

# **FARM MANAGEMENT MANUAL**

**2021**



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While every effort has been made to ensure the information in this publication is accurate, much of the base data that has been used for the analyses has been collected from farms and cannot be verified from written records. The Ministry of Agriculture and Fisheries does not accept any responsibility or liability for error or fact omission, interpretation or opinion which may be present, nor for the consequences of any decisions based on this information.

The information provided here does not form part of any recommendation or advice as to what crops should be grown or the production system to be used. Advisers and farmers need to interpret the information included here for individual farms before recommendations or decisions can be made.

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Any general enquiries regarding the content of the Farm Management Manual should be directed to the Assistant Chief Executive Officer, Policy and Planning Division, Ministry of Agriculture and Fisheries, Samoa.

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# 1. INTRODUCTION

The Farm Management Manual for Samoa – 2020 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 analyse 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:

- an indication of the relative profitability of crops and enterprises, to help when choosing which crops to grow or enterprises to carry out on the farm;
- a basis for benchmarking where farmers can compare their own performance with that of a representative, average enterprise in Samoa; and
- a guide for farmers preparing their own budgets.

For the 2020 edition of the farm management manual, budgets have been developed, based on information collected from Samoan farmers, for the following crops and enterprises.

- **Root crops:**
  - Talo Samoa (Taro)
  - Talo Palagi (Cocoyam)
  - Yam
  - Ginger
  - Ta’amu (Giant Taro)
- **Vegetables:**
  - Capsicum
  - Chinese cabbage
  - Cucumber
  - Eggplant
  - Head cabbage
  - Lettuce
  - Long Bean
  - Tomatoes

- **Tree crops:**
  - Banana (Cavendish)
  - Citrus
  - Cocoa (Samoan variety – Trinitario, koko Samoa)
  - Coconut (Samoan Tall and hybrid varieties, virgin organic coconut oil)
  - Papaya
- **Livestock:**
  - Beef cattle
  - Chickens (meat and eggs)
  - Piggery
  - Sheep
- **Aquaculture:**
  - Sea grapes
  - Tilapia

## 2. FARM MANAGEMENT

### 2.1 Background

In recent years, there has been increasing recognition that the driving force that will revitalise 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 urbanisation, 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.

### 2.2 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 fertiliser 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 commercialisation and the demands of the marketplace make it even more difficult.

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

### 2.3 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:

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

A successful farm business will 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.

## 2.4 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 that 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 are 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.

## 2.5 Farm Management Terms

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

**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 fertiliser, 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 be 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 to produce 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.

## 2.6 Budgeting Tools for Farm Management

A number of budgeting tools exist for analysing 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.

## 2.7 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 taro are used by the family, and 1,000 taro 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 CROP BUDGETS

## ROOT CROPS IN SAMOA



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

#### *Taro*

##### **Recommended Varieties:**

TaloFusi, TaloSalani, TaloTanumalala, 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.

##### **Spacing:**

*Traditional System:*

Between rows: 1m

Plants within rows: 1m

##### **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.

##### **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.

##### **Harvest Yield/Food Value:**

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

##### **Yield:**

8 – 12 tonnes/acre

##### **Food Value:**

Contains large amounts of Vitamin A, Vitamin B1, Vitamin B2 and Vitamin C



**Enterprise Budget for Talo Samoa****GROSS MARGIN FOR TALO SAMOA**

**Varieties:** TaloFusi, TaloSalani,  
TaloTanumalala

**ASSUMPTIONS-ONE PRODUCTION CYCLE**

(A) Average number of plants:	4,000
(B) Area (Acres):	1
Plant Spacing:	1m x 1m
Growth Period (months):	8-9 months
Mortality (%)	5%
No. of taro per basket(pile):	5
No. of taro per basket (piles sold):	760
(C)No. of working hours per day:	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Taro	760	piles@	\$20.00	\$15,200
<b>(D) Total Income</b>				<b>\$15,200</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting Materials(tiapula)	4,000	suckers @	\$1.00	\$4,000

**Crops Husbandry**

Pest &diseases control

Gramoxone	5	litres@	\$38.00	\$190.00
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**Selling Costs**

Transport to market	6	trips	\$30	\$180.00
Hire of market stall	6	days	\$10	\$60.00

**Labour**

Hired Labour	7	days@	\$24.00	\$168.00
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<b>(E)TOTAL DIRECTS COST:</b>	<b>\$4,598.00</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>	<b>\$10,602.00</b>
Gross Margin per family labour input (F/H)	\$407.77
Gross Margin per plant (F/A)	\$2.65
Gross Margin per acre (F/B)	\$10,602.00

**LABOUR INPUTS (DAYS)**

<b>TASK</b>	<b>(G) HIRED LABOUR</b>	<b>(H) FAMILY LABOUR</b>	<b>TOTAL DAYS</b>
Land preparation - slashing	7		7
planting		10	10
weed and spraying		2	2
harvesting		8	8
marketing		6	6
<b>TOTAL LABOUR REQUIREMENT - DAYS</b>	<b>7</b>	<b>26</b>	<b>33</b>
Average Wage Rate (\$/day)(I)			\$24.00
<b>(J) Total cost of hired labour (I*G)</b>			\$168.00
<b>(K) Total cost of family Labour(I*H)</b>			\$624.00
Total labour requirement - (days)			33
<b>GROSS MARGIN - including labour cost(F-K)</b>			<b>\$9,978.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

<b>Yield (no. of Plants)</b>	<b>Price (\$/bundle)</b>		
	\$15.00	\$20.00	\$25.00
710	\$6,052.00	\$9,602.00	\$13,152.00
760	\$6,802.00	\$10,602.00	\$14,402.00
810	\$7,552.00	\$11,602.00	\$15,652.00

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



### **3.2. Talo Palagi -** *(Xanthosomasaggitifolium)*

#### **Cocoyam**

#### **Recommended Varieties:**

Local variety.

#### **Seed Rate:**

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

#### **Planting Time:**

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

#### **Planting Methods:**

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

#### **Spacing:**

*Traditional System:*

Suckers are planted at a spacing of 2m x 2m.

#### **Fertilizer:**

- Soil analysis should be done before fertilizer application. Inorganic Fertilizer application for talopalagi 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.



#### **Disease Control/Management:**

No major disease of economic importance.

#### **Insect Control/ Management:**

*Plant Hoppers and Cutworms:*

- Apply Malathion at 30ml/15L of water OR
- Diazinon at 60ml/15L of water when appropriate.

#### **Harvest Yield/Food Value:**

Harvesting commences from 8 months up to 15 months and depends on the soil fertility.

#### **Yield:**

8 – 12 tonnes/acre

#### **Food Value:**

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

**Enterprise Budget for Talo Palagi****GROSS MARGIN BUDGET FOR TALO  
PALAGI****ASSUMPTIONS-ONE PRODUCTION CYCLE**

<b>(A)</b> Average number of plants:	1,010	959.5
<b>(B)</b> Area (Acres):	1	
Plant Spacing:	2m x 2m	
Growth Period (months):	8-15months	
Mortality (%)	5%	
No. of taro harvested:	4000	
No. of taro per basket(piles):	10	
No. of taro per basket(piles sold):	400	
<b>(C)</b> No. of working hours per day:	8	

<b>INCOME (\$)</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT PRICE</b>	<b>TOTAL</b>
Taro	400	piles@	\$30.00	\$12,000
<b>(D) Total Income</b>				\$12,000

<b>DIRECT COSTS (\$)</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>TOTAL</b>
Planting Materials(tiapula)	1,010	suckers @	\$0.30	\$303
<b>Crops Husbandry</b>				
Pest &diseases control				
Gramoxone	5	litres@	\$38.00	\$190.00
<b>Selling Costs</b>				
Transport to market	6	trips	\$30	\$180.00
Hire of market stall	6	days	\$10	\$60.00
<b>Labour</b>				
Hired Labour	7	days@	\$24.00	\$168.00
<b>(E)TOTAL DIRECTS COST:</b>				<b>\$901.00</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>				<b>\$11,099.00</b>
Gross Margin per family labour input				\$426.88

(F/H)

Gross Margin per plant (F/A) \$10.99

Gross Margin per acre (F/B) \$11,099.00

#### LABOUR INPUTS (DAYS)

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Land preparation - slashing	7		7
planting		10	10
weed and spraying		2	2
harvesting		8	8
marketing		6	6
<b>TOTAL LABOUR REQUIREMENT - DAYS</b>	<b>7</b>	<b>26</b>	<b>33</b>
Average Wage Rate (\$/day) (I)			\$24.00
(J) Total cost of hired labour (I*G)			\$168.00
(K) Total cost of family Labour(I*H)			\$624.00
Total labour requirement - (days)			33
<b>GROSS MARGIN - including labour cost(F-K)</b>			<b>\$10,475.00</b>

#### SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (no. of Plants)	Price (\$/bundle)		
	\$25.00	\$30.00	\$35.00
350	\$7,849.00	\$9,599.00	\$11,349.00
400	\$9,099.00	\$11,099.00	\$13,099.00
450	\$10,349.00	\$12,599.00	\$14,849.00

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

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

#### Recommended Varieties:

PalaiUea, PalaiMao'I, Ufi Lei,  
PalaiNiuKini, Ufi Tau.

#### Seed Rate:

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

#### Planting Time:

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

#### Planting Methods:

*Tuber cuttings* or seedlings are planted into mounds

#### Spacing:

*Traditional System:*

Seedlings or tuber cuttings are planted at a spacing of 2m between mounds and 2m within mounds.

#### 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.

#### 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:* Headsetts to be treated with wood ash or treated or sprayed with Manozeb @ 53g/16L before planting. Use disease free planting material.

#### Insect Control/ Management:

*Tuber Scale:*

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

#### Harvest Yield/Food Value:

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. PalaiMao'i) are left on the ground for 3 to 4 years for bigger harvest.

#### Yield:

8 – 12 tonnes/acre

#### Food Value:

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

## Enterprise Budget for Yam

### GROSS MARGIN FOR YAM

#### ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants (seed tuber):	1,000	950
(B) Area (Acres):	1	
Plant Spacing:	2m x 2m	
Growth Period (months):	10-36months	
Mortality (%)	5%	
No. of yam per basket(tuber):	5	
Average price, (\$/kg)	\$4.40	
No. of yam per basket (tuber sold):	190	
Average price per basket	25	
Yield range from (kg/ac)	2000-8000	
(C)No. of working hours per day:	8	

INCOME (\$)	QUANTITY (yield)	UNIT	UNIT PRICE	TOTAL
Yam (tuber/kg)	190	basket	\$25.00	\$4,750
<b>(D) Total Income</b>				<b>\$4,750</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting Materials(tiapula)	1,000	tuber	\$1.00	\$1,000
<b>Selling Costs</b>				
Transport to market	4	trips	\$30	\$120.00
Hire of market stall	4	days	\$10	\$40.00

<b>(E)TOTAL DIRECTS COST:</b>	<b>\$1,160.00</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>	<b>\$3,590.00</b>

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**LABOUR INPUTS**

TASK	QUANTITY	UNIT COST	TOTAL
Planting	5	24	120
Fertilizer Application	16	24	384
Weed Control	15	24	360
Harvesting	3	24	72
Packing	1	24	24
<b>TOTAL LABOUR DAYS @ \$ 24/Person</b>			
<b>Day</b>	40		\$960.00
Average Wage Rate (\$/day)(I)			\$24.00
Total labour requirement - (days)			40.00
<b>(G) Total cost of hired labour</b>			\$960.00
<b>GROSS MARGIN - including labour cost(F-G)</b>			\$2,630.00

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**SENSITIVITY ANALYSIS - EXCLUDING COST OF LABOUR**

Yield (no. of Basket)	Price (\$/basket or pile)		
	\$20.00	\$25.00	\$30.00
140	\$1,640.00	\$2,340.00	\$3,040.00
190	\$2,640.00	\$3,590.00	\$4,540.00
240	\$3,640.00	\$4,840.00	\$6,040.00

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

### 3.4. Ginger - (*Zingiberofficinare*)

#### 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 Time:

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

#### Planting Methods:

*Tuber cuttings* or seedlings are planted into mounds

#### Spacing:

*Traditional System:*

Mature ginger produce is planted at a spacing of 0.6m between rows and 0.15m within rows.

#### 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

#### Disease Control/Management:

*Phythium Rot:* Treat planting material in Sundomil 3.5g/L of Water in 5 minutes.

Remove infected plants and burn.

