joined at 16-24 months of age and are retained for five years (i.e. weaner bulls purchased in Year 1 will first be joined in Year 2 and will be culled in Year 3 to avoid the risk of inbreeding). Bulls should be replaced every 2 years after the birth of the F1 female progeny.

Stocking rate:

Eighty acres of pasture are available for the cattle enterprise, allowing 2 acres per LSU when the enterprise reaches steady state production (i.e. 30 cows).

The farmer commences a pasture improvement program in Year 1, improving 5 acres per year, by incorporating improved pasture species and legumes into the native pasture. This pasture improvement helps to increase the carrying capacity of the grazing area.

Herd Structure:

For the development budget, the beef cattle herd is established in Year 1 with the purchase of 10 weaner heifers (5-6 months) and one weaner bull. The enterprise builds up to a steady state self-replacing herd of 30 cows (represented in gross margin budget). The herd structure over the 15 year period is presented over leaf.

[1] Livestock units are used to estimate the carrying capacity and stocking rate of grazing land, by recognizing that cattle of different age/size classes have varied nutritional requirements. To calculate livestock unit equivalents, the following weightings are used: Cow- 1.0, bull – 1.5, heifer-0.8, weaner-0.5, calf-0.3. In Samoa, the stocking rate recommended by MAF -Animal and Plant Health Divisions is 1 LSU/acre for improved pastures.

All heifer calves are retained for herd development, until the beef cattle enterprise has a breeding herd of 30 cows in Year 10. The oldest cows and poorest performers are then culled, to maintain cow numbers at 30 head.

Hundred per cent of bull calves are retained as steers until 18-24 months of age, and the remaining fifty per cent are retained as steers until three years of age. Cull bulls are sold at three years of age.

b) Income

Markets:

Sale cattle are sold to the following markets:

- Steers (18-24 months):
  Retailing - $1,700 per head of 200kg at $8.50/kg.
- Steers (3 years old):
  Retail butchers - $1,500 per head (250 kg carcass dressed weight[2] @ $8.50/kg).
- Cull cows (9+years old):
  Fa'alavelave - $1,100 per head. Average 220kg carcass weight @ $5/kg retailing.
- Cull bulls (7 years old):
  Retail butchers - $1,350 per head (300 kg dressed weight @ $4.50/kg).

c) Direct Costs

Supplementary feed:

Cattle are supplementary fed with salt mineral blocks comprised of fine salt (i.e. only during drought season), copra meal, molasses and urea. Approximately six blocks are required per thirty head of cattle (i.e. 0.2 blocks/head) at a cost of $85.00 per 20kg block.

Animal husbandry:

Muster Package offered by MAF for Animal husbandry is $100 (<20 herd) and $150 (>20 herd). This cost includes castration, drenching, ear tagging, recording, and pasture production assessment. Drench and ear tags are provided by the farmer at own expense.

Cattle Vaccinations for tuberculosis and brucellosis are no longer provided by MAF-Animal Production and Health Division.

Pasture improvement:

Five acres of pasture are improved annually, incorporating improved grass species (e.g. Batiki, Signal, Elephant) and legumes (e.g. Calliandra, Leuceana).

Planting material is sourced free of charge from neighbors and MAF-Animal Production and Health Division.

Weedicide is purchased for weed control (1 x 5 litre bottle Roundup /per 5 acres @ $200.00).

Selling Costs:

Utilizing the Mobile Slaughter unit and ensuring compliance with the Slaughter and Meat Supply Act 2015 The slaughter and supply of carcasses for retail will cost the farmer $50 per head, which also includes inspection and dressing.

d) Labour

The farmer uses both hired labour and family labour for the cattle enterprise.

Hired labour are paid $24.00 per day and used for the following tasks.

- Fencing:
  10 men x 5 days/week x 3 weeks (Year 1)
- Pasture improvement:
  5 men x 5 days (Years 1-10)

Family labour is used for day-to-day operation of the beef enterprise (e.g. herd monitoring, animal husbandry, maintaining fences, checking water, slaughtering, delivery to market etc.).

- Herd monitoring, maintaining fences, water etc.:
  3 hours/day (5 days/week)
- Slaughtering:
  3 men x 4 hours/animal

[2] Dressing percentage: 50 percent.

- Delivery to butchers:
  1 man x 4 hours/return trip

Family labour is valued at the minimum rate for labour of $24.00 per day ($3.00/hour).

e) Capital Cost

The following capital items are required for a cattle enterprise with 30 cows (total herd approximately 70 head).

- Breeding stock – weaner heifers and bulls (5-6 months old):
  - $500/head
- Fencing (4 rows of barbed wire and wooden posts):
  - $35,200/12 sub division
- Stockyards (50 head capacity):
  - $10,000
- Temporary watering points (44 gallon drums):
  - $800

Permanent water supply (mains connection, pipes, troughs, water tanks): $10,000

Enterprise Background for Beef Cattle – 100 Cows

This gross margin budget represents a fully commercial beef cattle enterprise running a self-replacing herd with 100 cows (245 head in herd). Cattle are grazed on 350 acres.

a) Production Information

Calving percentage:

The calving percentage is 70% (e.g. for every 10 cows joined, 7 calves will be born). For every 14 months, there will be calves born. It is assumed that for each calving, approximately 50 per cent of calves born are bulls and 50 per cent are heifers.

Mortality rate:

$5,000

For calves aged 0-6 months, the mortality rate is 5 per cent (i.e. 1 calf in 20 calves born will not survive). For the remainder of the herd (i.e. animals over 6 months of age), the mortality rate is 2 per cent (i.e. 1 animal in 50 will not survive).

Breeding Life of Cows and Bulls:

Heifers are first mated at 16 -24 months of age and calve the following year. Cows are retained for a 7 calving. Bulls are first joined at 16-24 months of age and are retained for five years.

Stocking rate:

The stocking rate is one adult beef animal for one acre of 70% improved grass and 30% legumes.

The farmer has commenced a pasture improvement program, improving 15 acres per year, by incorporating improved pasture species and legumes into the native pasture. This pasture improvement helps to increase the carrying capacity of the grazing area.

Herd Structure:

Ninety nine per cent of bull calves are retained as steers until three years of age, and the remaining one per cent is retained for bull retention. Cull bulls are sold at five years from birth.

b) Income

Markets:
Sale cattle are sold to the following markets:

- Steers (18-24 months):
  Retailing - $1,700 per head (prime meat so about 200kg dressed at $8.50/kg).
- Steers (3 years old):
  Retail butchers - $2,125 per head (250kg dressed weight[3] @ $8.50/kg).
- Cull cows (9+years old):
  Retailing - $1,000 per head (Average 220kg carcass weight at $5/kg).
- Cull bulls (7 years old):
  Retail butchers - $1,400 per head (300kg dressed weight @ $4.50/kg).

c) Direct Costs

Supplementary feed:

Cattle are supplementary fed with salt mineral blocks comprised of fine salt, copra meal, molasses and urea. Approximately six blocks are required per thirty head of cattle (i.e. 0.2 blocks/head) at a cost of $85.00 per 20kg block.

Animal husbandry:

Muster Package offered by MAF for Animal husbandry is $100 (<20 herd) and $150 (>20 herd). This cost includes castration, drenching, ear tagging, recording, and pasture production assessment. Drench and ear tags are provided by the farmer at own expense.

Cattle vaccinations for tuberculosis and brucellosis are no longer provided by the MAF-Animal Production and Health Division.

Pasture improvement:

Fifteen acres of pasture are improved, incorporating improved grass species (e.g. Batiki, Signal, Elephant) and legumes (e.g. Calliandra, Leuceana).

Planting material is sourced free of charge from neighbors and MAF - Animal Production and Health Division.

Weedicide is purchased for weed control (1 x 5 litre bottle Roundup/per 5 acres @ $200.00).

Selling Costs:

Utilizing the Mobile Slaughter unit and ensuring compliance with the Slaughter and Meat Supply Act 2015 The slaughter and supply of carcasses for retail will cost the farmer $50 per head, which also includes inspection and dressing.

d) Labor

The farmer uses both hired labour and family labour for the cattle enterprise.