*Bacteria Rot (Erwnia):* Remove infected plants and ensure good drainage system.



#### Insect Control/ Management:

*Root Knot Nematode:* Hot water treatment of Planting materials at 51°C for 10 minutes

- Crop rotation with Talo and Ta'amu.
- Sanitation – Remove all Rhizomes from the field after harvesting
- Proper selection of seed materials

#### Harvest Yield/Food Value:

Mature: 9 to 10 months from planting.

#### Yield:

10 - 25tonnes/acre

#### 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**

<b>(A)</b> Average number of plants:	11,000
<b>(B)</b> Area (Acres):	1
Plant Spacing:	0.6m x 0.15m
Growth Period (months):	9-10 months
No. of ginger per packet:	5
No. of ginger packet(sold):	4000
Yield range (kg/ac)	10,000 - 25,000
<b>(C)</b> No. of working hours per day:	8

<b>INCOME (\$)</b>	<b>QUANTITY (yield)</b>	<b>UNIT</b>	<b>UNIT PRICE</b>	<b>TOTAL</b>
Ginger	4,000	packet	\$5.00	\$20,000
<b>(D) Total Income</b>				<b>\$20,000</b>

<b>DIRECT COSTS (\$)</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>TOTAL</b>
Planting Materials(tiapula)	1,100	seed@	\$0.50	\$550

**Crops Husbandry**

Pest & diseases control				
Poultry Manure(kg)	10,000	50.00	\$5.00	\$1,000.00

**Selling Costs**

Transport to market	6	trips	\$30	\$180.00
Hire of market stall	6	days	\$10	\$60.00

<b>(E)TOTAL DIRECTS COST:</b>	<b>\$1,790.00</b>
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<b>(F) GROSS MARGIN (\$) (D-E)</b>	<b>\$18,210.00</b>
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Gross Margin per acre (F/B)	\$18,210.00
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**LABOUR INPUTS**

<b>TASK</b>	<b>NO. DAYS</b>	<b>QUANTITY</b>	<b>UNIT COST</b>	<b>TOTAL</b>
Seed Treatment	1	2	\$ 24.00	\$48.00
Land Cleaning	1	5	\$ 24.00	\$120.00
Digging	1	10	\$ 24.00	\$240.00
Planting	1	5	\$ 24.00	\$120.00
Fertilizer Application	1	5	\$ 24.00	\$120.00
Weed Control	1	3	\$ 24.00	\$72.00
Harvesting	1	5	\$ 24.00	\$120.00
Grading and Sorting	1	3	\$ 24.00	\$72.00
Packing	1	3	\$ 24.00	\$72.00
<b>TOTAL LABOR DAYS @ \$ 24/person day</b>		<b>41</b>		<b>\$984.00</b>
Average Wage Rate (\$/day) (I)				\$24.00
Total labour requirement - (days)				41.00
<b>(G) Total cost of hired labour</b>				<b>\$984.00</b>
<b>GROSS MARGIN - including labour cost(F-G)</b>				<b>\$17,226.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF LABOUR**

Yield (no. of Plants)	Price (\$/packet)		
	\$3.00	\$5.00	\$8.00
3950	\$10,060.00	\$17,960.00	\$29,810.00
4000	\$10,210.00	\$18,210.00	\$30,210.00
4050	\$10,360.00	\$18,460.00	\$30,610.00

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

### 3.5. Ta'amu - (*Alocasia spp*)

#### *Giant Taro*

#### **Recommended Varieties:**

Ta'amuNiuKini, Ta'amu Toga.

#### **Seed Rate:**

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

#### **Planting Time:**

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

#### **Planting Methods:**

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

#### **Spacing:**

*Traditional System:*

Suckers are planted at a spacing of 2m x 2m.

#### **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 Gramoxoneetc.). Preferably manual weeding is recommended.

#### **Disease Control/Management:**

No major disease of economic importance.



#### **Insect Control/ Management:**

*Plant Hoppers and Cutworms:*

- Apply Malathion at 30ml/15L of water OR
- Diazinon at 60ml/15L of water when appropriate.

#### **Harvest Yield/Food Value:**

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

#### **Yield:**

8 – 12 tonnes/acre

#### **Food Value:**

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

**Enterprise Budget for Ta'amu (Giant Taro)**  
**GROSS MARGIN BUDGET FOR TA'AMU (GIANT TARO)**

**ASSUMPTIONS-ONE PRODUCTION CYCLE**

(A) Average number of plants:	1,000	950
(B) Area (Acres):	1	
Plant Spacing:	2m x 2m	
Growth Period (months):	12-18 months	
Mortality (%)	5%	
(C) No. of working hours per day:	8	

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Ta'amu	950	corms	\$20.00	\$19,000
<b>(D) Total Income</b>				<b>\$19,000</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting Materials(tiapula)	1,000	suckers @	\$0.50	\$500

**Crops Husbandry**

Pest & diseases control

Gramoxone	5	litres@	\$38.00	\$190.00
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**Selling Costs**

Transport to market	6	trips	\$30	\$180.00
Hire of market stall	6	days	\$10	\$60.00

**Labuor**

Hired Labour	7	days@	\$24.00	\$168.00
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<b>(E) TOTAL DIRECTS COST:</b>				<b>\$1,098.00</b>
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<b>(F) GROSS MARGIN (\$) (D-E)</b>				<b>\$17,902.00</b>
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Gross Margin per family labour input (F/H)				\$0.00
Gross Margin per plant (F/A)				\$18.84
Gross Margin per acre (F/B)				\$17,902.00

**LABOUR INPUTS (DAYS)**

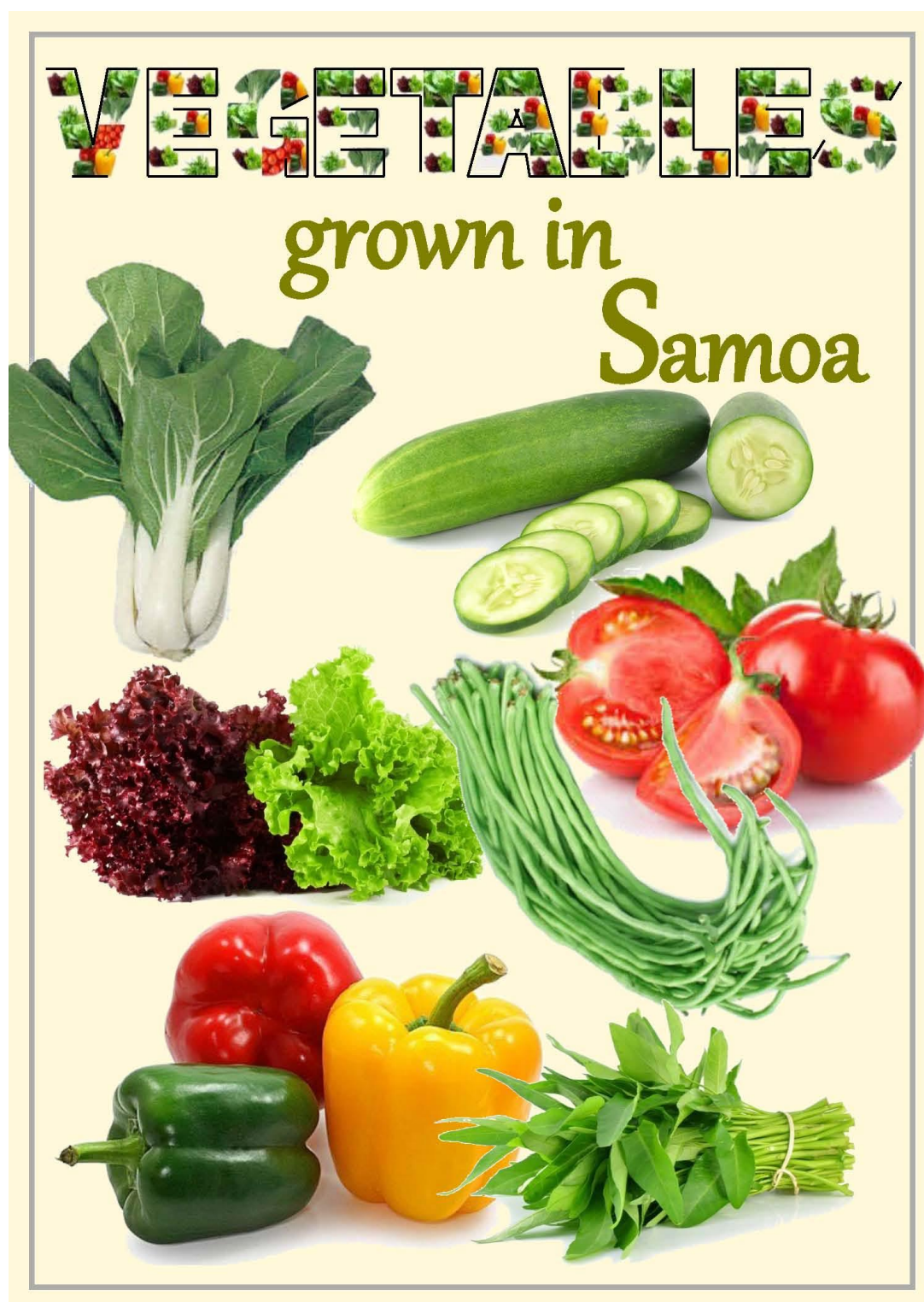
TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Land preparation - slashing	4		2
planting	4		1
weed and spraying	1		1
harvesting	4		4
marketing	1		6
<b>TOTAL LABOUR REQUIREMENT - DAYS</b>	<b>14</b>	<b>0</b>	<b>14</b>
Average Wage Rate (\$/day)(I)			\$24.00
(J) Total cost of hired labour (I*G)			\$336.00
(K) Total cost of family Labour(I*H)			\$0.00
Total labour requirement - (days)			33
<b>GROSS MARGIN - including labour cost(F-K)</b>			<b>\$17,902.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of Plants)	Price (\$/bundle)		
	\$15.00	\$20.00	\$25.00
900	\$12,402.00	\$16,902.00	\$21,402.00
950	\$13,152.00	\$17,902.00	\$22,652.00
1000	\$13,902.00	\$18,902.00	\$23,902.00

**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. VEGETABLE BUDGETS



## 4.1. Capsicum (Sweet Pepper)

### Recommended Varieties:

Alice Hybrid, Olga hybrid, Queen Star, Yolo Wonder

### Seed Rate:

400kg/acre

### 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

### Planting Methods:

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

### Spacing:

Between rows: 0.4m x 0.3m

Plants within rows: 0.4m x 0.3m

### Fertilizer:

a) *Poultry Manure*: 4 tonnes. Broadcast and mix well with soil 2 weeks before planting.

b) *NPK*: - 13:13:21 81kg/acre basal application before sowing.

- Soil analysis should be done before fertilizer application.



### 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.

*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.