Hired labour are paid $24.00 per day and used for the following tasks.

- Day-to-day operations:
  2 men x 5 days/week/52 weeks
- Fencing:
  10 men x 5 days/week x 3 weeks (Year 1)
- Pasture improvement:
  4 men x 5 days (Years 1-10)

Family labour is also used for day-to-day operation of the beef enterprise (e.g. herd monitoring, animal husbandry, maintaining fences, checking water, slaughtering, delivery to market etc.).

- Herd monitoring, maintaining fences, water etc.:
  3 hours/day (5 days/week)
- Slaughtering:
  3 men x 4 hours/animal

Family labour is valued at the minimum rate for hired labour of $24.00 per day ($3.00/hour).

[3] Dressing percentage: 50 percent.

e) Capital Costs

The following capital items are required for a cattle enterprise with 100 cows (total herd approximately 245 head).

- Breeding stock – weaner heifers and bulls (5-6 months old):
  $1,100/head (i.e. $5.50kg @ 200kg LW)
- Fencing (4 rows of barbed wire and wooden posts):
  $44,000 - 16 subdivisions
- Stockyards (50 head capacity):
  $10,000
- Temporary watering points (44-gallon drums):
  $1,000
- Permanent water supply (mains connection, water tanks, pipes, troughs):
  $10,000

GROSS MARGIN BUDGET FOR BEEF CATTLE

Scenario:	**30 Breeding Cows (Self-Replacing Herd)**
Stock Rate	1cattle = 1 Acre

ASSUMPTIONS

(A) No. of breeding cows	**20**
Total no. of cattle	45
Calving %:	60%
(B) Area grazed (acres):	**50**
Area of improved pasture (acres):	50%
Total no. of head sold:	10

INCOME ($)	**Quantity**	**Unit**	**Unit Price**	**Total**
Cull cows	4	head	1000	4000
Steers(18-24 month old)	3	head	800	2400
Livestock Sales - Retail Butcher				
Steers (3years old)	3	head	1200	3600
(C) Total Income ($)				**$10,000.00**

COSTs($)	**Quantity**	**Unit**	**Unit Price**	**Total**
Supplementary Feed				
Salt mineral blocks	1	block(s)	$85.00	$85.00
Animal Husbandry				
Animal health E.g. Drench	10	head	$1.00	$10.00
Ear Tags	10	tag	$2.00	$20.00
Pasture Improvement				
Sting	1	5ltr	$150.00	$150.00
Transport				
Retail butcher	3	trips	$20.00	$60.00
Labour				
Hired labour	6	Man/days	$24.00	$144.00
(D) Total Costs				**$469.00**

(E) GROSS MARGIN(C-D)			**$9,531.00**
Gross Margin/Breeding Cow(E/A)			$476.55
Gross Margin/Family Labour Day(E/G)			$88.25
Gross Margin/Acre(E/B)			$190.62
Labour Inputs (Days)			
Task	**(F) Hired Labor**	**(G) Family Labor**	**Total**
Pasture Improvement	15		15
Beef enterprise operation		100	100
Slaughtering		7.5	7.5
Transport to market		5	5
Total labour - Days	15	112.5	127.5
(H) Average Wage Rate ($/day)			**$24.00**
(I) Total cost of hired labour			**$360.00**
(J) Total cost of family Labour(H*G)			**$2,700.00**
Total labour requirement - (days)			112.5
GROSS MARGIN - including family labour cost (E-J)			**$6,831.00**

SENSITIVITY ANALYSIS - Retail Market (excl. cost of family labour)

No. of Head Sold	Price Change		
steer 3years old	$800.00	$1,000.00	$1,200.00
5	$3,581.00	$4,581.00	$5,581.00
10	$7,526.00	$9,526.00	$11,526.00
15	$11,471.00	$14,471.00	$17,471.00

SENSITIVITY ANALYSIS - Fa'alavelave Market (excl. cost of family labour)

No. of Head Sold	Price Change		
	$800.00	$900.00	$1,000.00
5	$3,581.00	$4,081.00	$4,581.00
10	$7,526.00	$8,526.00	$9,526.00
15	$11,471.00	$12,971.00	$14,471.00

Note: This is a generic budget which should be used as a **GUIDE** only.
Farmer's should generate budgets based on their individual situations.

6.2. Chickens - Permaculture

Enterprise Background for Meat Chickens – 20 Chickens

This gross margin budget represents a commercial village-scale chicken enterprise, consisting of 20 hens. The enterprise sells 60 meat chickens per production cycle (12 weeks).

Chickens roam freely inside the fence (i.e. fenced system) and forage for food in the surrounding environment (e.g. insects, grass, seeds etc.).

Chickens are supplementary fed with kitchen scraps, rice, ripe fruits and fresh coconuts. Also there should be a small house to house the nesting boxes.

Note: It is likely that families with village-based chicken enterprises of this scale would retain a number of chickens for home consumption.

a) Production Information

The chicken enterprise consists of 20 brood hens and one improved Indian Game bred rooster. These chickens are locally bred chickens (Moa Samoa).

Each production cycle takes approximately 12 weeks (i.e. from laying of eggs to turning off chickens for sale). The egg incubation period is 21 days.

On average, each hen hatches 10 chicks (i.e. 200 chicks). However, only 60 per cent of chicks survive (i.e. 120 chicks) until the time of slaughter, due to a high mortality rate (40 per cent).

The chickens are slaughtered at around 6 months or 24 weeks of age.

b) Income

Chickens are sold to family and friends in the farmer's village and other nearby villages for an average of $15.00 each.

c) Direct Costs

This is a permaculture set up where 4 x 50m rolls chicken wires are required, $5000 for shelter with feed and water troughs inclusive. Cassava based ration costs $0.50/kg and feed intake is average at 80g/hen + chicks.

There is no supplementary feeding or animal husbandry costs associated with the chicken enterprise.

d) Labour

This is a one-man labour enterprise. One labour can carry out feeding, slaughtering and carcass delivery one hour daily all throughout the year.

e) Capital Costs

The cost of setting up a shed plus costs of feed and water troughs is estimated at $5,000.

Brood stock (hens and roosters) are purchased live for $20.00. Initially, a farmer would most likely only purchase a few hens and one rooster to develop his own breeding flock.

Enterprise Background for Meat Chickens – 100 Broiler Chickens

The following budgets represent two scenarios for a fully commercial meat chicken enterprise:

- Gross margins budget for a 200 imported day old chicks operation (85 days cycle aiming to reach 2kg LW to slaughter); and
- Development budget for a 100 hen free-range meat chicken operation (3 year timeframe).

In these budgets, meat chickens are produced from a 100 hen brood.

200 Cobb day old chicks are imported from New Zealand.

Chickens are fed with Broiler Starter ration at $2.50/kg imported. Housing is provided for nesting and shelter.

a) Production Information

Flock structure:

The chicken enterprise consists of 200 day old Cobb chicks imported.

Production cycle:

- Each production cycle takes approximately 85 days.
- 200 Day Old chicks are imported from New Zealand.

Mortality rate:

The mortality rate of chicks is 2 per cent. This is mainly at brooding due to not sufficient heat.

196 chicks survive to slaughtering in one production cycle.

b) Income

Chickens are sold to families and local retail outlets (shops, restaurants etc.) for $5.00 per lb. Each chicken weighs approximately 3lb ($15.00 per chicken).

Manure is retained for on-farm use as fertilizer.

c) Direct Costs

Supplementary feed:

Chickens are supplementary fed with Broiler Starter ration at $2.50/kg imported.

Housing and enclosure maintenance:

Sand is used as litter material in the chicken house. Sand aids bacterial growth for the breakdown of manure. In addition, chickens ingest some of the sand which aids digestion and formulation of egg shells. Around 250kg of sand is required per production cycle at a cost of $20.00.

Grass growing in the enclosure is cut once a month (3 times per production cycle). Ten litres of fuel mixed with two-stroke oil is required for each mowing (@ $2.00 per litre).