### 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

### Harvest Yield/Food Value:

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

### Yield:

5000-6000kg/acre

### Food Value:

A rich source of Vitamin A and Vitamin C

**Enterprise Budget for Capsicum**  
GROSS MARGIN BUDGET FOR CAPSICUM

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

**ASSUMPTIONS-ONE PRODUCTION CYCLE**

(A) Average number of plants:	35,000(33,250)
(B) Area (Acres):	1
Plant Spacing:	0.4m x 0.3m
Growth Period (months):	3 months
Mortality (%)	5%
No. of plants harvested for sale:	33,250
Total estimated yield (kg/acre):	5,000kg
Average weight per packet (kg):	0.64kg
(C) No. of working hours per day:	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPSICUM	7,812	packet	\$6.00	\$46,872.00
<b>(D) Total Income</b>				<b>\$46,872.00</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting materials	24	pkt (1,500 seeds)	\$10.00	\$240.00
<b>Crops Husbandry</b>				
<i>Pest &amp; Diseases</i>				
Gramoxone	5	1L	\$38.00	\$190.00
Conqueror	5	200mls bottle	\$35.00	\$175.00
Slug Out	6	10kg bag	\$300.00	\$1,800.00
<b>Fertilizer</b>				
NPK (12:5:20)	2	20kg	\$80.00	\$160.00
Chicken Manure	23	10kg bag	\$10.00	\$230.00
<b>Irrigation</b>				
Water	4	months	\$50.00	\$200.00
<b>Selling Costs</b>				
Transport (farmer)	3	months	\$150.00	\$450.00
<b>Labour</b>				
Hired Labour	8labourers	9days	\$24.00	\$1,728.00
				<b>\$5,173.00</b>

<b>CAPITAL COSTS (\$)</b>				
Knapsack sprayer	1		\$280.00	\$280.00
Mist blower	1		\$2,300.00	\$2,300.00
				<b>\$2,580.00</b>

<b>(E)TOTAL DIRECTS COST:</b>				<b>\$7,753.00</b>
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<b>(F) GROSS MARGIN (\$ (D-F))</b>				<b>\$39,119.00</b>
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Gross Margin per family labour input (F/H)	\$2,794.21
Gross Margin per plant (F/A)	\$1.11
Gross Margin per acre (F/B)	\$39,119.00

**LABOUR INPUTS (DAYS)**

TASK	(G)HIRED LABOUR	(H)FAMILY LABOUR	TOTAL DAYS
Land Preparation	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
<b>TOTAL LABOUR REQUIREMENTS (DAYS)</b>	<b>9</b>	<b>14</b>	<b>23</b>

Average Wage Rate (\$/hour) (I)	\$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

<b>GROSS MARGIN - including costs of family labour (F-K)</b>	<b>\$38,783.00</b>
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# **SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of packets)	Price (\$/packet)		
	\$5.00	\$6.00	\$8.00
7,762	\$31,057.00	\$38,819.00	\$54,343.00
7,812	\$31,307.00	\$39,119.00	\$54,743.00
7,862	\$31,557.00	\$39,419.00	\$55,143.00

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



## 4.2. Chinese Cabbage - *Brassicachinensis*

### Recommended Varieties:

White Pak Choi, Green Stem Pak Choi, Wongmoon, Saladeer

### Seed Rate:

120g/acre

### 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.

### Planting Methods:

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

### Spacing:

Between rows: 0.1x0.1m

Plants within rows: 0.1x0.1m

### Fertilizer:

a) *Poultry Manure*: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.

b) *NPK*: - 13:13:21 80kg/ha basal application before transplanting.

- Soil analysis should be done before fertilizer application.

### 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, Lepipteran Pest, Center Grub, Greasy Cutworm*: Apply Superguard @ 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

### Harvest Yield/Food Value:

Approximately 11,400 Chinese cabbages are harvested and sold, after taking into account a 5 per cent loss (600 plants) due to insect damage.

### Yield:

8,000-10,000kg/acre

### Food Value:

Source of Vitamin A, Vitamin B & Vitamin C

**Enterprise Budget for Chinese Cabbage**  
GROSS MARGIN BUDGET FOR CHINESE CABBAGE

**Varieties:** Green Stem, Pak Choi, Wongmoon, Saladeer

**ASSUMPTIONS-ONE PRODUCTION CYCLE**

(A) Average number of plants:	12,000(11,400)			
(B) Area (Acres):	0.3			
Plant Spacing:	0.1m x 0.1m			
Growth Period (months):	3			
Mortality (%)	5%			
No. of plants harvested for sale:	11,400			
No. of plants per bundle:	4			
(C) No. of working hours per day:	8			
<b>INCOME (\$)</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT PRICE</b>	<b>TOTAL</b>
CHINESE CABBAGE	2,850	bundles	\$3.00	\$8,550.00
<b>(D) Total Income</b>				<b>\$8,550.00</b>

<b>DIRECT COSTS (\$)</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>TOTAL</b>
Planting materials	30	pkt (400 seeds)	\$10.00	\$300.00
<b>Land Preparation</b>				
Sting	1	5L bottle	\$150.00	\$150.00
<b>Crops Husbandry</b>				
<i>Pest &amp; Diseases</i>				
Insecticide (Match)	1	500ml bottle	\$125.00	\$125.00
<b>Fertilizer</b>				
NPK (12:5:20)	2	20kg bag	\$80.00	\$160.00
<b>Selling Costs</b>				
Transport to market	12	trips	\$10.00	\$120.00
Hire of market stall	12	days	\$10.00	\$120.00
<b>Labour</b>				
Hired Labour	48	days	\$24.00	\$1,152.00
<b>(E)TOTAL DIRECTS COST:</b>				<b>\$2,127.00</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>				<b>\$6,423.00</b>
Gross Margin per family labour input (F/H)				\$45.20
Gross Margin per plant (F/A)				\$0.53
Gross Margin per acre (F/B)				\$21,410.00

**LABOUR INPUTS (DAYS)**

TASK	(G)HIRED LABOUR	(H)FAMILY LABOUR	TOTAL DAYS
Land Preparation		4	4
Planting seed in nursery box		2	2
Transplanting	48		48
Pest and Disease Control		8	8
Weeding		24	24
Fertilizing		8	8
Harvesting		24	24
Processing/Packing		24	24
Marketing		48	48
<b>TOTAL LABOUR REQUIREMENTS (DAYS)</b>	<b>48</b>	<b>142</b>	<b>190</b>
Average Wage Rate (\$/day) (I)			\$24.00
(J) Total cost of hired labour (I*G)			\$1,152.00
(K) Total costs of family labour (I*H)			\$3,408.00
Total labour requirement (days)			190
<b>GROSS MARGIN - including family labour cost (F-K)</b>			<b>\$3,015.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of bundles)	Price (\$/bundle)		
	\$2.00	\$3.00	\$4.00
2,800	\$3,473.00	\$6,273.00	\$9,073.00
2,850	\$3,573.00	\$6,423.00	\$9,273.00
2,900	\$3,673.00	\$6,573.00	\$9,473.00

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

### 4.3. Cucumber - *Cucumissativus*

**Recommended Varieties:**

Money Maker, Zipangu, Bountiful, Slice Master

**Seed Rate:**

800g/acre

**Planting Time:**

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

**Planting Methods:**

Seeds are sown directly into well cultivated soil.

**Spacing:**

Between rows: 0.6m x 0.8

Plants within rows: 0.5m x 0.6m

**Fertilizer:**

a) *Poultry Manure*: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.

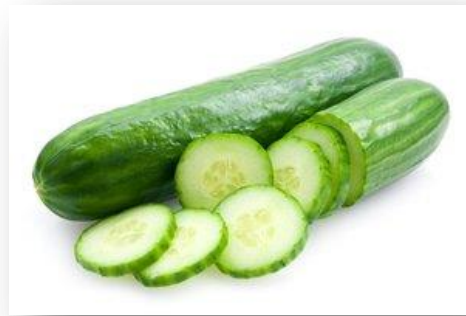
b) *NPK*: - 13:13:21 80kg/acre basal application before sowing.

- Soil analysis should be done before fertilizer application.

**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.

**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.

**Harvest Yield/Food Value:**

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

**Yield:**

12,000-15,000kg/acre

**Food Value:**

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:	600(570)
(B) Area (Acres):	0.1
Plant Spacing:	0.5m x 0.6m
Growth Period (months):	3-4
Mortality Rate (%)	5%
No. of plants harvested for sale:	570
Production per plant (no. of cucumbers)	5
Total production (no. of cucumbers)	2,850
No. of cucumbers per packet:	5
(C) No. of working hours per day	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
CUCUMBER	570	packet	\$10.00	\$5,700.00
<b>(D)Total Income</b>				<b>\$5,700.00</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting materials	15	pkt (40 seeds)	\$10.00	\$150.00
<b>Land Preparation</b>				
Sting	1	5L	\$150.00	\$150.00
<b>Crops Husbandry</b>				
<i>Pest&amp; Diseases Control</i>				
Orthene	5	60g pkt	\$6.00	\$30.00
Talon	1	10kg	\$600.00	\$600.00
<b>Fertilizer</b>				
NPK (12:5:20)	2	20kg	\$80.00	\$160.00
<b>Selling Costs</b>				
Transport to market	6	trips	\$10	\$60.00
Hire of Market Stall	6	days	\$10	\$60.00
<b>Labor</b>				
Hired Labor	21	days	\$24.00	\$504.00
<b>(E)TOTAL DIRECT COSTS:</b>				<b>\$1,714.00</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>				<b>\$3,986.00</b>
Gross Margin per family labour input (F/H)				\$94.90
Gross Margin per plant (F/A)				\$6.60
Gross Margin per acre (F/B)				\$39,860.00

**LABOUR INPUTS (DAYS)**

TASK	(G)HIRED LABOUR	(H)FAMILY LABOUR	TOTAL DAYS
Land Preparation	6		6
Planting	7		7
Pest/Disease Control	2		2
Fertilizing	6		6
Harvesting/Packaging		18	18
Marketing		24	24
<b>TOTAL LABOUR INPUT</b>	<b>21</b>	<b>42</b>	<b>63</b>
Average Wage Rate (\$/day (I)			\$24.00
Total Cost of hired labour (I*G)			\$441.00
(J) Total Costs of Family labour (I*H)			\$1,008.00
Total labour requirement (days)			63
<b>GROSS MARGIN - including costs of family labour (F-J)</b>			<b>\$2,978.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of packets)	Price (\$/packet)		
	\$9.00	\$10.00	\$12.00
520	\$2,966.00	\$3,486.00	\$4,526.00
570	\$3,416.00	\$3,986.00	\$5,126.00
630	\$3,856.00	\$4,586.00	\$5,846.00

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

#### 4.4. Eggplant - *Solanum melongena*

##### **Recommended Varieties:**

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

##### **Seed Rate:**

100g/acre

##### **Planting Time:**

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

##### **Planting Methods: Germination**

5 to 10 days after sowing

##### **Transplanting**

Seedlings should be planted when plants are 3 leaf stage. Seedlings raised in seed trays can be planted any time of the day

##### **Spacing:**

Between rows: 1.5m

Plants within rows: 0.6x0.7m

##### **Fertilizer:**

a) *Poultry Manure*: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.

b) *NPK*: - 13:13:21 80kg/ha basal application before transplanting.

- Soil analysis should be done before fertilizer application.

##### **Weed Control/ Management:**

Apply Paraquat @ 100mls/15L of water.

Hand weeding or hoeing is necessary.

Practice manual weed control.

##### **Disease Control/Management:**

*Bacterial Wilt*: Practice good crop rotation with grain and avoid solanaceous crops



(Tomatoes, Chilies, Bhindi, Capsicum & 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

##### **Harvest Yield/Food Value:**

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

##### **Yield:**

Fresh 15,000-18,000kg/acre

##### **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:	8,000 (7,600)
(B) Area (Acres):	1
Plant Spacing:	0.6m x 0.7m
Growth Period (months):	2-3
Mortality Rate (%)	5%
No. of plants harvested for sale:	7,600
Total estimated yield (kg/acre):	16,000kg
Average weight per packet (kg):	5kg
(C) No. of working hours per day:	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
EGGPLANT	3,200	packet	\$10.00	\$32,000.00
<b>(D) Total Income</b>				<b>\$32,000.00</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting materials	80	pkt (100seeds)	\$10.00	\$800.00
<b>Crops Husbandry</b>				
<i>Pest&amp; Diseases Control</i>				
Gramoxone	5	1L	\$38.00	\$190.00
Cusol	1	1L	\$45.00	\$45.00
Conqueror	5	200mls bottle	\$35.00	\$175.00
Slug Out	6	10kg bag	\$300.00	\$1,800.00
<b>Fertilizer</b>				
NPK (12:5:20)	2	20kg	\$80.00	\$160.00
Chicken Manure	23	10kg	\$10.00	\$230.00
<b>Irrigation</b>				
Water	4	months	\$50.00	\$200.00
<b>Selling Costs</b>				
Transport (farmer)	3	months	\$150.00	\$450.00
<b>Labour</b>				
Hired Labour	14	days	\$24.00	\$336.00
<b>(E)TOTAL DIRECT COSTS:</b>				<b>\$4,386.00</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>				<b>\$27,614.00</b>

Gross Margin per family labour input (F/H)

Gross Margin per plant (F/A) \$3.45

Gross Margin per acre (F/B) \$27,614

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of packets)	Price (\$/packet)		
	\$8.00	\$10.00	\$12.00
3,150	\$20,814.00	\$27,114.00	\$33,414.00
3,200	\$21,214.00	\$27,614.00	\$34,014.00
3,250	\$21,614.00	\$28,114.00	\$34,614.00

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

## 4.5. Head Cabbage - *Brassica oleracea*

### Recommended Varieties:

FS Cross, KK Cross

### Seed Rate:

120g/acre

### 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.

### Planting Methods:

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

### Spacing:

Between rows: 0.6m x 0.7m

Plants within rows: 0.45m x 0.55m

### Fertilizer:

a) *Poultry Manure*: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.

b) *NPK*: - 13:13:21 80kg/ha basal application before sowing.

- Soil analysis should be done before fertilizer application.

### 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 burnt.



- 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, Greasy Cutworm: Apply Superguard @ 8ml/16L of Water or Steward @ 8ml/16L water only when recent damage is visible.

### Harvest Yield/Food Value:

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.

### Yield:

12,000-20,000kg/acre

### Food Value:

Good 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:	2,500(2,375)
(B) Area (Acres):	0.3
Plant Spacing:	0.45m x 0.55m
Growth Period (months):	3
Mortality (%)	5%
No. of plants harvested for sale:	2,375
(C) No. of working hours per day:	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
HEAD CABBAGE	2,375	per cabbage	\$5.00	\$11,875.00
<b>(D) Total Income</b>				<b>\$11,875.00</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Planting materials	11	pkt (240 seeds)	\$10.00	\$110.00
<b>Crops Husbandry</b>				
<i>Pest &amp; Diseases</i>				
Orthene	7	60g pkt	\$6.00	\$42.00
<i>Weed Control</i>				
Sting	1	5L	\$150.00	\$150.00
<b>Fertilizer</b>				
NPK (12:5:20)	2	20kg	\$80.00	\$160.00
<b>Selling Costs</b>				
Transport (farmer)	40	trips	\$10.00	\$400.00
Hire of Stall	30	days	\$10.00	\$300.00
<b>Labour</b>				
Hired Labour	9	days	\$24.00	\$216.00
				<b>\$1,378.00</b>

<b>CAPITAL COSTS (\$)</b>				
Knapsack Sprayer			\$280.00	\$280.00
Mist blower			\$2,300.00	\$2,300.00
				<b>\$2,580.00</b>
<b>(E) TOTAL DIRECT COSTS:</b>				<b>\$3,958.00</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>				<b>\$7,917.00</b>

Gross Margin per family labor input (F/H): \$791.70

Gross Margin per plant (F/A): \$3.16

Gross Margin per acre (F/B): \$26,390.00

<b>LABOUR INPUT (DAYS)</b>			
<b>TASK</b>	<b>(G)HIRED LABOUR</b>	<b>(H)FAMILY LABOUR</b>	<b>TOTAL DAYS</b>
Land Preparation	2		2
Planting seed in nursery box	3	2	5
Transplanting			
Pest and Disease Control	1		1
Weeding	2		2
Fertilizing	1	1	2
Harvesting		3	3
Processing/Packing		3	3
Marketing		1	1
<b>TOTAL LABOUR REQUIREMENTS (DAYS)</b>	<b>9</b>	<b>10</b>	<b>19</b>
Average Wage Rate (\$/day) (I)			\$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
<b>GROSS MARGIN - including family labour cost (F-K)</b>			<b>\$7,677.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

<b>Yield (no. of head cabbage)</b>	<b>Price (\$/head cabbage)</b>		
	<b>\$3.00</b>	<b>\$5.00</b>	<b>\$7.00</b>
2,325	\$3,017.00	\$7,667.00	\$12,317.00
2,375	\$3,167.00	\$7,917.00	\$12,667.00
2,425	\$3,317.00	\$8,167.00	\$13,017.00

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

## 4.6. Lettuce

### Recommended Varieties:

Tropical, Red Rapid

### Seed Rate:

### Planting Time:

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

### Planting Methods:

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

### Spacing:

Between rows: 0.2m x 0.2m

Plants within rows: 0.15m x 0.15m

### Fertilizer:

a) *Poultry Manure*: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.

b) *NPK*: - 13:13:21 80kg/acre basal application before sowing.

c) *Urea*: 40kg/acre. Side dressed in 2 split applications i.e. 2 -4 weeks after transplanting.

- Soil analysis should be done before fertilizer application.

### 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.

### 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.

### Harvest Yield/Food Value:

Lettuces for sale are harvested from approximately 66,500 plantlets after taking into account a 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 in 5" 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.

### Yield:

3,000-5,000kg

### Food Value:

Vitamin C

**Enterprise Budget for Lettuce**  
GROSS MARGIN BUDGET FOR LETTUCE

**Varieties:** Tropical, Red Rapid

**ASSUMPTIONS-ONE PRODUCTION CYCLE**

(A) Average number of plants:	66,500(63,175)
(B) Area (Acres):	1
Plant Spacing:	0.15 x 0.15m
Growth Period (months):	3
Mortality (%)	5%
No. of plants harvested for sale:	63,175
Total estimated yield (kg/acre)	4,000kg
Average weight per packet (kg)	0.5kg
(C) No. of working hours per day:	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
LETTUCE	8,000	packet	\$3.00	\$24,000.00
<b>(D) Total Income</b>				<b>\$24,000.00</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Planting materials	133	pkt (500seeds)	\$10.00	\$1,330.00
<b>Crops Husbandry</b>				
<i>Pest &amp; Diseases</i>				
Cusol	1	1L	\$45.00	\$45.00
<b>Fertilizer</b>				
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
<b>Selling Costs</b>				
Transport (farmer)	40	trips	\$10.00	\$400.00
<b>Labour</b>				
Hired Labour	8 laborers	12 days	\$24.00	\$2,304.00
				<b>\$5,649.00</b>

CAPITAL COSTS (\$)				
Knapsack Sprayer			\$280.00	\$280.00
Hiring of Excavator			\$7,000.00	\$7,000.00
				<b>\$7,280.00</b>

**(E) TOTAL DIRECT COSTS:** **\$12,929.00**

**(F) GROSS MARGIN (\$) (D-E)** **\$11,071.00**

Gross Margin per family labor input (F/H):

Gross Margin per plant (F/A): \$0.16

Gross Margin per acre (F/B): \$11,071.00

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of packets)	Price (\$/packet)		
	\$2.00	\$3.00	\$5.00
7,500	\$2,071.00	\$9,571.00	\$24,571.00
8,000	\$3,071.00	\$11,071.00	\$27,071.00
8,500	\$4,071.00	\$12,571.00	\$20,571.00

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

#### 4.7. Long Bean - *Vignasessquipedalis*

##### **Recommended Varieties:**

Mangere pole, Kentucky Wonder, Shiny Fardenlosa

##### **Seed Rate:**

3-5kg/acre

##### **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.

##### **Planting Methods:**

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

##### **Spacing:**

For trellising

Between rows: 0.5x0.6m

Plants within rows: 0.4x0.5m

Germination: 3 to 6 days after sowing

##### **Fertilizer:**

a) *Poultry Manure*: 2 tons/acre Broadcast and mix well with soil 2 weeks before planting.

b) *NPK*: - 13:13:21 80kg/ha basal application before transplanting.

- Soil analysis should be done before fertilizer application.

##### **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.

##### **Insect Control/ Management:**

*Bean Pod Borer*: Spray Lannate @ 32ml/16L or Sundothrin @ 20ml/16L of Water

*Aphids*: Dimethoate @ 16ml/16L (Sold Rogor)

##### **Harvest Yield/Food Value:**

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

##### **Yield:**

Fresh 5,000-7,000kg/acre

##### **Food Value:**

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

**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:	15,000(14,250)
(B) Area (Acres):	1
Plant Spacing:	0.4x 0.5m
Growth Period (months):	1
Mortality (%)	5%
No. of plants harvested for sale:	14,250
Total estimated yield (kg per acre):	6,000kg
Average weight per bundle (kg):	5kg
(C) No. of working hours per day:	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
LONG BEAN	1,200	bundle	\$6.00	\$7,200.00
<b>(D) Total Income</b>				<b>\$7,200.00</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Planting materials	100	pkt (50g)	\$15.00	\$1,500.00
<b>Crops Husbandry</b>				
<i>Pest &amp; Diseases</i>				
Cusol	1	1L	\$45.00	\$45.00
<b>Fertilizer</b>				
NPK 12:5:20	2	20kg	\$80.00	\$160.00
Chicken Manure	96	10kg	\$10.00	\$960.00
<b>Selling Costs</b>				
Transport (farmer)	30	trips	\$10.00	\$300.00
Hiring of stall	30	days	\$10.00	\$300.00

**(E) TOTAL DIRECT COSTS:** **\$3,265.00**

**(F) GROSS MARGIN (\$) (D-E)** **\$3,935.00**

Gross Margin per family labor input (F/H):

Gross Margin per plant (F/A): \$0.26

Gross Margin per acre (F/B): \$3,935.00

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of bundles)	Price (\$/bundle)		
	\$5.00	\$6.00	\$7.00
1,150	\$2,485.00	\$3,635.00	\$4,785.00
1,200	\$2,735.00	\$3,935.00	\$5,135.00
1,250	\$2,986.00	\$4,235.00	\$5,485.00

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

## 4.8. Tomatoes

### Recommended Varieties:

King Kong, Beefsteak, Roma, Alafua Large

### Seed Rate:

120g/acre

### Planting Time:

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

### Planting Methods:

Seedlings raised from the Nursery are transplanted directly into field beds.

### Spacing:

Between rows: 0.4m x 0.3m

Plants within rows: 0.4m x 0.3m

### Fertilizer:

NPK: 13:13:21 80kg/acre basal at planting

Urea: 40kg/acre Side dress 2 and 4 weeks after planting

Poultry Manure: 4.8 tonnes/acre Broadcast 2-3 weeks after planting. Soil analysis should be done before fertilizer application

### Weed Control/ Management:

Hand weeding or hoeing is necessary.

Inter row cultivation when plants are still small. Practice mulching to control weeds and retain soil moisture.

### Disease Control/Management:

*Anthracnose*: Apply Manozebe at 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.



*Stem Rot*: Use a 2-year rotation.

*Leaf Mould Mosaic/ Blossom end Root Rot*: Have your soil tested for corrective measures. Use Kocide (30g/15L of water) to prevent fungal infections.

### Insect Control/ Management:

*Spider (Tomato) Mite*: Apply Malathion at the rate of 30ml/15L of water

*Fruit worm or Fruit borer*: Steward at 7.5ml/15L of water. Or Delphin at 14g/15L of water.

### Harvest Yield/Food Value:

Tomatoes for sale are harvested from approximately 13,680 plants, after taking into account a 5 per cent loss (720 plants) due to non-germinating seeds and insect damage. Tomatoes are harvested into crates, and then placed in 5" x 9" plastic packets for sale. Approximately 105crates are harvested, with 40 packets on average, per crate. A total of 4,230 packets are sold.

**Yield:**15,000 to 17,000 kg

### Food Value:

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

**Enterprise Budget for Tomatoes**  
GROSS MARGIN BUDGET FOR TOMATOES

**Varieties:** King Kong, Beefsteak, Roma, Alafua Large

**ASSUMPTIONS-ONE PRODUCTION CYCLE**

(A) Average number of plants:	14,400(13,680)
(B) Area (Acres):	1
Plant Spacing:	0.4m x 0.3m
Growth Period (months):	5-6
Mortality (%)	5%
No. of plants harvested for sale:	13,680
Total estimated yield (no. of crates)	105
No. of packets per crate:	40
(C)No. of working hours per day:	8

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
TOMATO	4,200	packet	\$10.00	\$42,000.00
<b>(D) Total Income</b>				<b>\$42,000.00</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting Material	288	pkt (50 seeds)	\$15.00	\$4,320.00
<b>Crops Husbandry</b>				
<i>Pest &amp; Diseases</i>				
Cusol	1	1L	\$45.00	\$45.00
Conqueror	3	200mls bottle	\$35.00	\$175.00
Slug Out	6	10kg bag	\$300.00	\$1,800.00
<b>Fertilizer</b>				
NPK (12:5:20)	2	20kg bag	\$80.00	\$160.00
Chicken Manure	23bags/acre	10kg bag	\$10.00	\$230.00
<b>Irrigation</b>				
Water	4	months	\$50.00	\$200.00
<b>Selling Costs</b>				
Transport (farmer)	3	months	\$150.00	\$450.00
<b>Labour</b>				
Hired Labour	8 laborers	21 days	\$24.00	\$2,304.00
				<b>\$9,684.00</b>

CAPITAL COSTS (\$)				
Knapsack sprayer	1		\$280.00	\$280.00
Mist blower			\$2,300.00	\$2,300.00
				<b>\$2,580.00</b>

**(E)TOTAL DIRECTS COST: \$12,264.00**

**(F) GROSS MARGIN (\$) (D-E) \$29,736.00**

Gross Margin per family labour input (F/H)	\$708.00
Gross Margin per plant (F/A)	\$2.06
Gross Margin per acre (F/B)	\$29,736.00



<b>LABOUR INPUT (DAYS)</b>			
<b>TASK</b>	<b>(G)HIRED LABOUR</b>	<b>(H)FAMILY LABOUR</b>	<b>TOTAL DAYS</b>
Land Preparation	6		6
Planting seed in nursery box	7		7
Transplanting			
Pest and Disease Control	2		7
Weeding			
Fertilizing	6		6
Harvesting			
Processing/Packing		18	18
Marketing		24	24
<b>TOTAL LABOUR REQUIREMENTS (DAYS)</b>	<b>21</b>	<b>42</b>	<b>63</b>
Average Wage Rate (\$/day) (I)			\$24.00
(J) Total cost of hired labour (I*G)			\$504.00
(K) Total costs of family labour (I*H)			\$1,008.00
Total labour requirement (days)			63
<b>GROSS MARGIN - including family labour cost (F-K)</b>			<b>\$28,728.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

<b>Yield (no. of packets)</b>	<b>Price (\$/packet)</b>		
	<b>\$8.00</b>	<b>\$10.00</b>	<b>\$12.00</b>
4,150	\$20,936.00	\$29,236.00	\$36,536.00
4,200	\$21,336.00	\$29,736.00	\$38,136.00
4,250	\$21,736.00	\$30,236.00	\$38,736.00

**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. ENTERPRISE BUDGETS FOR TREE CROPS

### Tree Crops Grown in Samoa



## 5.1 Banana

### Enterprise Background for Banana

This development budget represents a one acre fully commercial banana enterprise (Cavendish variety), growing 800 banana plants, over a four year period.