Packaging:

Once slaughtered, de-feathered and cleaned, each chicken carcass is wrapped in plastic and a label is attached. Each chicken requires 0.5 meters of plastic wrap (250 meters per 500 birds @ $0.75 per meter). Labels cost $0.20 each.

Eggs are packed in recycled egg carton which are purchased for $0.10 each.

Delivery:

One trip per week is made to deliver chicken carcasses and eggs (12 trips per production cycle). Each return trip costs around $30.00.

d) Labour

Family labour is used for the operation of the chicken enterprise for the following tasks.

Task	Description	No. Hours	No. Days
Feeding	1 man x 1 hour/day @ 84 days	84	10.5
Mowing enclosure	1 man x 1 day/month @ 3 months	24	3
Maintaining housing	1 man x 1 hour/week @ 12 weeks	12	1.5
Slaughtering/carcass preparation	1 man x 0.5 hours/chicken @ 500 chickens	250	31.25
Carcass delivery	12 trips @ 4 hours/trip	48	6

Family labour is valued at the average wage rate for hired labour of $3.00 per hour.

e) Capital Costs

The following capital costs are associated with establishing the chicken enterprise:

- 200 x day old chick @ $4.10/head - $820.00
- 250 meters chicken wire @ $300/50m roll - $1,500
- Timber fence posts (from on-farm materials) - No cost
- Housing: 2 houses (one for brooding and the other for fattening/growing) - $10,000

GROSS MARGIN BUDGET FOR CHICKEN - MEAT

Scenario:	**20 Hens (village Scale Free Range enterprise)**			
ASSUMPTIONS				
(A) No. of hens	**20**			
Number of chicks/hens:	10			
Total no. of chicks hatched:	200			
Mortality Rate:	70%			
Total Number of Chicks sold	60%			
Production period (wks.)	12 weeks			
(B) No. of working hours per day:	**8**			
INCOME ($)	**Quantity**	**Unit**	**Unit Price**	**Total**
Meat chickens	60	chicken	$10.00	$600.00
(C) Total Income ($)				**$600.00**
COSTs($)	**Quantity**	**Unit**	**Unit Price**	**Total**
Transport				
carcass Delivery(1chicken/trip)	30	trips	$2.00	$60.00
(D) Total Costs				**$60.00**
(E) GROSS MARGIN(C-D)				**$540.00**
Gross Margin/Hen (E/A)				$27.00
Gross Margin/Family Labour Day(E/G)				$180.00
Labour Inputs (Days				
Task				**Total hours**
Feeding (1hr/day)				14
Slaughtering/Preparing(0.5 hrs./chicken)				30
Delivery(60trips @2hrs/trip)				60
(F) Total labour - Days				**104**
(G) Average Wage Rate ($/day)(I)				**$3.00**
(H) Total cost of family labour (F*G)				**$312.00**
(I) Total labour requirement - (days)				**22**
GROSS MARGIN - including family labour cost(E-H)				$228.00

SENSITIVITY ANALYSIS - (excl. cost of family labour)

No. of chicken Sold	Price Change		
	$8.00	$10.00	$12.00
40	$260.00	$340.00	$420.00
60	$420.00	$540.00	$660.00
80	$580.00	$740.00	$900.00

Note: This is a generic budget which should be used as a **GUIDE** only.
Farmer's should generate budgets based on their individual situations.

6.3. Chickens – Eggs

Enterprise Background for Egg Production (3000 Hens)

The following gross margin budget represents a fully commercial intensive egg production enterprise consisting of 3000-layer hens.

The production system is modeled on New Zealand and Australian systems for barn-laid eggs. Day old chicks are imported from New Zealand (Shaver, ISA Brown) and are raised in deep litter barns.

Chickens are fed imported custom made feeds and commence laying eggs at 17-18 weeks (smaller pullet eggs). At 23-24 weeks, chickens start laying full sized eggs and continue producing until 75-80 weeks, when chickens begin moulting[4].

a) Production Information

Flock structure:

The egg enterprise consists of 3000 layer hens.

Production cycle:

Each production cycle lasts for 80 weeks (i.e. from arrival of day-old chicks until chickens begin first moulting). Layer hens are slaughtered after the first moult.

The following feeding regime is used.

Age	Feed Type	Purpose
Day old chicks – 6 weeks	Starter feed	Increasing body weight & developing bone structure.
7 weeks – 17 weeks	Grower feed	For slowing growth & reaching maturity
18 weeks – 80 weeks	Layer feed	For laying eggs
80+ weeks	Copra meal	Maintaining condition

[4] Moulting is when chickens lose older feathers and grow new ones. Chickens generally stop producing eggs until the moult is completed.

Production level:

On average, each hen lays 345 eggs over the 80 week production cycle. Total egg production is 828,000 (69,000 dozen).

Mortality rate:

The mortality rate of chickens is 20 per cent (i.e. 600 deaths). Illness and bullying of weaker chickens from other chickens are the main causes of loss. The number of surviving chickens is 2,400.

b) Income

Eggs are sold to local retail outlets for $7.00/dozen.

Chicken manure is collected and sold as fertilizer for $5.00-$10.00 per bag.

Cull chickens are sold live for $5.00/chicken and slaughtered and cleaned for $6.50/chicken. Approximately 90 per cent of cull chickens are sold live.

c) Direct Costs

Day old chicks:

Day old chicks are purchased from New Zealand for SAT $5.50 (landed price including air freight, VAGST, import duty etc.).

Supplementary feed:

As mentioned, chickens are fed exclusively with imported custom-made chicken feed (starter, grower and layer feed) during the 80 week production cycle. Chicken feed is purchased from local farm supply stores in 40kg bags, for approximately $88.00/bag on average. Chickens are fed nine bags of feed per day.

Once chickens begin moulting, they are fed copra meal for up to six weeks prior to sale/slaughter. Chickens are fed 15 bags of copra per day for $12.00 per bag.

Housing maintenance:

Saw dust and manure is used as litter material in the barn. The barn floor and laying boxes are filled with saw dust twice during the production cycle (i.e. prior to arrival of day-old chicks and 15 weeks). Sixty bags of sawdust are used each time (40 bags for the floor and 20 bags for laying boxes) at a cost of $1.00 per 40 kg bag.

Packaging:

Recycled egg cartons are purchased locally at $0.10 per carton.

For cull chickens, once slaughtered and cleaned, each chicken carcass is wrapped in plastic. Each chicken requires 0.5 meters of plastic wrap ($0.75 per meter).

Electricity:

The barn is fitted with lights for heating. During the first three weeks of the production cycle when chicks are very young, the lights are frequently used to keep chicks warm. The electricity cost during the first three weeks is approximately $900. For the remaining weeks (Week 4 – Week 80), the electricity cost is $40.00 per week. During moulting, electricity costs $20.00 per week.

Disease control:

Disease control costs are minimal.

Day old chicks are pre- vaccinated for Marek's disease on arrival in Samoa. In addition, starter and grower feed include an anti-coccidial stat to build up chickens' resistance to coccidiosis.

The shed is cleaned out between production cycles and disinfected to minimise the risk of Marek's disease which leads to paralysis in chickens. The approximate cost of disinfectant is $100.

Delivery:

One trip per production cycle is made to Faleolo Airport to collect day-old chicks that are air-freighted from New Zealand ($30.00 for the return trip).

Once chickens commence laying (17-18 weeks), eggs are delivered to town daily ($30.00 per return trip). Any inputs required for the enterprise are picked up from town on daily trips.

During times when chickens are not laying (i.e. first 16 weeks and moulting), one trip is made to town per week for the egg enterprise ($30.00 per return trip).

d) **Labour**

Three full-time hired labourers are hired for the operation of the egg enterprise (feeding, cleaning sheds, egg collection, delivery etc.) during the 80-week production period for $120/week.

One full-time labourer is hired during moulting (feeding, maintenance etc.) at $120.00/week.

e) Capital Costs

The following capital costs are associated with establishing a barn-laid egg enterprise (constructed to Australian and New Zealand standards):

- Shed: $90,000
- Fittings for shed:
  Drinkers, laying boxes, feeders, perches, lighting $20,000
- Cement rain-water tank: $5,000
- Shed or ex-shipping container for feed storage: $2,000
- Truck (second-hand): $30, 000

6.4. Piggery

Enterprise Background for a Piggery – 5 Sows Building to 10 Sows

The following budgets represent two scenarios for a fully commercial sheep farm enterprise:

- Gross margins budget for a Piggery of 10 Sows (approx. piggery size - 120 head);

Both scenarios assumes that the Piggery is self-replacing (i.e. Sows are retained for developing the piggery unit and once the piggery reaches steady state, Sows are retained to replace cull Pigs).

The gross margin is not gross profit because it does not include fixed or overhead costs such as depreciation, interest payments, rates, and permanent labour which have to be met regardless of enterprise size.

The following analysis is based on a 'steady rate' situation, and consequently, excludes the substantial capital costs in establishing a piggery. Due to rapid market fluctuations and differing individual situations, it is strongly recommended that producers use their own figures as possible.

a) Production Information

Litter size:

The average litter size from the five farms this Budget is based on ranges from 8 to 12. Thus, the average litter size is 8 after taking into account the Mortality Rate.

Mortality rate:

For piglets aged 0-28 days (0-4 weeks), the mortality rate (Pre Weaning Mortality) is 20 per cent (i.e. 4 piglets in every 20 piglets born will not survive). For the remainder of the Piggery (i.e. animals over 4 weeks of age), the mortality rate is 5 percent (i.e. 2 animals in 40 will not survive).

Breeding Life of Sows and Boars:

Gilts are usually selected for breeding at five to six months of age. The selected gilts are reared to weigh between 120 and 130 kg live weight at 7 ½ - 8 months of age when they are ready to be served by a boar for the first time.

The boar must be at least 8 months old. Consider replacing the boars to avoid inbreeding.

Gilts have to be in good condition (i.e. ***Body Condition Score*** (BCS) of 2 to 3) to produce large litters (10 to 12 or more healthy piglets) and should not be too fat (i.e. BCS 4 to 5) or too thin (i.e. BCS below 2) when they are ready for mating. Therefore, they should be fed about 6 kg of meal dry basis or 8 kg meal fresh basis per day from the time of selection until a boar serves them at the age of eight months.

Replacement Sows are first mated at 8 months of age and the sow's gestation period is 116 days (approx. 3 months, 3 weeks, 3 days). She is with piglets for a month before weaning. This leaves five months between farrowing.

Sows that farrow regularly and rear large litters (10 – 12 or more piglets) and are free of other problems and diseases should rear five to six or even more litters before they have to be removed from the herd (Culled at 3 years old).

Other factors that lead to Sows being removed include BCS, mothering ability etc.

Stocking rate:

Pigs have different space recommendations depending on the age and size. Below are the calculated space requirements for the projected population of a 10 Sow unit, where 8 weeks weaning is practiced.

1. Determine the farrowing interval and number of farrowing's per year.

Gestation	114days
Lactation	42 days
Re mating	5 days
Farrowing interval	161 days

Number of farrowing's per Sow and Year 365/161 = 2.2

2. Determine the number of Farrowing Pens. The piglets remain in the farrowing pen until 12 weeks of age.

Before Farrowing	7 days
Farrowing Lactation	14 days
Farrowing Lactation Creep	28 days
Cleaning and Sanitation of Pens	7 days
Occupation per Cycle	56 days

Thus, one farrowing pen can be used for 365/56 = 6.5 farrowing are per pen. A 10 Sow Herd with an average of 2.2 farrowing's per Sow and Year requires (10 x 2.2)/6.5 = 4 Farrowing Pens.

3. Determine the number of Servicing/Gestating Pens.

Average Weaning to Conception Interval	5 days
Gestation Period less 7 days in Farrowing Pen	107 days
Cleaning and Sanitation of Pens	7 days
Occupation per Cycle	119 days

Thus, 1 place in the servicing/gestation accommodation can be used for 365/119 = 3.1 farrowing per year. With a total of 20 farrowing's a year 20/3.1 = 6 to 7 places would be required.

4. Determine the number of places for Replacement Stock.

Presume the Sows on Average get 5 litters, and then 20% of all litters will be from Gilts.

Rearing of Breeding Stock (12 to 35 weeks)	168 days
Gestation less 7 days in Farrowing Pen	107 days
Cleaning and Sanitation of Pens	2 days
Occupation per Cycle	277 days

About 30% more animals are separated than the required number of gilts thus the required number of places in the 10 Sow herd will be:

(10 x 1.9 x 0.2 x 1.3 x 277)/365 = 4 Places

Number of Sows = 10
Number of piglets = 22 (i.e. 2.2 x 10 = 22.2 piglets/sow/year)

Live weight	Minimum Total Space Required	
(Kg)	Area (m^2)	Area (ft^2)
<10	0.15	1.6
<20	0.20	2.2
<30	0.30	3.2
<50	0.40	4.3
<85	0.55	5.9
<110	0.65	7.0
>110	1.00	10.8
200 (Sow)	2.8	30

	Area in sq. meters	Area in sq. ft.
Boar mating pen	9.3	100
Boar Housing only	7.5	80
Sow loose-housed	2.8	30
Sow confined	1.5	16
Gilt housing during oestrus	2.8	30
Farrowing crate	4.6	50

Herd Structure:

For the development budget, the herd is established in Year 1 with the purchase of Sows (5-6 months) and one Boar. The enterprise builds up to a steady state self-replacing mob of 10 Sows (represented in gross margin budget). The herd structure over the 5 year period is presented over leaf.

b) Income

Markets:

Sale Pigs are sold to the following markets:

- Weaners (Size 2 approx. 12 weeks: Retail Butchers and Restaurants - $100 per head.
- Cull Sows (3+years old): fa'alavelave - $500 per head.
- Cull Boars (4 years old): retail butchers - $500 per head (200 lbs. dressed weight @ $3.00/lb.).

c) Direct Costs

Sow/Boar Feed:

Type of Feed	**%**	**Cost of Feed ($/kg)**
Cassava roots (fresh)	75	0.50
Copra meal	20	1.00
Meat meal	5	1.23
Minerals	1	0.22

- 204 dry days x $3.83 (6kg ration) + 161 farrowing dates x $5.09 (8kg ration) = $1,600.00.

Boar is fed 365 days with 6kg sow ration

Weaner/Grower feed:

Type of Feed	%	Cost of Feed ($/kg)
Cassava roots (fresh)	62	0.50
Copra meal	20	1.00
Meat meal	17	1.23
Minerals	1	0.22

- Weaned piglets at 6 weeks old when reaching 10kg LW and feed 380g feed/day for 56 days to reach 30kg LW
  - 56*$0.28 = $15.70
- Size 2 piglet retail price = $9.90/kg plus head

  Ave dressed wt. = 21kg
  - Retail price = 21*$9.90 = $208.00

  Or live sales @ $16/kg LW
  - 30kgLW x $16 = $480.00/weaner

The amount of feed (kg) required per day are as follows:

Pig Type	Feed weight (kg) per day (fresh)
Sow	8
Gilt	6
Grower	6
Boar	6

Animal husbandry:

Animal husbandry costs are estimated to be $10.00 per head annually. This cost covers drenching and any other related animal husbandry costs.

Vaccinations for parvovirus and treating leptospirosis and erysipelas are no longer provided by MAF-Animal Protection and Health Division.

Selling Costs:

Pork sold for fa'alavelave is collected from the farm-gate by buyers.

The farmer is responsible for the delivery of carcasses to retail butchers. One trip is made per carcass at a cost of $20.00/ return trip.

d) Labour

The farmer uses both hired labour and family labour for the cattle enterprise.

Hired labour is used for the following tasks.

- Cleaning:

  10 men x 5 days/week x 3 weeks (Year 3)

Once the Piggery exceeds 40 head, the farmer would hire one full-time labourer to assist with day-to-day operations (5 days per week @ $120/week).

Hired labourers are paid $24.00 per day.

Family labour is used for day-to-day operation of the Piggery (e.g. herd monitoring, animal husbandry, maintaining pens, checking water, slaughtering, delivery to market etc.).