#### a) Production Information

##### *Planting Material:*

Corms (bull heads) are used as planting material and are specially selected from high yielding, strong mother plants and are free of bunchy top disease, nematodes and weevils. Planting material is purchased from MAF-Crops Division.

##### *Mortality Rate of Plants:*

Approximately 5 per cent of plants do not survive (25). Non-surviving plants are re-planted, hence, the farmer purchases 525 corms.

##### *Planting Density:*

Approximately 800 corms are planted into a one acre plot, at a plant spacing of 2m x 2m.

##### *Cropping System:*

Bananas are grown as a Monocrop

##### *Growth Period:*

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

##### *Number of Months to Harvesting:*

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

- 1<sup>st</sup> ratoon 13-21 months
- 2<sup>nd</sup> ratoon 22-30 months
- 3<sup>rd</sup> ratoon 31-39 months
- 4<sup>th</sup> ratoon 40-48 months

##### *Planting Time:*

Bananas can be planted all year round; however, the best yields are obtained in the wet season (November-March).

#### b) Income

##### *Harvestable/Saleable Yield:*

Each banana crop (plant crop and subsequent ratoon crops) yields around 800 bunches of bananas over the 48 month growth period. 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 (800 bunches). In Year 2, yield from the first ratoon is sold (800 bunches) plus half of the yield from the second ratoon (400 bunches). Similarly in Year 3, the remaining half of the second ratoon's yield (400 bunches) plus the yield from the third ratoon (800 bunches). In Year 4, the yield from the fourth ratoon (800 bunches) is harvested and sold.

##### *Markets:*

Bunches of bananas are sold at the Fugalei Market.

##### *Price:*

The price for Cavendish bananas is \$20.00 per bunch in Years 1 and 2, \$18.00 per bunch in Year 3 and \$15.00 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 Material:*

Planting material is purchased from MAF-Crops Division for \$1.00 per corm

#### *Pest and Disease Control:*

Black leaf streak is one of the most serious problems affecting bananas. Production is also reduced by scab moth and bunchy top virus.

The following products are used to control Black leaf streak. A mist blower is used to spray the plot, with 2 spray loads per application.

Product Name	No. of Applications/Cycle	Application Rate	Price
Tilt	Yr 1: 6 apps. (2 sprays/app).	130ml/application	\$180.00/litre
	Yr 2-4: 7 apps (2 sprays/app).		
Misting Oil	Yr 1: 26 sprays	1.3litres/spay	\$25.00 /litre
	Yr 2-4: 30 sprays		

The following product is used to control Scab Moth<sup>1</sup>.

Product Name	No. of Applications/Year	Application Rate	Price
Tridex (Black leaf control)	1 (injected into plant)	Yr 1: 100ml/acre Yr 2-4: 200ml/acre	\$45/litre

<sup>1</sup>Shortage of tridex due to COVID19 and currently out of stock hence why it doesn't reflect in the Enterprise budget

#### *Weed Control:*

The following product is applied using a knapsack sprayer prior to planting and during the growth period to control weeds:

#### *Fertilizer:*

The following product is used for fertilizing:

Product Name	No. of Applications/Cycle	Application Rate	Price
NPK (12:5:20)	Yr 1: 5 apps. Yr 2: 6 apps. Yr 3-4: 7 apps.	40 kg bag / application	\$160 / 40kg bag

#### *Selling Costs:*

Cavendish bananas are sold at Fugalei Market. The costs involved with selling to the market include transport to the market and hire of a market stall.

The fuel cost per return trip to the market is \$15.00. It is assumed that the farmer also takes other agricultural produce to the market. Hence, \$15 is estimated as a portion of the total cost of a return trip to the market.

In Year 1, it is assumed that bananas are harvested over an eight week period and are sold at the market one day per week during this time. Hence, the cost of transport to market is (\$120.00). In Years 2-4, bananas are harvested and taken to the market for sale fortnightly (i.e. one-day for 26 weeks). In these years, the cost of transport is \$390.00

The cost per day of hiring a market stall is \$10.00/day. In Year 1, the cost of hiring a market stall is \$80.00 (i.e. 8 days @ \$10.00 per day). In Years 2-4, the cost is \$260.00 (i.e. 26 days @ \$10.00 per day).

#### d) Labour

The farmer uses both hired labour and family labour for the Cavendish banana enterprise for the following tasks.

Task	Year 1	Year 2	Year 3	Year 4
Land preparation	3 men x 1 day	-	-	-
Planting	3 men x 2 days	-	-	-
Re-planting	1 man x 0.25 days	-	-	-
Spraying - Black Leaf	1 man x 2hrs x 13 apps.	1 man x 2 hrs x 15 apps.	1 man x 2 hrs x 15 apps.	1 man x 2 hrs x 15 apps.
Scab Moth control	1 man x 4hrs x 8 weeks	1 man x 2hrs x 52 weeks x 2 times/week	1 man x 2hrs x 52 weeks x 2 times/week	1 man x 2hrs x 52 weeks x 2 times/week
Weed control	1 man x 1 day/s pray x 2 sprays	1 man x 1 day/s pray x 2 sprays	-	-
Fertilising	1 man x 0.5 days/a pp. x 4 apps.	1 man x 0.5 days/a pp. x 4 apps.	1 man x 0.5 days/a pp. x 4 apps.	1 man x 0.5 days/a pp. x 4 apps.
Desuckering	2 men x 0.5 days x 4 times/year	2 men x 0.5 days x 4 times/year	2 men x 0.5 days x 4 times/year	2 men x 0.5 days x 4 times/year

Deleafing	1 man x 0.5 days/ month x 8 month s	1 man x 0.5 days/ month x 12 month s	1 man x 0.5 days/ month x 12 month s	1 man x 0.5 days/ month x 12 month s
Proping	1 man x 0.5 days/ month x 8 month s	1 man x 0.5 days/ month x 12 month s	1 man x 0.5 days/ month x 12 month s	1 man x 0.5 days/ month x 12 month s
Harvesting	2 men x 0.5 days x 8 harvest s	2 men x 0.5 days x 12 harvest s	2 men x 0.5 days x 12 harvest s	2 men x 0.5 days x 12 harvest s
Marketing	1 man x 8 days	1 man x 12 days	1 man x 12 days	1 man x 12 days

Hired labour is used for land preparation, planting, spraying for Black Leaf and de-suckering.

Family is used for the remaining tasks and is valued at the current market rate for hired agricultural labour, being \$24.00 per day.



## Enterprise Budget for Banana Samoa

GROSS MARGIN FOR Banana SAMOA (CAVENDISH VARIETY)

Varieties: Williams (Tall), Apollo (Dwarf), Asdia (Dwarf), Traditional

### ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	800				
(B) Area (Acres):	1				
Plant Spacing (meters):	2 X 1				
Mortality Rate (%):	5				
Growth Period (years):	4				
Plant Crop (months):	12				
1st ratoon (months)	9				
2nd ratoon (months)	9				
3rd ratoon (months)	9				
4th ratoon (months)	9				
(C ) No. of working hours per day:	8				
<b>INCOME (\$)</b>		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
Yield (No. brunches)					
Plant Crop		760			
1st ratoon			760		
2nd ratoon			380	380	
3rd ratoon				760	
4th ratoon					760
Total no of brunches sold		760	1140	1140	760
Price (\$/bunch)		\$20	\$20	\$18	\$15
		\$	\$	\$	\$
<b>(D) Total Income</b>		<b>15,200</b>	<b>22,800</b>	<b>20,520</b>	<b>11,400</b>
<b>DIRECT COSTS (\$)</b>		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
Planting Materials 800 seedlings @\$1.00					
<b>Crops Husbandry</b>					
<b>Pest and disease control</b>					
Tilt (\$180/litre)		360	1,260	1,260	1,260
Misting Oil (\$25/litre)		650	750	750	750
<b>Weed control</b>					
Gramoxone (\$45/litre)		540	360	0	0
<b>Fertiliser</b>					
NPK (12:5:20) (\$160/40kg bag)		800	960	1,120	1,120
<b>Selling Costs</b>					
Transport to market (\$15/trip)		120	390	390	390
Hire of market stall (\$10/ day)		80	260	260	260
<b>Labour</b>					
Hired Labour		360	192	192	192
<b>(E)TOTAL DIRECTS COST:</b>		<b>2,910</b>	<b>4,172</b>	<b>3,972</b>	<b>3,972</b>
<b>(F) GROSS MARGIN (\$) (D-E)</b>		<b>(12,290)</b>	<b>(18,628)</b>	<b>(16,548)</b>	<b>(7,428)</b>

LABOUR INPUTS (YEARS)	Year 1	Year 2	Year 3	Year 4
<b>(G) Hired Labour</b>	360	192	192	192
<b>(H) Family Labour</b>				
<b>Task</b>				
Land preparation - spraying	3			
planting	6			
replanting	1			
black leaf steak control	3	4	4	4
weed control	2	2	0	0
fertilizing	2	2	2	2
desuckering	3	3	3	3
deleafing	4	6	6	6
propping	4	6	6	6
harvesting and packing	8	26	26	26
marketing	8	26	26	26
<b>TOTAL LABOUR REQUIREMENT - DAYS</b>	44	75	73	73
Total no. of days hired labour	15	8	8	8
Total no. of days family labour	29	67	65	65
Average Wage Rate (\$/unit) (days)	\$	\$	\$	\$
	24	24	24	24
	\$	\$	\$	\$
<b>(K) Total cost of family labour</b>	696	1,608	1,560	1,560
	\$	\$	\$	\$
<b>NET INCOME - including family labour cost(D-E-K)</b>	<b>11,594</b>	<b>17,020</b>	<b>14,988</b>	<b>5,868</b>

#### SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR

Yield (no. of brunches)	Price (\$/brunches)		
	\$15.00	\$18.00	\$20.00
710	\$6,678.00	\$8,808.00	\$10,228.00
760	\$7,428.00	\$9,708.00	\$11,228.00
810	\$8,178.00	\$10,608.00	\$12,228.00

**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. Citrus - *Citrus aurantifolia*

This development budget represents a one acre fully commercial citrus enterprise (Tahitian variety), growing 200 Tahitian lime plants, over a 10 year period.

### Recommended Varieties:

- Tahitian Lime
- Meyer Lemon

### Seed Rate:

- 200 seedlings in 1 acre

### Planting Material:

All citrus requires well-drained soils or they will succumb to root rot problems. Citrus tends to perform best on slightly acidic soils and performs better in sub-tropical conditions.

### Planting Time:

Citrus grows best in full sun once established. However, young trees will need shade for the first six months.

### Spacing:

Between Rows: 3m

Plants within Rows: 6m

### Weed Control/Management:

- Ring Weeding between the plants during early stages of growth, Spray with Glyphosphate between plants @ 150-200ml/15L of Water.

### Disease Control/Management

*Black Sooty Mold* is a fungal growth that is caused by aphid infestations. Spray the tree with a heavy stream of water to dislodge the aphids and remove the mold. Or spray the tree with insecticidal soap or oil. Use a product labeled for citrus trees, and apply it on overcast days.