- Herd monitoring, maintaining fences, water etc.:

  3 hours/day (5 days/week)
- Slaughtering:

  3 men x 4 hours/animal
- Delivery to butchers:

  1 man x 4 hours/return trip

Family labour is valued at the market rate for hired agricultural labour of $24.00 per day ($3.00/hour).

GROSS MARGIN BUDGET FOR PIGS

Assumption					
Herd Parameters					
Sow numbers			10 SOWS		
Boar %			6%		
Sows replaced after			3 Years		
Boar replaced after			2 Years		
Sow Mortality			3.00%		
Reproduction				**Per Sow**	**Total Herd**
Litters per year				2.1	**21**
Average litter size born alive				10	**210**
Average litter size weaned				8.8	**184**
No. pigs reared/sow/year				18	**180**
Less replacement gilts				0.036	**3**
No. pigs available for sale					**177**
Piglet Mortality					
Pre-weaning mortality				20%	
Post-weaning mortality				5%	

GROSS MARGIN BUDGET - SOWs

Income:		**Quantity**	**Unit Price**		
No. sows available for sale		10	$700.00		$7,000.00
(A) Total Income					**$7,000.00**
VARIABLE COSTS:			**Unit Price**	**Quantity**	**Total**
Herd					
	Health	@	$5.00	10	$50.00
	Recording	@	$2.00	10	$20.00
Shed					
	Electricity	@	$15.00	10	$150.00
	Repairs & Main.	@	$10.00	10	$100.00
Labour	Day	@	$24.00	5	$120.00
(B) Total Costs					**$440.00**
**** This Variable Costs reflects only 10 Sows**					
TOTAL GROSS MARGIN (A -B)					**$6,560.00**

SENSITIVITY ANALYSIS

No. of sows Sold	**Price Change**		
	$500.00	$700.00	$900.00
5	$2,220.00	$3,220.00	$4,220.00
10	$4,560.00	$6,560.00	$8,560.00
15	$6,900.00	$9,900.00	$12,900.00
Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.			

SENSITIVITY ANALYSIS - Fa'alavelave Market (excluding cost of family labour)

No. of sows Sold	Price Change		
	$400.00	$600.00	$800.00
5	$1,720.00	$2,720.00	$3,720.00
10	$3,560.00	$5,560.00	$7,560.00
15	$5,400.00	$8,400.00	$11,400.00
Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.			

6.5. Sheep

Enterprise Background for Sheep Farming – 10 Ewe lambs Building to 30 Ewes.

The following budgets represent two scenarios for a fully commercial sheep farm enterprise:

- Development budget for a new sheep flock starting with 6 lambs (5-6 months old) and building to 100 sheep (approx. flock size - 200 head) over a 8-year timeframe;

Both scenarios assumes that the sheep flock is self-replacing (i.e. females are retained for breeding up until the flock reaches its maximum stock density, ewes are culled due to productivity or health issues.

Eight acres of improved pastures are available for the sheep enterprise.

a) Production Information

Lambing percentage:

The lambing percentage is 120 percent (e.g. for every 10 ewes joined, 12 lambs will be born). It is assumed that for each lambing, approximately 50 percent of lambs born are male and 50 percent are female.

Mortality rate:

For lambs aged 0-6 months, the mortality rate is 10 per cent (i.e. 2lambs in 20 lambs born will not survive). For the remainder of the mob (i.e. animals over 6 months of age), the mortality rate is 2 per cent (i.e. 1 animal in 50 will not survive).

Breeding Life of Ewes and Rams:

Replacement Ewes (Ewe Hogget) are first mated at 12 months of age with an approximate gestation period of 5 months (i.e. purchased in Year 1 will be joined in Year 2 and calve in Year 3).

Due to the small number of breeding ewes available for developing the mob, Ewes are retained for a maximum breeding season of six years (culled at 6 years old).

Stocking rate:

Eight acres of improved pastures are available for the sheep enterprise, allowing an acre per 5 livestock units when the enterprise reaches steady state production (i.e. 30 sheep).

The farmer commences a pasture improvement program in Year 1, improving 5 acres per year, by incorporating improved pasture species and legumes into the native pasture. This pasture improvement helps to increase the carrying capacity of the grazing area.

Figure: Fiji fantastic Sheep

Flock Structure:

For the development budget, the mob is established in Year 1 with the purchase of 10 ewe lambs (5-6 months) and one Ram. The enterprise builds up to a steady state self-replacing mob of 30 ewes (represented in gross margin budget). The mob structure over the 10 year period is presented over leaf.

All wethers are not retained for mob development; they should be fattened and sold off to make room for the ewes.

Ewe replacement rate is the percentage of ewes that are replaced in the flock each year. You need to keep enough ewe lambs to replace the ewes that die, as well as the ones that you cull. A replacement rate of 15 to 20 percent is common. You can make more rapid genetic improvement if you replace ewes at a more rapid rate.

The ram replacement rate is an indication of how many years a ram is kept. A 33 percent replacement rate means that you keep a ram for three years before getting rid of him. In this budget, it is assumed that breeding rams are purchased. However, in most cases, it is really the Animal health report and visual observations of these animals will determined the viability of keeping the animal or are culled.

b) Income

Markets:

Sale of Mutton to consume and Sheep for Breeding are as follows:

Culled Stock:

- $8.80/kg dress weight (i.e. this is the same throughout all classes of Sheep - avg. dressed weight 12kg)

Breeding Stock (i.e. Ram Hoggets'):

- $6.00/kg live weight – avg. wt. 22kg, and Ewe Hoggets' = $6.60/kg l wt. – avg. weight 35kg.

c) Direct Costs

Supplementary feed:

This feed comprises of what is readily available here in Samoa, and formulating this feed to ensure the ration is balanced in minerals, energy and protein.

This is the ratio for supplementary feed, for instance:

- If 10 kg of supplementary feed is needed, then 15 shovels of dessicated coconut is mixed with 7 ½ shovels of Brewer's grain.

- If 20 kg of supplementary feed is needed, then 30 shovels of dessicated coconut is mixed with 15 shovels of Brewer's grain.

Animal husbandry:

Animal husbandry costs are estimated to be $20.00 per head annually. This cost covers drenching and any other related animal husbandry costs.

The most common diseases/ conditions that affect mob mortality rates and performance are internal parasites, clostridia diseases, respiratory syndromes and foot rot.

The veterinary service is currently provided by the MAF – Animal Protection and Health Division, at a subsidized fee.

Pasture improvement:

Two acres of pasture are improved annually, incorporating improved grass

species (e.g. Batiki, Signal, Elephant) and legumes (e.g. Calliandra, Leuceana).

Planting material is sourced free of charge from neighbors and MAF-Animal Protection and Health Division.

Weedicide is purchased for weed control (1 x 5 litre bottle Sting/per 5 acres @ $150.00).

Selling Costs:

The farmer is responsible for the delivery of carcasses to retail butchers. One trip is made per carcass at a cost of $20.00/ return trip.

d) Labour

The farmer uses both hired labour and family labour for the cattle enterprise.

Hired labour is used for the following tasks.

- Fencing:
  5 men x 5 days/week x 2 weeks (Year 3)
- Pasture improvement:
  2 men x 5 days (Years 1-4)

Hired labourers are paid $24.00 day.

Family labour is used for day-to-day operation of the Sheep enterprise (e.g. herd monitoring, animal husbandry, maintaining fences, checking water, slaughtering, delivery to market etc.).

- Herd monitoring, maintaining fences, water etc.:
  3 hours/day (5 days/week)
- Slaughtering:
  2 men x 2 hours/animal
- Delivery to butchers:
  1 man x 4 hours/return trip

Family labour is valued at the market rate for hired agricultural labour of $24.00 per day ($3.00/hour).

e) Capital Costs

The following capital items are required for a Sheep enterprise with 10 Sheep (total herd approximately 30 head).

- Breeding stock – Ewe lambs and Rams (5-6 months old): $150-200/head
- Fencing (2 rows of barbed wire and wooden posts): $8,000
- Temporary watering points (44 gallon drums) : $200

Permanent water supply (mains connection, pipes, and troughs).

ENTERPRISE BUDGETS FOR SHEEP

DEVELOPMENT BUDGET FOR SHEEP

Scenario: **6 Sheep Mob building up to 100 Sheep**

Production Assumptions			**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
(A) No. of Breeding Ewes			5	9	11	25	50	85	138	215
Total no. of Sheep			6	13	22	37	74	121	191	293
Total no. of Sheep sold:										
	Ewes		0	0	0	1	5	4	6	10
	Rams/Wethers		0	3	6	11	24	36	53	78
Cost of breeding stock ($/head)										
	Ewe Hoggets'		231	231	231	231	231	231	231	231
	Ram Hoggets'		132	132	132	132	132	132	132	132
Price of Culled Stock ($220/25kg)			220	220	220	220	220	220	220	220
(B) Area grazed (acres)			50	50	50	50	50	50	50	50
Area of improved pasture (acres)			4	8	12	16	20	24	28	32
INCOME ($)			**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Livestock Sales										
Culled Stock	$220.00	per head	0	$660.00	1,320	2,420	6,148	8,480	12,508	18,656
(C) Total Income ($)			**$0**	**$660**	**$1,320**	**$2,420**	**$6,148**	**$8,480**	**$12,508**	**$18,656**
COSTS ($)		**Days**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**
Animal Husbandry										
	Animal health (i.e. drenching) ($5/head)		30	30	50	80	180	260	380	560
	Ear tags (@$2.00/tag)		12	12	20	32	72	104	152	224
Pasture Improvement										
	Sting (1 x 5 litre bottles/year @ $150/bottle)		150	150	150	150	150	150	150	150
Transport										
	Transport to retail butcher (@$20.00/trip)		0	20	20	40	40	60	60	80
Labour										
Hired labour	24	10	$240.00	$240.00	$1,440.00	$240.00	$240.00	$240.00	$240.00	$240.00
(D) Total Costs			**$432.00**	**$452.00**	**$1,680.00**	**$542.00**	**$682.00**	**$814.00**	**$982.00**	**$1,254.00**
(E) GROSS MARGIN (C-D)			**($432.00)**	**$208.00**	**($280.60)**	**$1,878.00**	**$5,466.00**	**$7,666.00**	**$11,526.00**	**$17,402.00**

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

7. Aquaculture

7.1. Sea Grapes

Sea grapes, or limu, are a favorite local delicacy enjoyed by many throughout the generations. Sea grapes is a collective term for the edible varieties of the green seaweed called the Caulerpa. Green seaweed from the genus Caulerpa is consumed throughout the Pacific and South East Asia.

Enterprise Background for Sea Grapes

The following budget represents the scenario for fully commercial sea grape enterprises:

- Gross margin budget for one site (six-week production cycle);
- Gross margin budget for three sites (one six-week production cycle); And Sea grapes are produced in trays suspended in coastal waters.

The following production and cost information provided by MAF - Fisheries' Aquaculture Section was used to compile each of the budgets. This information is for one site of sea grapes over one production cycle. For the three site enterprise budgets, this information has been scaled up accordingly.

a) Production Information

- Production cycle: 6 weeks (35 days)
- Pond Dimensions: 4m x 6m x 2m
- Cage area:24 m2
- Amount of sea grapes per cage: 10kg
- No. of trays per site:6 trays
- Mortality rate:5%
- No. of sea grapes sold: 180 bundles
- No. of bundles per tray: 30

b) Income Harvestable/Saleable Yield

Approximately 180 sea grapes bundles are harvested, after considering a 5 per cent loss (18 bundles).

Markets: All surviving sea grapes are sold to family and friends in the producer's village and neighboring villages. Sea grapes are collected directly from the producer, so there are no selling costs incurred.

Price: The estimated price of sea grapes ranges from $10.00 - $20.00 per bundle. The average price is $15.00 per bundle of sea grapes.

c) Direct Costs

Sea Grape Biomass: Sea grapes biomasses are purchased from villages that have them grown naturally in the lagoon for $5.00/kg. The amount of *C. racemosa* (sea grapes) biomass required to fill up one tray is 10 kg. There are six trays needed for every site, thus, 60kg of horizontal runners (i.e. stolons) biomass are needed to produce fronds (edible portions) in a fully commercial sea grape enterprise.

Feed: *(Macro algae)* There is no purchase cost for feed, as seaweed is collected from the lagoon *(Halimedacapiosa.) Halimedacapiosa* not only provides sea grapes with feed but also acts as supporting habitat for *C. racemosa* (sea grapes) to grow.

d) Labour

Family labour is used for the sea grapes enterprises for the following operational tasks.

- Harvesting: 24 hours – 2 people x 6 hrs x 2 times/week.
- Feeding (Supporting Habitat): 1 people x 2 hours x once

Family labour is also used for the construction of cages: 6 hrs - 2 people x 3hrs. This cost is associated with capita land is hence, only included in thedevelopment budget.

Family labour is valued at the market rate for hired labour of $3.00 per hour.

e) Capital Costs

The following capital items are required for producing one cage of sea urchins. These costs are included in the development budget.

- Materials for cage constructions:
    - 2 x 1 x 30m roll of mesh @$80.00
    - 4 x Rebars (metal bars for frame) @$35.00 each $140.00
    - 2 Rolls Tying nylon for cages @30.00
- Mask & snorkel @$70.00

GROSS MARGIN BUDGET FOR SEA GRAPES - 1 SITE – 6 TRAYS

Assumptions	
Production cycle/cage (days):	35 (6 weeks)
Stocking density (m	24
Site area (m	24
(A) Amnt. of sea grapes per cage	10kg
Mortality rate:	5%
No. of sea grapes bundles sold	180
(B) Number of trays	6
(C) No. hours per working day	8
Feed	Seaweed from lagoon (*Halimed acapiosa.*)

INCOME ($)	**QUANTITY**	**UNIT**	**UNIT**	**TOTAL**
Sea Grapes	180	bundles	$15.00	$2700
(D) Total Income				$2,700

DIRECT COSTS ($)	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL**
Sea Grapes	60	biomass	$5.00	$300.00
(E) Total Variable Costs				$300.00
(F) GROSS MARGIN (D-E)				$2,400
(G) Gross Margin/Sea grapes (F/A)				$240.00
(H) Gross Margin/trays (F/B)				$400.00

Family Labour Inputs (Hours)	**No. of Hours**
Feeding	120
Harvesting	50
(J) Total Family Labour Hours	170
(K) Cost of family labour ($/hour)	$3.00
(L) Total Cost of Family Labour (J x K)	$510.00
(M) Total Family Labour Days (J/C)	21.25
(N) Gross Margin - incl. cost of family labour (F-L)	$2,712.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situations.

7.2. Tilapia

Enterprise Background for Tilapia

The following budgets represent a fully commercial tilapia growing-out enterprise. Two budgets are presented:

- Gross margin budget for a single production cycle (six months) at steady state production;
- Development budget over five years (two production cycles per year over five years).

Tilapia are grown-out from fingerlings in an earthen pond (20m x 20m x 1.5m). Water is supplied to the pond from a river/freshwater spring located approximately 30 meters away from the pond via gravity feeding using PVC piping.

Fish are harvested at approximately 6 months using a purse seine net and are then transferred to a cement tank filled with flowing water located next to the pond for 24 hours for purging.

After purging, fish are transferred to buckets and sold immediately. Fifty per cent are sold to local villages (family, friends in same village and nearby villages) and fifty per cent to hotels and other retail outlets in Apia.

At the end of each six-month production cycle the ponds are drained and left to dry out for 2 weeks prior to the next production cycle. For the development budget, it is assumed that two Tilapia crops can be produced each year.