The most common problems you'll encounter are those caused by the *Phytophthora* fungus. This pathogen causes *root rots* and *trunk cankers*. To prevent Root Rot and Cankers, plant trees in well-draining soil and avoid planting them too deeply.

### Insect Control/ Management:

*Leaf Miner* attacks new growth on the lime tree, *Citrus Scale insects* will cause lime tree leaves to fall off, *Citrus Mites*, *Aphids* – use neem oil sprays on all parts of the tree to control these lime tree pests.

### Harvest Yield:

Harvest starts at 3<sup>rd</sup> Year with 50-60 fruits per tree. Stabilize in the 8<sup>th</sup> – 10<sup>th</sup> year with average production of 300 per tree

### Food Value:

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





# Enterprise Budget for Tahitian Lime (10-YEAR-OLD TREE)

GROSS MARGIN FOR CITRUS SAMOA

Varieties: Meyer Lemon

## ASSUMPTIONS-ONE PRODUCTION CYCLE

(A) Average number of plants:	200	
(B) Area (Acres):	1	
Plant Spacing (meters):	3 x 6	
Growth Period (years):	8 to 10	
Estimate No. of citrus fruit harvest per tree	300	60,000
No. of citrus per bag:	6	
No. of citrus sold):	10,000	
(C) No. of working hours per day:	8	

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Citrus	10,000	bag @	\$8.00	\$80,000
<b>(D) Total Income</b>				<b>\$80,000</b>

DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting Materials	1,000	seedlings @	\$1.00	\$1,000
<b>Crops Husbandry</b>				
Fertiliser				
NPK (12:5:20)	1	litre @	\$80.00	\$80.00
<b>Selling Costs</b>				
Transport to market	6	trips	\$15	\$90.00
Hire of market stall	6	days	\$10	\$60.00
<b>Labour</b>				
Hired Labour	6	days@	\$24.00	\$144.00

**(E) TOTAL DIRECTS COST: \$1,374.00**

**(F) GROSS MARGIN (\$) (D-E) \$78,626.00**

Gross Margin per family labour input (F/H)	\$7,862.60
Gross Margin per plant (F/A)	\$393.13
Gross Margin per acre (F/B)	\$78,626.00

**LABOUR INPUTS (DAYS)**

<b>TASK</b>	<b>(G) HIRED LABOUR</b>	<b>(H) FAMILY LABOUR</b>	<b>TOTAL DAYS</b>
Land preparation - spraying & slashing	4		4
planting		3	3
fertilizing		2	2
harvesting and packing		2	2
marketing		3	3
<b>TOTAL LABOUR REQUIREMENT - DAYS</b>	<b>4</b>	<b>10</b>	<b>14</b>
Average Wage Rate (\$/day)(I)			\$24.00
<b>(J) Total cost of hired labour (I*G)</b>			\$96.00
<b>(K) Total cost of family Labour(I*H)</b>			\$240.00
Total labour requirement - (days)			33
<b>GROSS MARGIN - including labour cost(F-K)</b>			\$78,386.00

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

<b>Yield (no. of Plants)</b>	<b>Price (\$/bundle)</b>		
	\$10.00	\$15.00	\$20.00
200	\$626.00	\$1,626.00	\$2,626.00
250	\$1,126.00	\$2,376.00	\$3,626.00
300	\$1,626.00	\$3,126.00	\$4,626.00

**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. Cocoa - *Theobroma cacao*



#### **Recommended Varieties:**

- Trinitario (Samoan Cocoa)
- Criollo
- Amelonado

#### **Seed Rate:**

- 435 seedlings in 1 acre

#### **Planting Time:**

- Can be planted all year round but best planting time is Mid-September to December

#### **Spacing:**

- 3m x 3m

#### **Cropping System:**

- While cocoa trees are often intercropped with coconuts, in this instance, cocoa is grown as a monocrop.

#### **Weed Control/Management:**

- Ring Weeding
- Pruning

#### **Disease Control/Management**

*Black Pod:* Spray with Kocide at 53g/16L of Water every 2 weeks.

*Canker:* Remove and destroy diseased plants

*Sanitation:* Remove disease parts away from the Cocoa field, burn and bury.

#### **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

#### **Number of Years to Harvesting:**

- In the development budget, cocoa pods are first harvested in Year 3.

#### **Harvest Yield/Food Value:**

*Yield:* 1.0 ton/acre wet Beans

Or

0.8 ton/acre Dry Beans

*Harvest:*

Cocoa pods are first harvested in year 4

*Food Value:*

Source of Thiamin, Niacin and Vitamin B12

## Enterprise Budget for Cocoa Samoa

### GROSS MARGIN FOR COCOA SAMOA

Varieties: Trinitario (Samoan Cocoa), Criollo, Amelonado

ASSUMPTIONS-ONE PRODUCTION CYCLE				
(A) Average number of plants:	435			
(B) Area (Acres):	1			
Plant Spacing (meters):	3 X 3			
Growth Period (months):	36			
Estimate No. of cocoa pods harvest per tree :	40	17400		
No. of cocoa pods per basket:	15			
No. of cocoa pods per basket (sold):	1,160			
(C) No. of working hours per day:	8			
INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Cocoa Pods	1,160	bags @	\$30.00	\$34,800
(D) Total Income				\$34,800
DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting Materials	435	seedlings @	\$1.00	\$435
<b>Selling Costs</b>				
Transport to market	7	trips	\$15	\$105.00
Hire of market stall	7	days	\$10	\$70.00
<b>Labour</b>				
Hired Labour	6	days@	\$24.00	\$144.00
(E)TOTAL DIRECTS COST:				\$754.00
(F) GROSS MARGIN (\$) (D-E)				\$34,046.00
Gross Margin per family labour input (F/H)				\$895.95
Gross Margin per plant (F/A)				\$78.27
Gross Margin per acre (F/B)				\$34,046.00

**LABOUR INPUTS (DAYS)**

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Weeding		4	4
Pruning	2	6	8
Removing black pods	2	6	
Harvesting		4	
Pod breaking	2	6	
Drying		3	
Packaging		4	
Transporting to market		3	
Marketing		2	
<b>TOTAL LABOUR REQUIREMENT - DAYS</b>	<b>6</b>	<b>38</b>	<b>44</b>
Average Wage Rate (\$/day)(I)			\$24.00
<b>(J) Total cost of hired labour (I*G)</b>			<b>\$144.00</b>
<b>(K) Total cost of family Labour(I*H)</b>			<b>\$912.00</b>
Total labour requirement - (days)			33
<b>GROSS MARGIN - including labour cost(F-K)</b>			<b>\$33,134.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of Plants)	Price (\$/bundle)		
	\$10.00	\$15.00	\$20.00
2000	\$19,246.00	\$29,246.00	\$39,246.00
2500	\$24,246.00	\$36,746.00	\$49,246.00
3000	\$29,246.00	\$44,246.00	\$59,246.00

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

## 5.4. Coconut – *Cocosnucifer*



### Recommended Varieties:

- Samoan Tall Coconut-copra
- Hibrids

### 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

### Spacing:

- 9m x 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.

### Weed Control:

Ring Weeding, spray with Glyphosphate between plants @ 100ml/15L of Water or Paraquat at 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

*For older plants:* Remove and destroy diseased plants.

### Insect Control/Management:

#### 1. Rhinoceros Beetle

Rhinoceros beetle controlled by biological control methods, using virus, fungus and pheromone traps, also good field sanitation is necessary

### 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 Yields:

- Tall Samoan Coconut 5-7 years to bear nuts
- Hybrid 4-5 years to bear nuts

### Food Value:

Vitamin C, Vitamin B1, B2 and Iron

**Enterprise Budget for Coconut Samoa(10 YEAR OLD TREE)**

GROSS MARGIN FOR COCOA SAMOA

Varieties: Samoan Tall Coconut-copra, Hybrids

**ASSUMPTIONS-ONE PRODUCTION CYCLE**

(A) Average number of plants:	50	
(B) Area (Acres):	1	
Plant Spacing (meters):	9 X 9	
Average Growth Period (years)	60	
Average Age of trees (years)	10	
Estimate No. of coconuts harvest per tree :	40	2000
No. of cocoa pods per basket:	10	
No. of coconut sold per basket:	200	
(C) No. of working hours per day:	8	

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Coconuts	200	basket @	\$5.00	\$1,000
<b>(D) Total Income</b>				<b>\$1,000</b>
<b>DIRECT COSTS (\$)</b>	<b>QUANTITY</b>	<b>UNIT</b>	<b>UNIT COST</b>	<b>TOTAL</b>
Planting Materials	50	seedlings @	\$1.00	\$50
<b>Selling Costs</b>				
Transport to market	7	trips	\$15	\$105.00
Hire of market stall	7	days	\$10	\$70.00
<b>(E) Total Direct Cost:</b>				<b>\$225.00</b>

<b>(F) GROSS MARGIN (\$) (D-E)</b>	<b>\$775.00</b>
Gross Margin per family labour input (F/H)	\$43.06
Gross Margin per plant (F/A)	\$15.50
Gross Margin per acre (F/B)	\$775.00

**LABOUR INPUTS (DAYS)**

TASK	(G) HIRED LABOUR	(H) FAMILY LABOUR	TOTAL DAYS
Weeding	2	4	6
Collecting nuts		4	4
Dehusking		2	
Marketing		8	
<b>TOTAL LABOUR REQUIREMENT - DAYS</b>	<b>2</b>	<b>18</b>	<b>20</b>
Average Wage Rate (\$/day)(I)			\$24.00
(J) Total cost of hired labour (I*G)			\$48.00
(K) Total cost of family Labour(I*H)			\$432.00
Total labour requirement - (days)			20
<b>GROSS MARGIN - including labour cost(F-K)</b>			<b>\$343.00</b>

**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

Yield (no. of Plants)	Price (\$/bundle)		
	\$10.00	\$15.00	\$20.00
2000	\$19,775.00	\$29,775.00	\$39,775.00
2500	\$24,775.00	\$37,275.00	\$49,775.00
3000	\$29,775.00	\$44,775.00	\$59,775.00

**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*

### Enterprise Background for Papaya

This development budget represents a one acre fully commercial banana enterprise (Hawaiian Variety), growing 1000 papaya plants, over 9 – 14 months period.

#### Recommended Varieties:

- Sunrise
- Waimanalo
- Local Samoa

#### Seed Rate:

- 1,000 seedlings in 1 acre

#### Planting Time:

- Can be planted all year round but best planting time is November to March.

#### Spacing:

Between Rows: 2m

Plants within Rows: 2m

#### Weed Control/Management:

- Ring Weeding between the plants during early stages of growth, Spray with Glyphosphate between plants @ 150-200ml/15L of Water.

#### Disease Control/Management

*Anthracnose*: Attacks ripe fruits, sunken brown spots that enlarge and results in rot as fruits ripen.

*Phytophthora stem and fruit rot*: Apply Mancozeb at 50g/15L water to prevent fungal infections or Sundomil @ 50g/15L of water on the ground around the root area.

*Black Leaf Spot*: Apply Mancozeb 50g/15L of water.

#### 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.

#### Harvest Yield:

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. Maximum yield of 28 tonnes can be achieved through minimizing post-harvest loss.