The following production and cost information provided by MAF – Fisheries' Aquaculture Section was used to compile each of the budgets. This information is for one six-month production cycle. For the development budget, this information was scaled up accordingly to represent two production cycles per year, over five years.

a) Production Information

- Production cycle:6 months (180 days)
- Stocking density: 5/m2
- Pond dimensions20m x 20m x 1.5m
- Pond area:400 m2
- Land area used by enterprise: 0.1 acre
- No. of juveniles: 2,000
- Mortality rate: 5%
- No. of fish harvested: 1,900
- Average weight/fish: 300 grams

b) Income

Harvestable/Saleable Yield: Approximately 1,900 fish are harvested, after considering a 5 per cent mortality loss (100 fingerlings).

Markets: Fifty per cent of sales (950 tilapia) are made to local villagers. Buyers pick up fish from the Tilapia farm on the day of harvest. Fish are sold on a per-string basis, with three fish per string. A further fifty per cent of sales (950 tilapia) are made to Apia-based hotels and retail outlets. The producer delivers fish to these markets on the day of harvest. Fish are sold on a per kilogram basis, with a single fish weighing 300 grams.

Price: Fish are sold to local villagers for $5.00 per string (316 strings for one production cycle), and to hoteliers and retailers for $4.50 per kilogram.

a) Direct Costs

Juveniles: Tilapia juveniles (approx. 20 grams/juvenile) are supplied free of

charge from MAF Fisheries Division's Hatchery.

Feed: Tilapia are supplementary fed custom-made formulations produced by a local company Farm Tech Company comprised of fishmeal, copra meal, brewer's waste, chicken pellets and flour. Two formulations are used:

- Fingerling formulation (1.2kg/day for 30 days)
- Adult formulation (10kg/day for 150 days)

The full cost of fingerling and adult formulate on is $1.66/kg and $1.44/kg respectively7. Fish are fed twice a day.

Chicken Manure: Prior to releasing fingerlings in the pond, one bag of chicken manure is placed in the pond to aid algal blooming, at a cost of $10.00 per bag. This is of course only for large scale earth ponds. Otherwise Lau Pele, Manioka or Bok choy leaves are used because it is cheaper or regularly found at the farms.

Delivery Costs: One trip per production cycle is made to Apia to deliver tilapia to hotel and retail customers at a cost of $30/trip. Other farmers have hotel chefs visit their farms. Ice is required to keep fish fresh. Five buckets are purchased @ $5.00 per bucket.

b) Labour

Family labour is used for the tilapia enterprise for the following operational tasks.

- Feeding: 90 hours – 1 person x 0.5 hours x 180 days
- Maintaining pond periphery: 12 hours – 1 person x 2 hours x 6 months
- Harvesting: 30 hours – 10 people x 3 hrs
- Transfer from purge tank into buckets: 2 hours – 2 people x 1 hours
- Selling to villagers: 4 hours – 1 person x 4 hours
- Delivery to hotels and retail outlets: 4 hours – 1 person x 4 hours

Family labour is also used for pipe installation and pond maintenance. These costs are associated with capital and are hence, only included in the development budget.

- Pipe installation: 8 hours – 2 people x 4 hours (Year 1)
- Pond sludge removal: 2 hours – 1person x 2 hours (every five years)

An imputed cost for family labour of $3.00/hour is assumed.

c) Capital Costs

The following capital items are required for producing tilapia under the production parameters stated. These costs are included in the development budget.

- Pond construction: $4,500 - 30 hrs. contract labour ($150/hr.)
- Piping:
  - 40m x 2" high pressure PVC piping: $550 (40m x $13.75/m)
  - 6 x 2"PVC elbows: $48.00 (6 x $8.00/unit)
  - 2" ball valve: $113/unit
- Cement purging tank: $3,000 (9m x 1.5m x 1.5m)
- Net: $500 (Secondhand tuna purse seine net)
- Buckets: $200

ASSUMPTIONS - ONE YEAR'S PRODUCTION (2 CYCLES

Production cycle (months):	6	
No. of production cycles per year:	2	
Pond dimensions:	20m x 20m	
Pond area (m	400	
Stocking density/m	5	
(A) No. of juveniles:	4000	
Mortality Rate:	5%	
No. of fish harvested:	3800	
Harvestable weight (kg)	0.3	
Proportion to village sales:	50% (1900 fish sold on a per strings basis)	
No. of fish per string (village sales):	3	
No. of strings sold (village sales):	633	
Proportion to hotels, retail outlets:	50% (sold on a per kilo - 1900 fish =570kg)	
Price per string of fish	5	
Price per kilogram of fish	4.5	
Feed cost per cycle ($/kg):		
Fingerling feed - 1.2kg/day for 30 days	0.83	(Supplied by MAF - free until a profit is made and then at half price)
Adult feed - 10kg/day for 150 days	$0.72	(Supplied by MAF - free until a profit is made and then at half price)
(B) No. of working hours per day	8	

INCOME ($)	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Tilapia - Village Sales (633 strings @ $5.00)	3165	3165	3165	3165	3165
Tilapia - Hotels, Retail Outlets (570kg @ $4.50)	2565	2565	2565	2565	2565
(C) Total Income	$5,730.00	$5,730.00	$5,730.00	$5,730.00	$5,730.00
DIRECT COSTS($)					
Juveniles (Free of charge from MoA)	0	0	0	0	0
Chicken manure (1 bag/cycle @ $10/bag)	20	20	20	20	20
Feed	0	0	2220	2220	2220
Transport to local retailers (1 trip/cycle @ $30/trip)	60	60	60	60	60
Ice (5 bags/cycle @ $3.00/bag)	30	30	30	30	30
(D) Total Direct Costs	110	110	2330	2330	2330
(E) Gross Margin ($) (C-D)	$5,620.00	$5,620.00	$3,400.00	$3,400.00	$3,400.00

Fixed cost	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Pound Constructions (30hrs contract labour @$150hr)	$4,500.00	$0.00	$0.00	$0.00	$0.00
Pond maintenance	$0.00	$0.00	$0.00	$0.00	$0.00
Pipes and fittings		$0.00	$0.00	$0.00	$0.00
2" PVC Piping (40m @ $13.67/m)	$547.00	$0.00	$0.00	$0.00	$0.00
2" PVC Elbows (6@ $8.00)	$48.00	$0.00	$0.00	$0.00	$0.00
2"ball valve	$113.00	$0.00	$0.00	$0.00	$0.00
cement purging tank (9mx1.5mx1.5m)	$3,000.00	$0.00	$0.00	$0.00	$0.00
Net	$500.00	$0.00	$0.00	$0.00	$0.00
Buckets	$200.00	$0.00	$0.00	$0.00	$0.00
(F)Total Fixed costs	$8,908.00	$0.00	$0.00	$0.00	$0.00
(G)Annual Net Income (E-F)	-$3,288.00	$5,620.00	$3,400.00	$3,400.00	$3,400.00

Net Income/Fish (G/A)	-$0.82	$1.41	$0.85	$0.85	$0.85
Net Income/Family Labour Day (G/K)	-$90.08	$153.97	$93.15	$93.15	$93.15
Cumulative Net Income	-$3,288.00	$2,332.00	$5,732.00	$9,132.00	$12,532.00

Family Labour Inputs (Hours)

Task	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Pipe installation	8	0	0	0	0
Feeding	180	180	180	180	180
Maintaining pond periphery	24	24	24	24	24
Hasvesting	60	60	60	60	60
Tranfer to buckets from purge tank	4	4	4	4	4
Selling on-Farm to village	8	8	8	8	8
Transport to market	8	8	8	8	8
Pond Sludge removal	0	0	0	0	0
(H) Total Family Labour Hours	**292**	**284**	**284**	**284**	**284**
(I) Average family labour cost ($/hour)	$3.00	$3.00	$3.00	$3.00	$3.00
(J) Cost of Family Labour ($) (HxI)	$876.00	$852.00	$852.00	$852.00	$852.00
(K) Total Family Labour Days (H/B)	36.5	36.5	36.5	36.5	36.5
(L) Net Income - incl cost of family labour (G-J)	-$4,164.00	$4,768.00	$2,548.00	$2,548.00	$2,548.00
cumulative Net Income - incl cost of family labour	-$4,164.00	$604.00	$3,152.00	$5,700.00	$8,248.00

Note: This is a generic budget which should be used as a **GUIDE** only. Farmer's should generate budgets based on their individual situation.

8. Appendices

8.1. Market Price Collection (Crops) - June 2022/2023

	SBS (Av. Sep 21-Apr 22)		Farmer Joe		Frankies		Lucky Foodtown		Fugalei Market	
Product	**Unit**	**Price**	**Unit**	**Price**	**Unit**	**Price**	**Unit**	**Price**	**Unit**	**Price**
Root Crops										
Talo Samoa	kg	$2.76							bundle	$20.00
Talo Palagi		$2.76								
Yam		$4.07								
Ginger			pkt	$3.00	pkt	$2.50	pkt	$4.50	pkt	$5.00
Ta'amu (Giant Taro)		$4.82							crop	$10.00-$60.00
Vegetable Crops										
Bell Pepper			kg	$3.00						
Chinese Cabbage	kg	$5.90		$4.00	pkt	$2.50		$4.00	pkt	$3.00
Cucumber	kg	$4.56	pkt	$7.00			pkt	$10.00	pkt	$5.00
Eggplant				$5.00			kg	$5.90	pkt	$5.00
Head Cabbage	kg	$7.57			kg	$9.00				
Lettuce			pkt	$3.80	pkt	$4.50				
Long Bean			bundle	$5.00					pkt	$5.00
Tomatoes	kg	$13.97	large pkt	$8.00	kg	$16.10			pkt	$10.00
Radish										
Celery										
Okra										
Sweet Corn			pkt	$7.00						
Pumpkin		$3.39	kg	$3.50	kg	$3.00	kg	$5.00	fruit	$5 - $20
Tree & Fruit Crops										
Banana	kg	$1.20	kg	$3.50			kg	$3.00	bundles	$10.00-$25.00
Citrus (Lime)			pkt	$5.00			pkt	$5.00	pkt	$5.00
Cocoa									bundle	$20.00
Coconut	kg	$0.87							bundle	$5.00
Papaya			kg	$4.00					fruit	$1.00 - $2.00
Watermelon					kg	$8.00				

8.2. Input Price Collection - June 2022/2023

	Agriculture Store		Farming Supplies Ltd.		Bluebird L&H		MAF Crops Division	
Product	**Unit**	**Price**	**Unit**	**Price**	**Unit**	**Price**	**Unit**	**Price**
Weed Control								
Atrazine								
Gramoxone	5L	$190.00	5L	$145.00				
Round Up (Glyphosphate)	5L	$240.00	1L	$31.00				
Disease Control								
Benomyl								
Bravo								
Cusol	1L	$45.00			200ml	$45.00		
Mancozeb								
Manzate			1kg	$56.00		$56.00		
Misting Oil	5L	$125.00						
Kocide								
Sundomil								
Tilt	500ml	$90.00						
Tridex								
Insect Control								
Attack	200ml	$55.00						
Attack	5L	$1,100.00						
Avid								
Bifenthrin								
Blitzem	kg	$24.00	kg	$25.00				
Claw PCO	6L	$500.00						
Confidor								
Conqueror	500ml	$55.00						
Delfin								
Diazion								
Rogor (Dimethoate)								
Lannate								
Malathion								
Match	500ml	$125.00						

Misting Oil	5L	$125.00						
Neem Oil								
Orthene (Acephate)	60g	$9.00						
Slug Out	10kg	$330.00	5kg	$290.00	kg	$32.00		
Steward	1L	$700.00						
Sting	5L	$150.00						
Suncloprid								
Suncis								
Sunthene (Acephate)								
Super Guard								
Talon	10kg	$650.00	10kg	$620.00				
Fertilizer								
Ammonium Sulphate								
Brigitta								
Hydrogreen 12:5:18:8	20kg	$150.00						
Muriate of Potash								
NPK 12:5:20	20kg	$120.00	20kg					
NPK 12:8:16	20kg	$120.00	20kg	$145.00				
NPK 13:13:21	20kg	$120.00						
NPK 14:5:15	20kg	$120.00	20kg					
NPK 15:3:20	20kg	$120.00	25kg	$135.00				
Orchid Food								
Poultry Manure								
Triple Superphosphate								
Urea	20kg	$150.00	20kg	$86.00				
Planting Materials								
Root Crops								
Talo Samoa							Suckers	$1.00
Talo Palagi							Suckers	$1.00
Yam							Tuber	$5.00
Ginger							Tuber	$1.00
Ta'amu (Giant Taro)							Corm	
Vegetable Crops								

Capsicum	large pkt	$50.00			pkt	$4.00	Seedlings Tray	$13.00
Chinese Cabbage	pkt	$10.00					Seedlings Tray	$13.00
Cucumber	pkt	$25.00			pkt	$4.00	Seed	$13.00
Eggplant							Seedlings Tray	$13.00
Head Cabbage							Seedlings Tray	$13.00
Lettuce							Seedlings Tray	$13.00
Long Bean	pkt	$15.00					Seed	
Tomatoes	pkt	$15.00			pkt	$6.00	Seedlings Tray	$13.00
Radish	pkt	$10.00					Seed	$1.00
Celery							Seeds	$1.00
Okra							Seed	
Sweet Corn	pkt	$10.00					Seed	
Pumpkin							Seed	
Tree & Fruit Crops								
Banana							Corm	$1.00
Lemon (Tahitian Lime)							Grafted	$0.20
Cocoa							Seedling	$0.20
Coconut							Seedling	$0.20
Papaya							Seedling	$1.00
Watermelon	pkt	$10.00					Seeds	

	Agriculture Store		**Farming Supplies Ltd.**		**Bluebird L&H**		**MAF Crops Division**	
	Unit	**Price**	**Unit**	**Price**	**Unit**	**Price**	**Unit**	**Price**
Capital Costs								
De-suckering tool								
Fruit collection bin								
Hiring of excavator								
Knapsack sprayer			16L	$360.00	18L	$155.00		
Ladder								
Mist blower			11L	$2,340.00				
Spade			1	$84.00				

	Assumptions							
	Unit	**Price**	**Unit**	**Price**	**Unit**	**Price**	**Unit**	**Price**
Irrigation								

Water	month	$50.00						
Selling Costs								
Packaging	100 packets	$10.00						
Transport to market	trip	$10-20						
Hire of market stall	1 day	$6.00						
Labor								
Hired Labour	1hour	$3.00						

8.3. List of Commodities (Names & Production Spacing/Density)

Common Name (English)	Vernacular Name (Samoan)	Recommended Plant Spacing
Root Crops		
Taro	Talo Samoa	1m x 1m
Cocoyam	Talo Palagi	2m x 2m
Yam	Ufi	2m x 2m
Ginger	Fiu	0.6m x 0.15m
Giant Taro	Ta'amu	1.5m x 1.5m
Vegetable Crops		
Bell Pepper	Pepa	0.4m x 0.3m
Chinese Cabbage	Kapisi Saina	0.1m x 0.1m
Cucumber	Kukama	0.5m x 0.6m
Eggplant	Isaraelu	0.6m x 0.7m
Head Cabbage	Kapisis Lapotopoto	1.3m x 1m
Lettuce	Kapisi Taumafamata	0.15m x 0.2m
Long Bean	Pi Sosolo	0.4m x 0.5m
Tomato	Tamato	1m x 0.4m
Radish	Ratisi	0.5m x 0.5m
Celery		0.6m x 0.3m
Okra		1m x 0.3m
Sweet Corn	Saga	0.75m x 0.3m
Pumpkin	Maukeni	1.8m x 1.8m
Tree & Fruit Crops		
Banana	Fa'i	3m x 3m
Cocoa	Koko	3m x 3m
Lime	Tipolo	6m x 5m
Coconut	Niu	9m x 9m

Papaya	Esi	3m x 2m
Watermelon	Meleni	3m x 1m
Livestock		Recommended Stock Rate
Beef Cattle	Povi	1 cattle/acre
Chicken	Moa	
Piggery	Pua'a	12-14 sows/acre
Sheep	Mamoe	5 sheep/acre
Fisheries		Recommended Stocking Density
Sea Grapes	Limu fuafua	24/m2
Tilapia	Tilapia	5/m2