#### Food Value:

Excellent Source of Vitamin A & Vitamin C



# Enterprise Budget for Hawaiian Papaya Variety

GROSS MARGIN FOR PAPAYA SAMOA

Varieties: Sunrise, Waimanalo, Local Samoa

ASSUMPTIONS-ONE PRODUCTION CYCLE				
(A) Average number of plants:	1,000			
(B) Area (Acres):	1			
Plant Spacing (meters):	2 x 2			
Growth Period (months):	9 to 14			
Estimate No. of Papaya fruit harvest	2500			
No. of papaya per basket(pile):	10			
No. of papaya per basket(piles sold):	250			
(C) No. of working hours per day:	8			
INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Papaya	250	piles@	\$10.00	\$2,500
(D) Total Income				\$2,500
DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Planting Materials	1,000	seedlings @	\$1.00	\$1,000
Land preparations				
Sting	1	litres @	\$30.00	\$30
Crops Husbandry				
Fertiliser				
NPK (12:5:20)	1	litres @	\$80.00	\$80.00
Selling Costs				
Transport to market	4	trips	\$30	\$120.00
Hire of market stall	4	days	\$10	\$40.00
Labour				
Hired Labour	4	days@	\$24.00	\$96.00
(E) TOTAL DIRECTS COST:				\$1,366.00
(F) GROSS MARGIN (\$) (D-E)				\$1,134.00
Gross Margin per family labour input (F/H)				\$113.40
Gross Margin per plant (F/A)				\$1.13
Gross Margin per acre (F/B)				\$1,134.00

**LABOUR INPUTS (DAYS)**

<b>TASK</b>	<b>(G) HIRED LABOUR</b>	<b>(H) FAMILY LABOUR</b>	<b>TOTAL DAYS</b>
Land preparation - spraying & slashing	4		4
planting		3	3
fertilising		2	2
harvesting and packing		2	2
marketing		3	3
<b>Total labour requirement - Days</b>	<b>4</b>	<b>10</b>	<b>14</b>
Average Wage Rate (\$/day)(I)			\$24.00
<b>(J) Total cost of hired labour (I*G)</b>			\$96.00
<b>(K) Total cost of family Labour(I*H)</b>			\$240.00
Total labour requirement - (days)			33
<b>GROSS MARGIN - including labour cost(F-K)</b>			\$894.00

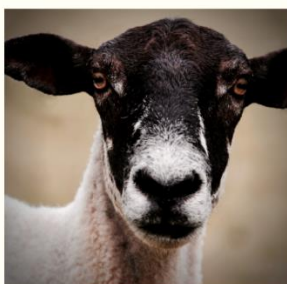
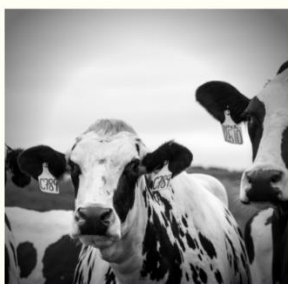
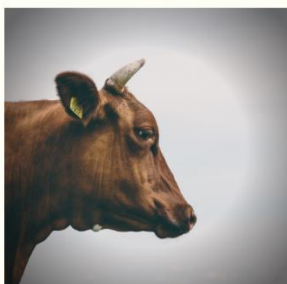
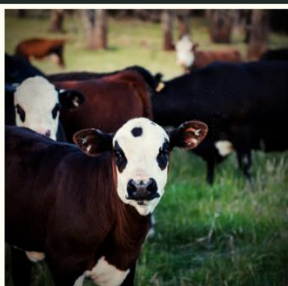
**SENSITIVITY ANALYSIS - EXCLUDING COST OF FAMILY LABOUR**

<b>Yield (no. of Plants)</b>	<b>Price (\$/bundle)</b>		
	<b>\$10.00</b>	<b>\$15.00</b>	<b>\$20.00</b>
200	\$634.00	\$1,634.00	\$2,634.00
250	\$1,134.00	\$2,384.00	\$3,634.00
300	\$1,634.00	\$3,134.00	\$4,634.00

**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. ENTERPRISE BUDGETS FOR 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 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 calf 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 livestock unit<sup>2</sup> (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.

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<sup>2</sup> 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.

### ***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.

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<sup>3</sup> @ \$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 \$75.00 per 20kg block.

### ***Animal husbandry:***

Muster Package offered by MAF for Animal husbandry is \$100. This cost includes castration, drenching and tagging but drench and tags are provided by the farmer.

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 neighbours and MAF-Animal Production and Health Division.

Weedicide is purchased for weed control (1 x 5 litre bottle Roundup /per 5 acres @ \$250.00).

### ***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.

### **d) Labour**

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

Hired labor is used for the following tasks.

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

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<sup>3</sup> Dressing percentage: 50 per cent.

- Pasture improvement: 5  
men x 5 days (Years 1-10)

Hired labourers are paid \$24.00 per day.

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
- 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:*

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 calvings. Bulls are first joined at 16-24 months of age and are retained for five years.

\$5,000

###### *Stocking rate:*

The stocking rate is one <sup>\$200</sup>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 (250 kgs dressed weight<sup>4</sup> @ \$8.50/kg).
- Cull cows (9+years old): - \$1,000 per head (Average 220kg carcass weight at \$5/kg retailing).
- Cull bulls (7 years old): retail butchers - \$1,400 per head (300 kgs 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 \$75.00 per 20kg block.

### ***Animal husbandry:***

Muster package offered by MAF: (\$100 which includes castration, drenching and tagging but drench and tags are provided by the farmer).

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 neighbours and MAF-Animal Production and Health Division.

Weedicide is purchased for weed control (1 x 5 litre bottle Roundup/per 5 acres @ \$250.00).

### ***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.

### **d) Labor**

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

Hired labour is 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: 5 men x 5 days (Years 1-10)

Hired labourers are paid \$24.00 per day.

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

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<sup>4</sup> Dressing percentage: 50 per cent.



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

**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):  
\$1,10000/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=1Acre

### 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
<b>(C) Total Income (\$)</b>				<b>\$10,000.00</b>

COSTs(\$)	Quantity	Unit	Unit Price	Total
<b>supplementary Feed</b>				
Salt mineral blocks	1	blocks	\$50.00	\$50.00
<b>Animal Husbandry</b>				
Animal health(.g. drench)	10	head	\$5.00	\$50.00
Ear Tags	10	tag	\$2.00	\$20.00
<b>Pasture Improvement</b>				
Sting	1	5ltr	\$150.00	\$150.00
<b>Transport</b>				
Retail butcher	3	trips	\$20.00	\$60.00
<b>Labour</b>				
Hired labour	6	mandays	\$24.00	\$144.00

**(D) Total Costs** \$474.00

**(E) GROSS MARGIN(C-D)** \$9,526.00

Gross Margin/Breeding Cow(E/A)	\$476.30
Gross Margin/Family Labour Day(E/G)	\$84.68
Gross Margin/Acre(E/B)	\$190.52

### Labour Inputs (Days)

Task	(F) Hired Labour	(G) Family Labour	Total
Pasture Improvement	15		15
Beef enterprise operation		100	100
slaughtering		7.5	7.5
Transport to market		5	5
<b>Total labour - Days</b>	<b>15</b>	<b>112.5</b>	<b>127.5</b>
<b>(H) Average Wage Rate (\$/day)(I)</b>			<b>\$24.00</b>
<b>(I) Total cost of hired labour</b>			<b>\$360.00</b>
<b>(J) Total cost of family Labour(H*G)</b>			<b>\$2,700.00</b>
Total labour requirement - (days)			112.5
<b>GROSS MARGIN - including family labour cost(E-J)</b>			<b>\$6,826.00</b>

### SENSITIVITY ANALYSIS - Retail Market(excluding cost of family labour)

No. of Head Sold	Price Change		
	\$800.00	\$1,000.00	\$1,200.00
steer 3years old			
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 - Faalavelave Market (excluding 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 are no supplementary feeding or animal husbandry costs associated with the chicken enterprise.

#### d) Labour

This is a one-manlabour 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 metres of plastic wrap (250 metres per 500 birds @ \$0.75 per metre). 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. Hou rs	No. Day s
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 metres chicken wire @ \$300/50m roll  
\$1,500
- Timber fence posts (from on-farm materials) No cost
- Housing:  
\$10,000 for 2 houses, one for brooding and the other for fattening/growing.

## 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
<b>Transport</b>				
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)				\$24.55
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			
<b>GROSS MARGIN - including family labour cost(E-J)</b>				<b>\$228.00</b>

### SENSITIVITY ANALYSIS - (excluding 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<sup>5</sup>.

#### 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

##### *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 \$5.50/dozen.

Chicken manure is collected and sold as fertiliser 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.

<sup>5</sup> Moulting is when chickens lose older feathers and grow new ones. Chickens generally stop producing eggs until the moult is completed.



### **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 metres of plastic wrap (\$0.75 per metre).

#### ***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** 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 leads to Sows being removed includes 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 practised.

1. Determine the farrowing interval and number of farrowings per year.

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

Number of farrowings 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  
 $365/56 = 6.5$  farrowings per pen. A 10 Sow Herd with an average of 2.2 farrowings per Sow and Year requires  $(10 \times 2.2)/6.5 = 4$  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  $365/119 = 3.1$  farrowings per year. With a total of 20 farrowings 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, 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  $(10 \times 1.9 \times 0.2 \times 1.3 \times 277)/365 = 4$  Places

Number of Sows = 10

Number of piglets = 22 (i.e.  $2.2 \times 10 = 22.2$  piglets/sow/year)

Liveweight	Minimum Total Space Required	
(Kg)	Area (m <sup>2</sup> )	Area (ft <sup>2</sup> )
<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

$$=56 \times \$0.28 = \$15.70$$

Size 2 piglet retail price = \$9.90/kg plus head

Avge dressed wt = 21kg

$$\text{Retail price} = 21 \times \$9.90 = \$208.00$$

Or live sales @ \$16/kg LW

$$30\text{kgLW} \times \$16 = \$480.00/\text{weaner}$$

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'alavelaveare 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 labor 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 labor 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
<b>(A) Total Income</b>			<b>\$7,000.00</b>

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>(B) Total Costs</b>	<b>\$440.00</b>
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**\*\* This Variable Costs reflects only 10 Sows**

<b>TOTAL GROSS MARGIN (A -B)</b>	<b>\$6,560.00</b>
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## 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 - Faalavelave 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.



**GROSS MARGIN BUDGET - Growers**

GROSS MARGIN BUDGET - GROWERS					
Income:		Quantity		Unit Price	Total
No. growers available for sale		10		\$150.00	\$1,500.00
(A) Total Income					\$1,500.00
VARIABLE COSTS:			Unit Price	Quantity	Total
Labour	day	@	\$24.00	5	\$120.00
Transport	day	@	\$30.00	1	\$30.00
(B) Total Variable Cost					\$150.00
TOTAL GROSS MARGIN (A - B)					\$1,350.00

**SENSITIVITY ANALYSIS**

No. of growers Sold	Price Change		
	\$140.00	\$150.00	\$160.00
5	\$550.00	\$600.00	\$650.00
10	\$1,250.00	\$1,350.00	\$1,450.00
15	\$1,950.00	\$2,100.00	\$2,250.00

**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 - Faalavelave Market (excluding cost of family labour)**

No. of growers sold	Price Change		
	\$120.00	\$130.00	\$150.00
5	\$450.00	\$500.00	\$600.00
10	\$1,050.00	\$1,150.00	\$1,350.00
15	\$1,650.00	\$1,800.00	\$2,100.00

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

**(C)FEED TABLE per Pig**

Class of Pig	Feed per pig(kg)	No. of pigs	Costs (\$)	Total Cost (\$)
(a)Sows	40kg	10	\$80.00	\$800.00
(b)Boars	40kg	1	\$80.00	\$80.00
(c)Growers	40kg	177	\$90.00	\$15,930.00
(d)Suckers	10kg	184	\$10.00	\$1,840.00
<b>Total feed cost</b>				<b>\$18,650.00</b>

This table of feeds is just a guide to farmers who are willing to purchase feeds for their Pig Farm and its available at Ah Liki Farm

**\*\* NOTE\*\*** Normal practice: Farmers are advised to plant cassava, ta'amu and other crops for feedings. Some have also collect food waste from restaurants.

## 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% (e.g. for every 10 ewes joined, 12 lambs will be born). It is assumed that for each lambing, approximately 50 per cent of lambs born are male and 50 per cent are female.

##### *Mortality rate:*

For lambs aged 0-6 months, the mortality rate is 10 per cent (i.e. 2 lambs 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 unit<sup>6</sup> (LSU) 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.



Fig: 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.

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<sup>6</sup> Livestock units are used to estimate the carrying capacity and stocking rate of grazing land, by recognizing that sheep of different age/size classes have varied nutritional requirements. To calculate livestock unit equivalents, the following weightings are used: Ewe- 1, Ram - 1.5, Wether-0.8, lamb-0.5. In Samoa, the stocking rate recommended by MoA-Animal and Plant Health Divisions is 5 LSU/acre for improved pastures and 5 LSU/2 acres for unimproved pastures.

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 determine the viability of keeping the animal or be 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 liveweight - avgwt 22kg, and Ewe Hoggets = \$6.60/kg lwt - 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.



*Fig: Fiji fantastic sheep*

### **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, clostridial diseases, respiratory syndromes and footrot.

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 neighbours 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):

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

<b>Production Assumptions</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>
(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
<hr/>								
<b>INCOME (\$)</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>
<b>Livestock Sales</b>								
Culled Stock      \$220.00    per head	0	\$660.00	1,320	2,420	6,148	8,480	12,508	18,656
<b>© Total Income (\$)</b>	<b>\$0</b>	<b>\$660</b>	<b>\$1,320</b>	<b>\$2,420</b>	<b>\$6,148</b>	<b>\$8,480.00</b>	<b>\$12,508.00</b>	<b>\$18,656.00</b>

<b>COSTS (\$)</b>	<b>Days</b>		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Year 7</b>	<b>Year 8</b>
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
<b>(D) Total Costs</b>			<b>\$432.00</b>	<b>\$452.00</b>	<b>\$1,680.00</b>	<b>\$542.00</b>	<b>\$682.00</b>	<b>\$814.00</b>	<b>\$982.00</b>	<b>\$1,254.00</b>
<b>€ GROSS MARGIN (C-D)</b>			<b>-\$432.00</b>	<b>\$208.00</b>	<b>-\$280.60</b>	<b>\$1,878.00</b>	<b>\$5,466.00</b>	<b>\$7,666.00</b>	<b>\$11,526.00</b>	<b>\$17,402.00</b>

**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. ENTERPRISE BUDGETS FOR AQUACULTURE



## 7.1. Sea Grapes

### Enterprise Background for Sea Grapes

The following budgets represent the scenario for fully commercial sea grape enterprises:

- Gross margin budget for one site (one 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 m<sup>2</sup>
- Amount of sea grapes per cage:  
10kg
- No. of trays per site: 6 trays
- Mortality rate:  
5%
- No. of sea grapes sold:  
342 bundles

#### b) Income

##### *Harvestable/Saleable Yield:*

Approximately 342 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 urchins ranges from \$8.00 - \$15.00 per sea urchin. The average price is \$10.00 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 \$3.30/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

(*Halimeda capiosa*). *Halimeda capiosa* 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 urchin 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 3 hrs. This cost is associated with capital and is hence, only included in the development 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  
\$800.00
  - 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	(6weeks)
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	342	
(B) Number of trays	6	
(C) No. hours per working day	8	

Feed seawee from lagoon(Halimedacapiosa.)

INCOME (\$)	QUANTITY	UNIT	UNIT PRICE	TOTAL
Sea Grapes	342	bundles	\$10.00	\$3,420
<b>(D) Total Income</b>				<b>\$3,420</b>
DIRECT COSTS (\$)	QUANTITY	UNIT	UNIT COST	TOTAL
Sea Grapes	60	biomass	\$3.30	\$198.00
<b>E) Total Variable Costs</b>				<b>\$198.00</b>
<b>(F) GROSS MARGIN (D-E)</b>				<b>\$3,222.00</b>
<b>(G) Gross Margin/Sea grapes (F/A)</b>				<b>\$134.25</b>
<b>(H) Gross Margin/Cage (F/B)</b>				<b>\$537.00</b>

Family Labour Inputs (Hours)	No. of Hours
Feeding	120
Harvesting	50
<b>(J) Total Family Labour Hours</b>	<b>170</b>
(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
<b>(N) Gross Margin - incl. cost of family labour (F-L)</b>	<b>\$2,712.00</b>

**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/m<sup>2</sup>
- Pond dimensions: 20m x 20m x 1.5m
- Pond area: 400 m<sup>2</sup>
- 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.

**c) 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 respectively<sup>7</sup>. 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.

**d) 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.

<sup>7</sup> Cost estimates of feed formulation are taken from a preliminary manual compiled by Ministry of Agriculture – Fisheries (Aquaculture) under the Tilapia Reproduction and Culture Development Project, 'Nutritional Requirements and Formula Feeds – Feeding Technique Manual', February 2005. At the time of compilation of these budgets, the above-mentioned manual was yet to be reviewed.

### e) 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

## DEVELOPMENT BUDGET FOR TILAPIA- (2 CYCLES PER YEAR)

### 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
<b>(C) Total Income</b>	<b>\$5,730.00</b>	<b>\$5,730.00</b>	<b>\$5,730.00</b>	<b>\$5,730.00</b>	<b>\$5,730.00</b>
<b>DIRECT COSTS(\$)</b>					
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
<b>(D) Total Direct Costs</b>	<b>110</b>	<b>110</b>	<b>2330</b>	<b>2330</b>	<b>2330</b>
<b>(E) Gross Margin (\$ (C-D))</b>	<b>\$5,620.00</b>	<b>\$5,620.00</b>	<b>\$3,400.00</b>	<b>\$3,400.00</b>	<b>\$3,400.00</b>

Fixed cost	Year 1	Year 2	Year 3	Year 4	Year 5
Pond Constructions (30hrs contract labour @ \$150/hr)	\$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
<b>(F) Total Fixed costs</b>	<b>\$8,908.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>
(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
<b>Family Labour Inputs (Hours)</b>					
<b>Task</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
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
<b>(H) Total Family Labour Hours</b>	<b>292</b>	<b>284</b>	<b>284</b>	<b>284</b>	<b>284</b>
(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.

## APPENDIX 1: UNITS AND CONVERSION TABLE

### Standard Weights and Measures (Imperial and Metric)

A	B	To Convert A to B	To Convert B to A
		Multiply By	Divide By
Ounces	Grams	28.35	28.35
Pounds	Kilograms	0.454	0.454
Ton	Metric tonne	1.02	1.02
Acre	Hectares	2.47	2.47
Feet	Meters	0.305	0.305

### Average Unit Weights of Agricultural Produce at Local Market

Product	Unit	Weigh/No.
Taro	1 taro	0.85kg
	Basket/pile	6.8kg
	Ave. no in basket/pile	8
Banana	Bunch	9.2kg
Taro Palagi	1 taro palagi	0.496
	Basket/pile	12.4kg
	Ave. no in basket/pile	25
Taamu	1 taamu	6.8kg
Coconut	1 coconut	1.7kg
	Basket/pile	17.0kg
	Ave. no in basket/pile	10
Breadfruit	basket	11.4kg
Yam	Basket/pile	5.8kg
Head Cabbage	1 head cabbage	0.8kg
Chinese Cabbage	Bundle	0.6kg
	Ave. no per bundle	3
Cucumber	Ave. per packet	1.8kg
	Ave. no per bundle	4
Pumpkin	Small pumpkin	1.6kg
	Medium pumpkin	2.2kg
	Large pumpkin	3.2kg

Source: Samoa Bureau of Statistics 2020



## APPENDIX 2: FARM INPUT PRICES

### Farming Input Price Collection – June 2020

	Farm Input Supplier #1		Farm Input Supplier #2		Farm Input Supplier #3	
	<i>Agriculture Store</i>		<i>Farming Supplies Ltd.</i>		<i>Bluebird L&amp;H</i>	
Product	Price	Unit	Price	Unit	Price	Unit
<b>Weed and Pest control</b>						
Agralin	\$100.00	5L	-	-	-	-
Conqueror	\$35.00	200ml	-	-	-	-
Cusol (copper solution)	\$45.00	1L	-	-	-	-
Gramoxone	\$190.00	5L	-	-	-	-
Match	\$125.00	500ml	-	-	-	-
Misting oil spray	\$125.00	5L	-	-	-	-
Orthene	\$6.00	60g	-	-	-	-
Round up	\$200.00	5L	\$31.00	1L	-	-
Slug out	\$300.00	10kg	-	-	-	-
Sting	\$150.00	5L	-	-	-	-
Talon	\$600.00	10kg	\$665.00	10kg	-	-
Tilt	\$180.00	1L	-	-	-	-
<b>Fertilizer</b>						
Hydrogreen 12:5:18:8	\$100.00	20kg	-	-	-	-
NPK 12:5:20	\$80.00	20kg	-	-	-	-
NPK 14:5:15	\$80.00	20kg	-	-	-	-
NPK 12:8:16	-	-	\$115.00	20kg	-	-
NPK 15:3:20	-	-	\$125.00	20kg	-	-
Urea	\$80.00	20kg	\$65.00	20kg	-	-
<b>Seeds</b>						
Bean contender	\$15.00	pkt	-	-	-	-
Beans snake	\$15.00	pkt	-	-	-	-
Broccoli	\$10.00	pkt	-	-	-	-
Capsicum	\$10.00	pkt	-	-	-	-
Carrot	-	-	-	-	\$8.64	pkt
Chinese cabbage	\$10.00	pkt	\$30.00	pkt	-	-
Coriander	\$10.00	pkt	-	-	-	-
Cucumber	\$10.00	pkt	-	-	\$6.00	pkt
Dwarf bean	\$10.00	pkt	-	-	\$4.80	pkt
Head cabbage	\$10.00	pkt	-	-	-	-
Lettuce	\$10.00	pkt	-	-	-	-
Onion	\$10.00	pkt	-	-	-	-
Pumpkin	\$10.00	pkt	-	-	-	-
Sweet corn	\$10.00	pkt	-	-	-	-
Tomatoes	\$15.00	pkt	-	-	\$6.00	pkt
<b>Watermelon</b>	<b>\$10.00</b>	<b>pkt</b>	-	-	-	-
<b>Animal Feed</b>						
Molasses	-	-	-	-	-	-

Chicken feed (starter feed)	-	-	-	-	-	-
Chicken feed (grower feed)	-	-	-	-	-	-
Chicken feed (layer feed)	-	-	-	-	-	-
Mineral salt blocks	-	-	-	-	-	-
<b><i>Fencing equipment</i></b>						
Barbed wire	\$320.00	400m roll	-	-	\$160.00	500m
Chicken wire	\$150.00	50m roll	-	-	\$160.00	30m
Staples	\$240.00	25kg	-	-	\$192.00	25kg

## APPENDIX 3: MARKET PRICES

### Samoa Monthly Local Market Survey – 2019

Weighted Average Price (\$SAT/Pound)

Commodity	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Taro	2.95	2.43	2.07	2.09	2.58	2.62	2.87	3.03	2.82	2.42	2.56	2.65
Banana	1.10	0.93	1.06	0.96	1.28	1.30	1.38	1.34	1.19	1.24	1.1	1.06
Ta'amu	6.37	6.00	6.43	5.45	7.33	6.65	7.12	6.41	5.2	5.92	5.83	8.25
Coconut	1.21	0.95	0.92	1.00	1.00	0.97	0.94	0.97	1.09	1.07	1.04	1.06
Breadfruit	1.16	1.05	1.32	1.99	2.27	1.47	1.49	1.36	1.33	1.33	1.39	1.81
Yam	6.84	4.67	4.66	5.37	4.24	4.30	4.13	4.62	4.62	4.74	4.44	4.84
Head Cabbage	11.32	8.88	11.89	8.47	13.12	8.92	8.27	8.93	6.77	6.87	5.48	5.84
Tomatoes	14.36	21.37	22.39	19.93	19.02	19.62	17.94	17.01	12.38	10.66	9.63	11.5
Chinese Cabbage	8.19	8.84	9.26	9.02	8.23	7.39	6.72	6.28	4.97	4.73	6.2	5.37
Cucumber	4.27	4.52	5.62	5.46	4.96	4.43	5.11	5.00	4.43	4.15	3.75	3.68
Pumpkin	2.96	2.87	3.79	4.04	3.92	3.55	3.60	4.21	3.19	3.06	3.01	3.1

Source: Samoa Bureau of Statistic, 2019

## APPENDIX 4: LIST OF COMMODITIES

### Commodity Names & Recommended Plant Spacing/Stock Rate/Stocking Density

Common Name (English)	Vernacular Name (Samoan)	Recommended Plant Spacing
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	2m x 2m
Capsicum	Pepa	0.4m x 0.3m
Chinese Cabbage	Kapisi Saina	0.1m x 0.1m
Cucumber	Kukama	0.5 x 0.6m
Eggplant	Isaraelu	0.6 x 0.7m
Head Cabbage	Kapisi Lapotopoto	0.45m x 0.55m
Lettuce	Kapisi Taumafamata	0.15m x 0.15m
Long Bean	Pi Sosolo	0.4 x 0.5m
Tomato	Tamato	0.4 x 0.3m
Banana	Fa'i	2m x 2m
Citrus	Tipolo	3m x 6m
Cocoa	Koko	3m x 3m
Coconut	Niu	9m x 9m
Papaya	Esi	2m x 1m
<b>LIVESTOCK</b>		<b>Recommended Stock Rate</b>
Beef Cattle	Povi	1 cattle/acre
Chicken	Moa	
Piggery	Pua'a	12-14 sows/acre
Sheep	Mamoe	5 sheep/acre
<b>FISHERIES</b>		<b>Recommended Stocking Density</b>
Sea Grapes	Limu fuafua	24/m2
Tilapia	Tilapia	5/m2